GUIDELINES FOR ORTHODONTICS

Version 1

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:

- General Dentist Practitioners to have a reference with information regarding the type of patient that should be referred to a Consultant/Specialist Orthodontist for orthodontic treatment.
- Assisting orthodontists to provide orthodontic treatment with optimum dentofacial function, health, stability and aesthetics.
- Enhancing functional efficiency, structural balance and aesthetic harmony of the dental arches.
- Starting interceptive treatment of Palatally Displaced Canine (PDC) at the right time to reduce the canine impaction in the future.
- Standardizing management of first permanent molars with poor prognosis.
- Assisting facilitate successful implementation of Orthodontic Miniscrews.
- Orthodontists to achieve good facial aesthetics, dental aesthetics, functional occlusion, periodontal health and stability after the orthodontic treatment.

DEFINITIONS

Balancing extraction: is the removal of a contralateral tooth, which is not necessarily a FPM, to preserve the dental midline.

Compensating extraction: is the extraction of an antagonistic molar to prevent its overeruption. Overeruption of upper FPM can prevent mesial migration of the mandibular second permanent molar.

Miniscrews is often referred to Temporary Anchorage Device (TAD) which titanium alloy American Society of Testing and Materials (ASTM) Grade 5 or stainless steel surgical bone screws that is temporarily fixed to the bone for the purpose of enhancing orthodontic anchorage either by supporting the teeth of the reactive unit (indirect anchorage) or by obviating the need for the reactive unit altogether (direct anchorage) which subsequently removed after use. Their attachment to bone is mechanical with no intent to encourage or establish any form of Osseo integration. Ideally, they should be placed in areas with adequate cortical bone with head of the screw in attached alveolar mucosa. Once they have served their purpose they are removed.

Orthodontic Anchorage is resistance to unwanted tooth movement. During orthodontic treatments, different techniques can be devised and used to reinforce anchorage. Traditional biomechanical techniques, such as the use of extra-oral anchorage by headgear or intra-oral, one by bars, palatal/lingual arches or intermaxillary elastics, cannot effectively control anchorage, either due to lack of patient compliance or due to inaccuracies in the support structures.

Orthodontics: is a the specialty area of dentistry concerned with the supervision, guidance and correction of the growing or mature dentofacial structures, including those conditions that require movement of teeth or correction of malrelationships and malformations of their related structures and the adjustment of relationships between and among teeth and facial bones by the application of forces and/or the stimulation and redirection of functional forces within the craniofacial complex.

Palatally Displaced Canine: is a developmental dislocation to a palatal site often resulting in tooth impaction requiring surgical and orthodontic treatments.

Primary Stability refers to the mechanical stability in the bone immediately after miniscrew insertion. It is a requirement for healing, constituting one of the most important factors for the success rate of miniscrews. Primary stability is a function of the miniscrew diameter, the miniscrew length, the number, and design of threads, the cortical thickness, and the cortical bone density.

Referral: is a process in which a health worker at a one level of the health system, having insufficient resources (drugs, equipment, skills) to manage a clinical condition, seeks the assistance of a better or differently resourced facility at the same or higher level to assist in, or take over the management of, the client's case. Key reasons for deciding to refer either an emergency or routine case include:

- To seek additional or different services for the client
- To seek admission and management of the client
- To seek expert opinion regarding the client

- To seek use of diagnostic and therapeutic tools.

Success of miniscrew is defined as a miniscrew with minimal mobility and inflammation and their ability to obtain full functional correction either through direct or indirect anchorage.

ABBREVIATIONS

ASTM	:	American Society of Testing and Materials
CBCT	:	Cone Beam Computed Tomography
CT	:	Computerized Tomography
DHA	:	Dubai Health Authority
DHIC	:	Dubai Health Insurance Corporation
DMF	:	Dento Maxillofacial
FPM	:	First Permanent Molar
HPSD	:	Health Policy and Standards Department
HRS	:	Health Regulation Sector
MRI	:	Magnetic Resonance Imaging
OPG	:	Orthopantomogram
PDC	:	Palatally Displaced Canines
PHCSS	:	Primary Healthcare Services Sector
RME	:	Rapid Maxillary expansion
TMJ	:	Temporomandibular Joint

A. GUIDELINES FOR GENERAL DENTAL PRACTITIONER TO REFER PATIENTS TO AN ORTHODONTIST

1. BACKGROUND

Orthodontic treatment is often complex care and there may well be several stages to plan the treatment before it begins. This treatment may last over two (2) years and require appointments every 5–6 weeks.

Appropriate referrals are an integral part of complete quality healthcare management. Referrals should be based on the education, training, interest and experience of the referred Consultant/Specialist Orthodontist and the unique needs of the patient. General Dental Practitioners are expected to recognize the extent of the treatment needs of their patients and when referrals are necessary. The early diagnosis and referral of orthodontic cases is imperative for providing the best care to patients.

2. SCOPE

2.1. To provide recommendations for the reference of a patient by a Dental General Practitioner to a Consultant/Specialist Orthodontist for orthodontic treatment.

3. PURPOSE

3.1. To ensure the use of equitable and appropriate available resources.

3.2. To aid General Dental Practitioners determine whether an orthodontic referral is warranted and who best to refer to for a specific problem.

3.3. To avoid making inappropriate referrals.

4. APPLICABILITY

4.1. DHA licensed General Dental Practitioners.

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

5.1. Orthodontic diagnosis deals with recognition of the various characteristics of the malocclusion.

5.2. Orthodontic diagnosis should be based on scientific knowledge combined at times with clinical experience.

5.3. Diagnosis include case history, clinical examination and other diagnostic aids such as radiographs.

6. **RECOMMENDATION TWO:** CLINICAL STEPS

6.1. The general dental practitioner should include appropriate details in the letter of referral including the patient main chief complaint, the medical history, the clinical findings and diagnosis.

6.2. The majority of orthodontic treatment could commence in the late mixed and early permanent dentition.

6.3. Earlier referral is needed in certain circumstances. However, for the majority of patients, this is the appropriate time to refer for an orthodontic assessment.

6.4. If patients are referred too early for treatment, they could be referred back to the referring general dental practitioner to monitor the dental development and then re-referred at the appropriate time.

6.5. Patients should not be referred early in an attempt to circumvent long waiting lists, as this is unfair on the patients, already on a waiting list, who were referred at the appropriate time.

6.6. The patient should not be referred to multiple providers, as this will result in inappropriate referrals, creation of artificial waiting lists and confusion for the patient.

6.7. Patients referred for orthodontic assessment would be expected to have a well-maintained dentition with no active or untreated decay and with a high standard of oral hygiene and with good attendance record.

6.8. Patients who are reluctant for treatment will present a poor prospect for success.

6.9. It is ideal for the patient to be keen about undergoing the orthodontic treatment rather than forcing it on them.

7. **RECOMMENDATION THREE:** SPECIAL CONSIDERATION

7.1. Patients who have inadequate oral hygiene or significant sweet intake in their diet render themselves unsuitable for active appliance treatment.

7.2. If such a patient is referred for advice, it should be explained to them that treatment would not be available until the above issues are addressed.

8. **RECOMMENDATION FOUR:** CONCLUSION

8.1. Appropriate orthodontic referral can allow more efficient and effective use of valuable resources, as well as maximize patient benefit.

B. GUIDELINES FOR PRE-ORTHODONTIC TREATMENT

1. BACKGROUND

Orthodontic problems, which can result from genetic and environmental factors, must be diagnosed before treatment begins. Proper diagnosis involves taking photographs, x-rays, and dental impressions, which enables the orthodontist to make informative decisions about the form of treatment necessary.

2. SCOPE

2.1. Development of diagnostic database and formulation of a problem list from the database for adequate treatment planning.

3. PURPOSE

3.1. To evaluate and document the oral health, jaw functional, facial proportions and smile characteristics.

3.2. To decide which diagnosis records are required

3.3. To formulate a treatment plan that deals with the problems in a way that creates maximum benefits to the patient.

4. APPLICABILITY

4.1. DHA licensed Consultant Orthodontists.

4.2. DHA licensed Specialist Orthodontists.

5. RECOMMENDATION ONE: DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS

5.1. After collecting data from clinical examination and analysis of the diagnostic records, the problem list is formed from which the diagnosis could be derived.

6. **RECOMMENDATION TWO:** CLINICAL ASSESSMENT PREORTHODONTIC TREATMENT

6.1. It is essential that full examination of skeletal form; soft tissue relationships and occlusal features are performed prior to undertaking treatment. It is sensible to carry out the assessment in a logical order so that none of the steps are missed. A simple assessment should include the following:

6.1.1. Patient's chief complaint

6.1.2. Medical history

6.1.3. Dental history

6.1.4. Clinical examination

6.1.5. Diagnostic Records: Radiographs, photos, and study models.

7. **RECOMMENDATION THREE:** CLINICAL STEPS FOR PREORTHODONTIC TREATMENT

7.1. Patient's Chief Complaint: should be recorded in the same words as described by the patients or parents.

7.2. Medical History

7.2.1. Prior to the initiation of treatment, a medical history shall be completed to evaluate the medical risks of dental treatment and to ensure documentation of all aspects of systemic health that may influence dental treatment.

7.2.2. The medical history questionnaire should be reviewed with the patient and must be completed in the patient's dental records.

7.2.3. The medical history should be commensurate with the proposed treatment, and it should be updated at regular intervals.

7.2.4. In the presence of a significant medical condition, the parents should provide the orthodontist with a detailed medical report, especially in cases where it might affect or limit the orthodontic treatment

7.2.5. All medical conditions should be accurately understood before any treatment is planned and this may involve seeking guidance from the patient's physician.

7.2.6. Medical alerts should be placed in a conspicuous place on the patient chart or folder.

7.2.7. The medical history must be checked at every subsequent visit and recorded in the patient's record. Any changes MUST BE documented in the patient notes and details entered.

7.3. Dental History:

7.3.1. Appropriate dental history should be taken prior to orthodontic treatment.

7.3.2. The dental history includes bad habits (thumb sucking, pacifier), trauma, and bruxism. If any habits were present, further information should be taken from the parents as at what age it was discontinued.

7.4. Clinical Examination:

7.4.1. A comprehensive examination should include the following with all the findings recorded in the examination record:

7.4.2. Extra oral examination: To assess maxillofacial structures in vertical, horizontal and sagittal relationships and to evaluate the facial proportions, form, asymmetry, soft tissues harmony and perioral musculature to determine the deviation from normal relationships and to assess the relation between the facial structures and the dentition.

7.4.3. Intraoral examination: To assess the hard and soft tissues (periodontium) of the oral cavity, type of malocclusion, crowding, arch form, asymmetry, and midline. The first important aspect to evaluate before initiating orthodontic treatment is the periodontal health where it will affect the long-term treatment and outcome.

7.4.4. Temporomandibular Joint (TMJ) and Functional analysis: To assess the different functions of the facial structures including breathing, swallowing, TMJ, Path of closure of the mandible and speech. The breathing pattern of the patient is essential in diagnosis where mouth breathing plays an important role in aetiology of malocclusions, as well as the swallowing pattern. Patients who present with TMJ pain seeking an orthodontic solution to correct the problems should be treated with caution. It should be clearly understood by the patient that orthodontic treatment would not solve any TMJ problems.

7.5. Diagnostic Record:

7.5.1. Diagnostic records vary from one patient to another according to the nature of the condition. They must be sufficient to identify the patient's

problem and allow the development of treatment plan. Pre-treatment diagnostic records include the following:

7.5.2. Radiographs:

a. Orthopantomogram (OPG): To obtain a broad view of the jaws, teeth, sinuses, nasal area, and temporomandibular (jaw) joints. In addition to impacted teeth, bone abnormalities, dental anomalies, bone pathology and fractures.

b. Lateral Cephalometric radiograph: These images allow the orthodontist to evaluate the 2-dimensional position of teeth in the profile view. Additionally skeletal and jaw relationships, tooth relationships, lip and nose relationships, chin relationships, spine analysis, and to identify skeletal anomalies.

c. Anteroposterior Cephalometric radiograph: It is mostly needed for skeletal asymmetry assessment

d. Intraoral radiographs: Taking intraoral x-rays, like periapical or bitewings prior to starting orthodontic treatment, would clear any uncertainties about the presence of caries or periodontal or periapical lesions.

8. **RECOMMENDATION FOUR:** BASIC PRINCIPLES ON THE USE OF CONE BEAM COMPUTED TOMOGRAPHY (CBCT)

8.1. CBCT examinations must not be carried out unless a history and clinical examination have been preformed

8.2. CBCT examinations must be justified for each patient to demonstrate outweigh the risks

8.3. CBCT examinations should potentially add new information to aid the patients management

8.4. CBCT should not be repeated 'routinely' on a patient without a new risk/benefit assessment having been performed

8.5. When accepting referrals from other dentists for CBCT examinations, the referring dentist must supply sufficient clinical information (results of a history and examination) to allow the CBCT Practitioner to perform the Justification process

8.6. CBCT should only be used when the question for which imaging is required cannot be answered adequately by lower dose conventional (traditional) radiography

8.7. CBCT images must undergo a thorough clinical evaluation ('radiological report') of the entire image dataset

8.8. Where it is likely that evaluation of soft tissues will be required as part of the patient's radiological assessment, the appropriate imaging should be conventional medical computerized tomography (CT) or Magnetic Resonance Imaging (MRI), rather than CBCT

8.9. CBCT equipment should offer a choice of volume sizes and examinations must use the smallest that is compatible with the clinical situation if this provides less radiation dose to the patient

8.10. Where CBCT equipment offers a choice of resolution, the resolution compatible with adequate diagnosis and the lowest achievable dose should be used

8.11. A quality assurance program must be established and implemented for each CBCT facility, including equipment, techniques and quality control procedures

8.12. Aids to accurate positioning (light beam markers) must always be used

8.13. All new installations of CBCT equipment should undergo a critical examination and detailed acceptance tests before use to ensure that radiation protection for staff, members of the public and patient are optimal

8.14. CBCT equipment should undergo regular routine tests to ensure that radiation protection, for both practice/facility users and patients, has not significantly deteriorated

8.15. For staff protection from CBCT equipment, the guidelines detailed in Section 6 of the European Commission document 'Radiation Protection 136. European Guidelines on Radiation Protection in Dental Radiology' should be followed

8.16. All those involved with CBCT must have received adequate theoretical and practical training for the purpose of radiological practices and relevant competence in radiation protection

8.17. Continuing education and training after qualification are required, particularly when new CBCT equipment or techniques are adopted

8.18. Dentists responsible for CBCT facilities who have not previously received 'adequate theoretical and practical training' should undergo a period of additional theoretical and practical training that has been validated by an

academic institution (University or equivalent). Where national specialist qualifications in DMFR exist, the design and delivery of CBCT training programs should involve a DMF Radiologist

8.19. For dento-alveolar CBCT images of the teeth, their supporting structures, the mandible and the maxilla up to the floor of the nose (e.g. 8cm x 8cm or smaller fields of view), clinical evaluation ('radiological report') should be made by a specially trained DMF Radiologist or, where this is impracticable, an adequately trained general dental practitioner

8.20. For non-dento-alveolar small fields of view (e.g. temporal bone) and all craniofacial CBCT images (fields of view extending beyond the teeth, their supporting structures, the mandible, including the TMJ, and the maxilla up to the floor of the nose), clinical evaluation ('radiological report') should be made by a specially trained Dento Maxillofacial (DMF) Radiologist or by a Clinical Radiologist (Medical Radiologist).

9. RECOMMENDATION FIVE: LIMITING FACTORS AFFECTING ORTHODONTIC TREATMENT

9.1. Severity of the malocclusion

9.2. Anatomic variation

9.3. Abnormal skeletal morphology or growth pattern

9.4. Persistent of bad oral habits or muscle parafunctions relating to the dento-facial structures such as thumb sucking tongue thrusting, bruxism etc.

9.5. Abnormal size, shape or number of teeth (e.g. idiopathic root resorptions, missing or supernumerary teeth)

9.6. Compromised periodontal disease. (E.g. recessions, bone loss. Periodontal pocket)

9.7. Aberrant tooth eruption patterns (e. g. transpositions of teeth)

9.8. Medical problems due to systemic conditions

9.9. Patient's failure to continue or complete treatment

9.10. Lack of cooperation or compliance of the patient such as unwillingness of ware of appliances, keeping appointments and bad oral hygiene

9.11. Poor quality integration of other recommended dental and/or medical services (i.e., fillings, restorations, scale, polish, ENT check-up etc.)

9.12. Patient discontinuing the treatment or transferring to another orthodontist during orthodontic treatment.

9.13. Patient transferring from another orthodontist where previous treatment plan or appliances limit the quality of outcome.

9.14. Incomplete correction of the cases or relapse of case after orthognathic surgical procedures.

9.15. The limiting factors above should be well documented in the patient's file before the treatment starts and the patient or parents should be informed about them.

10. **RECOMMENDATION SIX:** CONCLUSION

10.1. Resorption presents with a range of aetiologies and prognoses. A thorough understanding of the pathology is essential to allow appropriate treatment planning.

10.2. Timely intervention is essential for optimum management. Practitioners must be aware of when to intervene and have the confidence to do so. Delays in treatment via late diagnoses and referral waiting times may be catastrophic. The outcome for treatment may be uncertain and patients should always be well informed of this.

11. **RECOMMENDATION SEVEN:** RECOMMENDATIONS

11.1. The following categories of patient/orthodontic treatment would normally be expected to be commenced or continued as soon as possible, Priority 1 on the priority index- this includes:

11.1.1. Exposure and traction of impacted teeth

11.1.2. Growth modification

11.1.3. Traumatized incisor

11.1.4. Multidisciplinary cases- e.g. cleft lip and palate.

11.1.5. Transfer cases, (already in treatment by orthodontist in DHA in case the orthodontist left the department)

C. GUIDELINES FOR ORTHODONTIC TREATMENT

1. BACKGROUND

1.1. Orthodontic treatment is required for the correction of abnormal growth of jaws, abnormal development of teeth and prevention of conditions which would affect the normal growth.

2. SCOPE

2.1. To improve patient's life by enhancing functional efficiency, structural balance and aesthetic harmony.

2.2. Standardized Orthodontic management.

3. PURPOSE

3.1. To eliminate functional problems

3.2. To encourage the eruption and alignment of displaced or impacted teeth

3.3. To enhance patient experience by removal of any trauma from occlusion

3.4. To improve facial and dental aesthetics

4. APPLICABILITY

4.1. All DHA licensed Orthodontists and dental healthcare professionals engaged in orthodontic treatments.

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

5.1. After collecting data from clinical examination and analysis of the diagnostic records, the problem list is formed from which the diagnosis could be derived.

6. **RECOMMENDATION TWO:** COMUNICATION WITH THE ORTHODONTIC PATIENTS

6.1. Communicate with the patient in a professional manner and a simple language to ensure understanding.

6.2. Share with the patient or his/her guardian reasons for selecting a particular course of action.

6.3. Provide enough information to ensure that the patient or his/her guardian understand the nature, consequences and any substantial risks of the treatment proposed so that they are able to make an informed decision.

6.4. Since most of Orthodontic treatment is carried out on children it is advisable for a parent/guardian to be present at the discussion when consent is sought.

6.5. Where there are language problems, it is important that an interpreter be sought.

6.6. Written informed consent should be obtained for any orthodontic treatment the purpose which is to ensure the patient/guardian understand the proposed treatment; its benefits, risks, complications and expected treatment outcomes.

6.7. Written informed consent should be maintained in the patients' health records. Refer to the DHA guidelines for Informed Consent on the website www.dha.gov.ae.

6.8. Consent given for one procedure or episode of treatment does not give the orthodontist the automatic right to undertake any other procedure.

6.9. Patient must be informed and consent form must be signed if any changes are made regarding the treatment plan or treatment procedures.

6.10. Inform the patient/guardian a realistic time estimate for the treatment and retention phases of orthodontic therapy and also the frequency of visits during active treatment and retention. If more time is required to complete therapy, it should be made clear to the patient/guardian so that they can plan accordingly.

7. **RECOMMENDATION THREE:** USE OF CLINICAL LABORATORIES

7.1. All work sent to the laboratory should have a proper laboratory sheet completed with the patient's details and date of the next appointment. The laboratory sheet should have clinician name written clearly and the entry for the request should be signed.

7.2. The design of the appliance requested to be fabricated must be drawn clearly in the laboratory sheet to facilitate the communication with the technician.

7.3. The appointment dates should conform to the dates available with the laboratory.

7.4. Ensure that all works sent to the laboratories is decontaminated. To adhere to hospital health and safety regulations. The work should be washed thoroughly to remove blood and debris and then soaked in the disinfectant.

7.5. Allow sufficient time for the laboratory to finish the appliance i.e. At least four weeks

8. **RECOMMENDATION FOUR:** PATIENT CONFIDENTIALITY POLICY/PROTOCOL

8.1. The relationship between orthodontist and patient is based on the understanding that any personal information revealed by the patient to the dentist will not be divulged without the patient's consent.

8.2. The patients' health records should be aligned with the DHA guidelines for Managing health records which can be found on the DHA website www.dha.gov.ae, which could include the following:

8.2.1. The patient's name, current and previous addresses, telephone number and other means of personal identification such as his/her physical description.

8.2.2. The patient's study models, photographs and radiographs.

8.2.3. Information that the individual is or has been a patient of the clinic or attended, cancelled or failed to attend an appointment on a certain day.

8.2.4. Information concerning the patient's physical, mental or oral health or condition.

8.2.5. Information about treatment that is currently being provided, that has been provided or is planned for in the future.

8.2.6. Information about family members and personal circumstances supplied either by the patient or by others.

8.2.7. The amount that was paid for treatment and the amount owing.

8.3. Confidentiality

8.3.1. Information should not be disclosed to third parties without the consent of the patient except in certain specific circumstances.

8.3.2. Circumstances in which an orthodontist may decide to disclose information to a third party are as follows:

a. Where the patient has given consent to the disclosure.

b. Where disclosure is necessary for the purpose of enabling someone else to provide health care to the patient and the patient has consented to this sharing of information.

c. Where disclosure is required by statute or is ordered by a court of law, a solicitor or dentist to pursue a bona-fide legal claim against a patient.

8.4. Practical Rules for Everyday Practice

The principles of confidentiality give rise to a number of rules that all orthodontists and staff in the department must observe:

8.4.1. Records must be kept secure and in a location where it is not possible for other patients or individuals to read them.

8.4.2. Identifiable information about patients should not be discussed with anyone outside of the clinic including relatives or friends.

8.4.3. A school should not be given information about whether a child attended for an appointment on a particular day. It should be suggested that the child is asked to obtain the orthodontist's signature on a letter of attendance.

8.4.4. When talking to a patient on the telephone or in person in a public area care should be taken that sensitive information is not overheard by other patients.

8.4.5. Do not provide information about a patient's appointment record to a patient's employer.

8.4.6. Messages about a patient's care should not be left with third parties or left on answering machines. A message to call back is all that can be left.

8.4.7. Disclosure of appointment books, record cards or other information should not be made to police officers unless the orthodontist instructs otherwise.

8.4.8. Patients should not be able to see information contained in appointment books, day sheets or on computer screens.

8.4.9. Discussions about patients should not take place in public areas.

9. **RECOMMENDATION FIVE:** DISCOUNTINUING ORTHODONTIC TREATMENT

9.1. Commonly patients discontinue their treatment. To minimize the occurrence ensure that patients and parents fully understand the options, aims, implications and likely duration of treatment at the outset. This should form part of the informed consent process.

9.2. The roots of some patients' teeth become shorter (resorption) during orthodontic treatment. It is not known exactly what causes root resorption, nor is it possible to predict which patients will experience it. However, many

patients have retained teeth throughout life with severely shortened roots. If resorption is detected during orthodontic treatment, you may recommend a pause in treatment or the removal of the appliances prior to the completion of orthodontic treatment.

9.3. Treatment will be discontinued if there is a lack of patient co-operation, including poor oral hygiene, failed appointments, lack or wear time of appliances or elastics and where to continue the treatment would unfavourably affect the dental health of the patient. Prior to the discontinuance of treatment, the patient or parent will be thoroughly informed of the reasons and hopefully will agree to improve their compliance so making discontinuance unnecessary.

9.4. In the event that either party wishes to terminate the services because of dissatisfaction with the service, failure to keep up with the appointments, patient moving out of the area, or because of lack of cooperation of the patient, then one party shall so notify the other to that effect. Any request to anything other than that advised by the dentist automatically releases him/her from any further responsibility, and a request to discontinue orthodontic care will be signed by the patient and his/her parents.

D. GUIDELINES FOR INTERCEPTIVE TREATMENT OF PARTIALLY DISPLACED CANINES

1. BACKGROUND

Permanent canines are the second most commonly impacted teeth after third molars, and almost 1%-3% of the population has been found to have impacted maxillary canines. In 85% of cases with impaction, maxillary canines are palatally displaced. Diagnosis and treatment of Palatally Displaced Canine (PDC) are a challenge that requires coordination of care by several healthcare provider e.g. General Dentists, Orthodontists, Pediatric Dentists, Oral Surgeons and Periodontists.

The prevalence of PDCs vary from 0.9% to 2.8% depending on the patient's ethnic group, gender, definition and the diagnostic methods used. PDCs occur also twice as frequently in females than in males and unilateral displacement is more common than bilateral. In Caucasian population, maxillary canine displacement is five (5) times more common than in an Asian population. Buccal displacement is more common among Asians.

The management of the impacted canine is often complex and requires good team work. It is important that these clinicians communicate with each other to provide the patient with an optimal treatment plan based on scientific rationale.

2. SCOPE

2.1. Provide recommendations to assist dental healthcare professionals (General Dentists, Orthodontists, Pediatric Dentists, Oral Surgeons and Periodontists) in the timely detection and management of the palatally displaced maxillary canine.

2.2. Standardized management of interceptive treatment of impacted palatally displaced maxillary canine.

3. PURPOSE

3.1. To ensure provision of appropriate care for the patients based on the best available scientific evidence.

3.2. To reduce inappropriate variation in practice.

3.3. To reduce cost of treatment, duration of treatment and promote efficient use of resources.

3.4. To provide a more rational basis for referral.

3.5. To highlight shortcomings of existing literature and suggest appropriate future research.

4. APPLICABILITY

4.1. DHA licensed General Dentists,

4.2. DHA Licensed Consultant and Specialist Orthodontists, Pediatric Dentists, Oral Surgeons and Periodontists.

5. RECOMMENDATION ONE: DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS

5.1. Three diagnostic procedures can be used to evaluate whether a maxillary canine is erupting palatally or not. These methods are as follows:

5.2. Inspection

5.3. Various clinical signs can be observed, such as:

5.3.1. Delayed eruption of permanent successors

5.3.2. Persisting deciduous canine

5.3.3. Asymmetry in the exfoliation and eruption between the right and the left side in the maxilla

5.3.4. Absence of labial bulge

5.3.5. Presence of a palatal bulge

5.3.6. Position of lateral incisor.

5.4. Palpation

5.4.1. Labial bulge is normally palpable about 1 to 1.5 years before the maxillary canine emerges (absence of the bulge at age of 10 indicates that the canine might be displaced).

5.4.2. Non-significant mobility of the deciduous canine beyond the age of 13 years strongly indicates displacement of permanent canine.

5.5. Radiographs

5.5.1. Intraoral occlusal used to determine the buccolingual position of the displaced tooth and its relation to the midline.

5.5.2. Two periapical views known as the buccal object rule or Clark's Rule

5.5.3. Extraoral techniques includes panoramic, lateral cephalometric radiograph and cone beam computed tomography.

6. **RECOMMENDATION TWO:** TREATMENT OPTIONS FOR IMPACTED CANINES

6.1. There are various treatment modalities for palatally impacted canine. Patient and parent counselling on the various treatment options are essential.

6.2. Treatment options are as follows:

6.2.1. Interceptive treatment by extraction of deciduous canine

6.2.2. Surgical exposure and fixed appliance

6.2.3. Surgical removal of impacted canines

6.2.4. Auto transplantation of the impacted canine

6.2.5. No active treatment, long term monitoring.

7. **RECOMMENDATION THREE:** POINTS TO BE CONSIDERED DURING TREATMENT PLANNING

7.1. The age of the patient.

7.2. Available space.

7.3. Resorption of the lateral incisor.

7.4. The position of the canine crown and root.

7.5. The shape of the canine crown.

7.6. Does the patient and the parent request treatment.

8. **RECOMMENDATION FOUR:** IDEAL TIMING FOR DECIDUOUS CANINE EXTRACTION

8.1. Extraction of the deciduous canine results in significant more successful spontaneous eruption of the PDC in younger patients (10-11 years) than in older (12-14 years).

8.2. Interceptive treatment should therefore be performed around the age of (10-11).

8.3. There is a poor correlation between dental and chronological age, it is important to consider the overall stage of dental development of the child.

9. **RECOMMENDATION FIVE:** CLINICAL STEPS FOR INTERCEPTIVE TREATMENT OF PDC BY EXTRACTION OF DECIDUOUS CANINE

9.1. Prevention of ectopic eruption of canine by this simple means will reduce the treatment complexity involved with impacted canine, the treatment time and cost. Complications like resorption of lateral incisor root usually associated with a more mesially position ectopic canine and occurring frequently at age of twelve (12) years, can also be prevented.

9.2. Cut off points that helps to detect if interceptive extraction is necessary:

9.2.1. Canine cusp-midline.

9.2.2. Canine cusp tip-dental arch plane.

9.2.3. Mesio-angular angle.

9.2.4. Age of patient (younger patients 10-11 have more successful eruption compared to 11-12 years old).

9.3. Permanent canine erupts more often in younger patients with smaller mesio-angular angle, shorter distance of the canine cusp tip-dental arch plane and greater distance of the canine cusp tip-midline.

9.4. Cut- off point for the depth of impaction i.e. canine cusp tip- dental arch plane revealed that cases with a distance of 2.5 mm, interceptive extraction is not needed since the permanent canine will spontaneously erupt without any intervention.

9.5. Cases with canine cusp tip midline of 6 mm, will not benefit by interceptive extraction and should be surgically exposed.

9.6. Review after extraction of deciduous canine should be done at six (6) monthly intervals with follow up radiographs until the permanent canine erupt. If there is no improvement after one (1) year, other treatment options have to be considered. Canines with an improved position at the twelve (12) months should be followed up with a clinical and radiographic examination, as spontaneous eruption after twelve (12) months is still possible.

10. RECOMMENDATION SIX: ADJUNCT TREATMENT THAT WILL FACILITATE SPONTANEOUS ERUPTION

10.1. Use of Headgear.

10.2. Rapid Maxillary expansion (RME) showed Success rate 65.7% compared to 13.6% in control group.

10.3. RME + Headgear: showed success rate of 85.7% compared to 82.3% success rate in head gear group and 36% in control group.

10.4. Double extraction of C and D showed success rate of 97.3% compared to 78.6% success when only deciduous canine was extracted.

11. RECOMMENDATION SEVEN: SPECIAL CONSIDERATIONS

11.1. Consider Maintenance of the perimeter of the upper arch during observation period with space maintainer.

11.2. Consult the Orthodontist if extraction is of permanent tooth is indicated due to crowded arches.

11.3. Irreversible decisions to extract permanent teeth to allow canine to erupt should be deferred if possible.

12. RECOMMENDATION EIGHT: CONCLUSION

12.1. Extraction of the deciduous canine is an effective treatment in patients with PDCs

12.2. The canine cusp tip-midline has the best discriminatory power as to whether the PDC will spontaneously erupt or not, followed by the canine cusp tip-dental arch plane and the mesio-angular angle.

13. RECOMMENDATION NINE: RECOMMENDATIONS

13.1. Early diagnosis of PDC and extraction of the deciduous canine as an interceptive approach are recommended at an age of (10-13) years old.

13.2. Permanent canines with an improved position at the twelve (12) months control should be followed up with a clinical and if necessary, a radiographic examination, as spontaneous eruption after twelve (12) months is still possible.

13.3. By using the cut-off points as a guideline as to when to extract the deciduous canine or not to extract it, some surgical interventions and unnecessary extractions of the deciduous canine might be avoided.

13.4. For everyday diagnostics and follow up of unerupted permanent canines, conventional periapical radiographs are recommended. Cone beam computed tomography (CBCT) examinations should only be used in more complex cases when root resorption is suspected, or surgical exposure is needed. Seek orthodontic advice if there is any doubt.

E. GUIDELINES FOR MANAGING FIRST PERMANENT MOLARS OF POOR PROGNOSIS

1. BACKGROUND

First Permanent Molar (FPM) is most caries prone tooth in the permanent dentition, more than 50% of children over age of eleven (11) years have some caries experience in their teeth, 6% of children having hypoplastic FPMs in one or more teeth. Eruption of the FPM's occurs around the age of 6-7 years and root formation is complete by the age 9-10 years.

FPMs play key role in the dentition. The FPMs have deep occlusal fissures and if oral hygiene is neglect by the child and his/her parents, they are affected by cariogenic agents more than any other teeth, which results in extensive caries, followed by extensive fillings with recurrent caries in some cases and sometimes, their conditions are such that it causes pulpal involvement or abscess and make the treatment difficult. These conditions cause a poor prognosis for FPM and hence these teeth are prone to extraction.

2. SCOPE

2.1. Standardized management of FPM with poor prognosis.

3. PURPOSE

3.1. To describe appropriate care based on the best available scientific evidence and broad consensus.

3.2. To reduce inappropriate variation in practice.

3.3. To provide a more rational basis for referral.

3.4. To provide a focus for continuing education.

3.5. To promote efficient use of resources.

3.6. To act as focus for quality control, including audit.

3.7. To highlight shortcomings of existing literature and suggest appropriate future research.

4. APPLICABILITY

4.1. All DHA licensed Consultant Orthodontists.

4.2. All DHA licensed Specialist Orthodontists.

5. RECOMMENDATION ONE: DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS

5.1. Diagnosis should be based upon clinical history, clinical examination and radiographic assessment.

6. RECOMMENDATION TWO: IDEAL TIMING FOR FPM EXTRACTION

6.1. In the upper arch it is not critical, unerupted second permanent molar will generally erupt in good occlusal position after extraction of FPM.

6.2. In the lower arch, it is more critical, the outcome is variable and less predictable.

6.3. The ideal time for the extraction of the mandibular FPM is before the eruption of the second permanent molar about age of 8-9 years, however dental age should be taken into consideration. Refer to **Appendix 3**.

6.4. Best spontaneous occlusal results:

6.4.1. Child aged around 8- 9 years.

6.4.2. All permanent teeth are present including third molars.

6.4.3. Class I occlusion; Mild or moderate crowding (less than 3 mm).

6.4.4. Mandibular second molar roots should be half formed.

7. **RECOMMENDATION THREE:** BALANCING AND COMPENSATING EXTRACTIONS

7.1. The practice of balancing and compensating the extraction of FPM aim to preserve occlusal relationships and arch symmetry within developing dentition. In this context:

7.1.1. Compensating means extraction of an antagonistic molar to prevent its overeruption. Overeruption of upper FPM can prevent mesial migration of the mandibular second permanent molar.

7.1.2. Balancing means removal of a contralateral tooth, which is not necessarily a FPM, to preserve the dental midline.

7.2. Extraction of upper FPM does not necessitate the compensatory extraction of lower FPM but, Extraction of lower FPM may necessitate the compensatory extraction of upper FPM.

8. **RECOMMENDATION FOUR:** FACTORS TO CONSIDER WHEN PLANNING EXTRACTIONS OF FPM

8.1. Consider the following factors when planning extraction of FPM:

8.1.1. The restorative state of the tooth; E.g. Extensively carious FPM, Hypoplastic FPM, heavily restored FPM where premolars are perfectly healthy, apical pathosis or endodontically treated FPM.

8.1.2. Dental age of the patient; to achieve spontaneous space closure, the ideal time for extraction of FPMs is before the eruption of the second molars. Timing is more critical in the mandible that in the maxilla.

Delayed extractions result in incomplete space closure and establishment of poor contact point relationships.

8.1.3. Degree of crowding in the buccal and labial segments; the extraction of FMPs cannot be expected to resolve significant crowding in the labial segment spontaneously.

8.1.4. Class I cases with crowding in the presence of crowding in the buccal segments, extract at the optimal time to allow eruption of the second molar into a good occlusal position and this should provide some relief of any premolar crowding.

8.1.5. If the buccal segment crowding is bilateral, consider balancing extraction to provide suitable relief and maintain the centreline.

8.1.6. Any other type of malocclusion e.g. Class III, Class II with crowding seek orthodontic opinion.

8.1.7. In spaced dentitions, little space closure can be expected to occur, and the extraction of FPMs should be avoided.

8.1.8. Restorative methods should be used to retain such teeth within the dental arch. Orthodontic advice should be sought before carrying out any extractions.

8.1.9. The occlusal relationship; as a rule, if in doubt, get the patient out of pain, try to maintain the teeth and refer for an orthodontic opinion **Appendix 4**.

8.1.10. Presence and condition of the other teeth:

a. It is important to conduct a comprehensive clinical and radiographic examination to confirm the presence and condition of the remaining teeth.

b. A panoramic film can determine the presence of any developing third molar teeth.

c. The absence of third molar teeth does not necessarily contraindicate the extraction of compromised FPMs.

d. The decision to remove compromised FPMs when the third molars are not present is very much case-dependent.

9. **RECOMMENDATION FIVE:** CONCLUSION

9.1. Whenever the FPM is extracted or its long-term prognosis is poor, before taking any steps, a full clinical and radiographic evaluation associated with patient's dental models investigation is necessary to determine the following cases: The quality and quantity of dentition, teeth missing, occlusion, buds position, orthodontic problems, the level of parents and patient cooperation for future long-term orthodontic treatment and finally patient's oral hygiene. Based on this information, a decision is taken about the FPM extraction with poor prognosis, either of balancing or compensatory type, especially when future orthodontic treatment is uncertain.

10. **RECOMMENDATION SIX:** ENDORSEMENTS

10.1. Orthodontic advice should be sought before carrying out any extractions.

10.2. If extractions unavoidable–Balance.

10.3. Ensure all teeth are present before extracting.

10.4. Refer to another dentist for a second opinion in case of any doubt.

F. GUIDELINES FOR THE USE OF ORTHODONTIC MINI-SCREWS

1. BACKGROUND

Orthodontic Miniscrews are implantable devices, which provide anchorage to facilitate orthodontic treatment. This guideline describe steps required to perform miniscrew insertion in dental clinics. Orthodontic Miniscrews have become a reliable method in orthodontic practice for providing temporary additional anchorage. These devices are useful to control skeletal anchorage in less compliant patients or in cases where absolute anchorage is necessary.

Traditionally orthodontist have used to teeth, intraoral appliances and extra appliances to control anchorage which means minimizing the movement of certain teeth while completing the desired movement of other teeth. Secure anchorage is a fundamental requirement for successful treatment of many malocclusions. However, there are limitations in the ability to completely control all aspect of tooth movement such as inadequate patient compliance. Miniscrews have revolutionized the field of anchorage in orthodontics. Miniscrews have become a routine anchorage method in orthodontic practice given their high predictability and scientifically proven benefits. The small size of Miniscrews allows them to be place into bone between the teeth, thus expanding their clinical applications.

2. SCOPE

2.1. To provide Orthodontist an overview on Orthodontic Miniscrews, to assist them make informed choices in management of patients to receive orthodontic treatment, in order to achieve successful results.

3. PURPOSE

3.1. To improve the quality and the level of orthodontic treatment provided to the clients.

3.2. To answer specific questions in day-to-day practice.

3.3. To provide an information source for continuing professional education.

4. APPLICABILITY

4.1. DHA licensed Consultant Orthodontists.

4.2. DHA licensed Specialist Orthodontists.

5. RECOMMENDATION ONE: CHARACTERISTICS OF AN IDEAL ANCHORAGE DEVICE

5.1. There are a great number of advantages, which include easy insertion, decreased patient discomfort, immediate loading, reduced diameter, versatility in the forces to be used, ease of cleaning, and ease of removal and its low cost.

5.2. Ideal anchorage devices i.e., miniscrews should have the following characteristics:

5.2.1. Simple to use

5.2.2. Inexpensive

5.2.3. Biocompatible

5.2.4. Immobile

5.2.5. Immediately loadable

5.2.6. Small dimension can withstand orthodontic forces

5.2.7. Provides clinically equivalent or superior results when compared with traditional anchorage systems.

6. RECOMMENDATION TWO: INDICATIONS FOR MINISCREWS IN ORTHODONTICS

6.1. Provision of Anchorage

6.1.1. Moderate to maximum anchorage need.

6.1.2. Mild to moderate anchorage when the anchor unit is limited by inadequate number of anchor teeth e.g. hypodontia or periodontal support.

6.2. Specific tooth movement

6.2.1. En mass retraction

6.2.2. Canine retraction

6.2.3. Biaxillary protrusion

6.2.4. Molar distalisation

6.2.5. Intrusion of anterior and posterior teeth

6.2.6. To provide intra oral intermaxillary fixation if orthognathic surgery.

7. RECOMMENDATION THREE: LIMITATIONS OF MINISCREWS IN ORTHODONTICS

7.1. The limitations of Miniscrews in orthodontics are related to the following:

7.1.1. Poor oral hygiene

7.1.2. Smoking

7.1.3. Local bone pathology

7.1.4. Bleeding disorders

7.1.5. Anti-coagulant treatment

7.1.6. Bone metabolism disorders

7.1.7. Immune compromised

7.1.8. Diabetes mellitus

7.1.9. Local factors like bone amount and local infection.

8. RECOMMENDATION FOUR: CLASSIFICATION OF ORTHODONTIC MINISCREWS

8.1. The orthodontic miniscrew can be classified according to:

8.1.1. Head design: button or bracket incorporating various slots, tunnels, grooves and buttons to aid the attachment of auxiliary appliances such as ligature wires, elastic thread, elastomeric chain and Nickel Titanium coils.

8.1.2. Diameter: range from 1.2 mm to 2.7 mm.

8.1.3. Length: range from 4.0 mm to 12.0 mm.

8.1.4. Body design: tapered or cylindrical.

8.1.5. Trans-mucosal profile: from 0.0 to 3.0 mm.

8.1.6. Insertion technique: either self-tapping or self-drilling.

8.1.7. Thread orientation: left or right drilling insertion.

8.1.8. Alloy used for fabrication: titanium alloy American Society of Testing and Materials (ASTM) Grade 5 or stainless steel.

9. RECOMMENDATION FIVE: PARTS OF ORTHODONTIC MINISCREWS

9.1. A miniscrew usually has three parts: head, neck and body **Appendix 5**.

9.2. The Head

9.2.1. Designed to attach many systems of traction (wires, coils, elastics or other elastomeric devices).

9.2.2. Must be of sufficient dimension to accept and hold any load protocol selected for a particular application

9.2.3. Size of diameter and profile of miniscrew should be considered for patient's comfort and oral hygiene with the small diameter and low profile being the choice.

9.3. The Neck

9.3.1. Designed with an angle to allow insertion into the bone.

9.3.2. It the part that passes through the mucosa and termed Trans-mucosal part. Different neck lengths are available for variable mucosal thickness.

9.3.3. Should be smooth and highly polished to facilitate contact with mucosa and discourage plaque accumulation around the neck aid gingival health and cleaning. Most miniscrew failure starts with peri- miniscrew inflammation at this site.

9.4. The Body

9.4.1. Designed to increase the surface contact with the bone, and therefore increase stability.

9.4.2. Referred to the threaded part of the miniscrew that is embedded into cortical and medullary bone.

9.4.3. Shape of the miniscrew either being tapered or cylindrical had shown to have an effect on its success.

9.4.4. The taper shape miniscrew design had shown greater mechanical retention in the bone.

10. RECOMMENDATION SIX: SITE SELECTION FOR MINISCREW INSERTION

10.1. Bone Density and Thickness

10.1.1. Bone density and thickness are the key indicators for the success of the miniscrew. Essentially, the miniscrew is held in place by its engagement with the bone, so the denser and thicker the bone, the more contact there is between the miniscrew and the bone, resulting in greater stability.

10.1.2. Some studies have suggested that the self-drilling/self-tapping mini-screws generate a closer interaction with the bone than the self-tapping miniscrews, hence their higher success rate.

10.1.3. When inserting the miniscrew the aim is to engage as much of the cortical, bone as possible. This could mean placing the miniscrews at an angle to maximise contact area. Bone density and thickness vary considerably from patient to patient and even from site to site within the same patient, requiring careful assessment when considering miniscrew positioning.

10.1.4. Generally, the site must be an area where there are no significant anatomical structures that can be damaged, such as tooth roots, nerves

and blood vessels. Selection of miniscrew site should be 0.5- 1mm to nearest vital structure.

10.2. Maxilla

10.2.1. Buccal maxillary bone is generally thin and of variable quality whilst palatal bone is more favourable in both thickness and density. The anterior nasal spine and zygomatic buttress are also solid insertion points.

10.2.2. The main nerves and vessels to avoid involve the greater palatine foramen and the incisive papilla. In younger patients, it is also necessary to avoid the mid-palatal suture as the bone may not be fully developed and there is a risk of damaging the nasal septum.

10.3. Mandible

10.3.1. Buccal mandibular bone is usually of sufficient quality for miniscrew placement, although close proximity of the roots means care should be taken.

10.3.2. The ramus and retro molar regions are excellent regions for miniscrew placement since there are no teeth to consider.

10.3.3. The safest interradicular site for miniscrew insertion in the mandible was found to be between the first and second molars, whereas in the maxilla, this site was between the canines and first premolars.

10.3.4. Reviews of the relevant literature have led to spot the best sites for the placement of miniscrews is the following:

a. In maxilla, at a height of 6-9 mm from the crest of the second premolar and first molar (3.6 mm).

b. In mandible, at a height of 9-12 mm between the molars (4.3 mm). **Appendix 6.**

10.4. Soft Tissue

10.4.1. Failure of miniscrews has been associated with the type of soft tissue through which they have been inserted. Miniscrews inserted through attached mucosa have a higher success rate than those placed through movable and thin unattached mucosa.

10.5. Attached Mucosa

10.5.1. Attached Mucosa is the best area for insertion as the soft tissue is tightly bound to the underlying bone and does not twist up along the miniscrew as it is being inserted. Different areas of the mouth have varying thicknesses of attached mucosa, for example, the palatal mucosa. This must be taken into account when selecting the correct length of mini-screw.

10.6. Unattached Mucosa

10.6.1. Although it would be ideal to always place the miniscrews through attached mucosa, this is not always possible so careful preparation of the site may be required. This may involve raising a flap or using a tissue punch, as well as adding an auxiliary wire to the miniscrew that can penetrate through the healed mucosa. Irritation of the unattached

mucosa is common and must be considered in the site selection, particularly if there are frenum interferences.

10.7. Mechanics

10.7.1. The position of the mini-screw must provide some mechanical advantage, taking into account the desired tooth movements and the range of action required. Immediate loading of the miniscrew has been shown to be more successful

11. RECOMMENDATION SEVEN: CLINICAL APPLICATION

11.1. Step 1- Discuss miniscrew placement steps with patient.

11.1.1. Inform and show patient exactly where the miniscrew will be placed.

11.1.2. Discuss the placement procedure and explain the risks, benefits, and alternatives of the insertion and the use of miniscrew during treatment.

11.1.3. Answer any questions or concerns that the patient may have.

11.1.4. Patient or Parent/Guardian should sign an Informed Consent.

11.1.5. Take periapical radiograph to determine interradicular space

11.2. Step 2- Set up tray

11.2.1. Clean and disinfect all clinical contact surfaces, including treatment tray.

11.2.2. Clean hands thoroughly and use surgical gloves.

11.2.3. Keep all containers, instruments, and supplies free from contamination until patient is ready for the procedure. Do not remove sterile miniscrew from container.

11.3. Step 3- Prepare insertion site

11.3.1. Wear gown, facemask, protective eyewear and surgical gloves.

11.3.2. Have patient rinse for 30 seconds with chlorhexidine gluconate mouthwash.

11.3.3. Dry gingival tissue.

11.3.4. Using a sterile cotton swab, apply topical anesthetic.

11.3.5. Apply topical anesthetic no longer than 3 minutes and then rinse off. (Do not wipe)

11.4. Step 4- Place miniscrew

11.4.1. Manufactures guideline should be checked and followed.

11.4.2. Mark insertion point on mucosa with a sharp probe.

11.4.3. Determine mini-screw length and diameter.

11.4.4. Use tissue punch on unattached mucosa if required.

11.4.5. Place pilot, drill hole if required.

11.4.6. Insert miniscrew.

11.4.7. Take periapical radiograph to determine correct position.

11.5. Step 5- Load miniscrew after insertion

11.5.1. Depends on the case and the planned treatment

11.6. Step 6- Provide home care instructions

11.6.1. Instruct patient to rinse with chlorhexidine gluconate mouthwash daily for the first seven days (optional).

11.6.2. Direct patient to brush lightly around the miniscrew during the first week. Patient may brush normally after the first week.

11.6.3. Advise patient to contact the clinic if he/she experiences any swelling, persistent pain, or other discomfort.

11.7. Step 7- Clean up area

11.7.1. Transport contaminated instruments and supplies in a closed container to the sterilization area.

11.7.2. Dispose of consumable products and follow appropriate cleaning and sterilization instructions for each instrument.

12. RECOMMENDATION EIGHT: MINISCREW REMOVAL PROTOCOL

12.1. Removal of the miniscrew is done without anesthesia and twisting in the opposite direction to that used in the insertion. Therefore, it is recommended to note the type of orthodontic miniscrew thread used (right or left) to prevent fracture during removal.

13. RECOMMENDATION NINE: COMPLICATIONS

13.1. Possible complications after miniscrew insertion are as follows:

13.1.1. Inflammation of the soft tissue around the miniscrew, which will lead to difficulty inserting the elastic chain because of soft tissue covering the head of the miniscrew.

13.1.2. Fracture.

13.1.3. Loss of stability, loss of miniscrew and iatrogenic damage of the bone. Important factor to prevent miniscrew failure is control of compressive

stress in the soft tissue during miniscrew insertion. The miniscrew platform may rest above the gingival tissue without penetrating it. The correct choice of the trans-mucosal profile ensures that the miniscrew head will not penetrate the alveolar bone. Miniscrew with large diameter and tapered shape can induce excessive compression of the cortical bone with higher insertion torque. This can cause micro damage to the cortical bone in the form of cracks and possible fracture. The accumulation of minor damage can produce local ischemia, bone necrosis, bone remodelling, and premature loss of the miniscrew.

14. RECOMMENDATION TEN: FAILURES RELATED TO MINISCREWS

14.1. Most of screw failure occurs in a week after the implantation. Many factors are proposed for the relation with screw failure. This can be divided into:

14.1.1. Host factors, age, smoking, oral hygiene control, implant site, keratinized tissue, cortical bone thickness and bone density.

14.1.2. Technical factors: screw diameter, screw length, screw body design (tapered/cylindrical/threaded, insertion method (self-drilling vs self-tapping), insertion torque, insertion angle, treatment period, amount of loading, direction of loading and micro fracture of alveolar bone.

G. GUIDELINES FOR POST-ORTHODONTIC TREATMENT

1. BACKGROUND

Assessment of the outcomes of orthodontic treatment depends on the treatment objectives set during treatment planning, patient's age, the stage of dentofacial growth and development and the treatment provided.

Limiting factors mentioned above must also be considered when evaluating treatment outcomes. The effects of orthodontic treatment should be evaluated retrospectively by comparing the results with the pre-treatment condition.

2. SCOPE

2.1. To achieve good facial aesthetics, dental aesthetics, functional occlusion, periodontal health and stability after the orthodontic treatment.

3. PURPOSE

3.1. Improving the functioning of the orofacial apparatus.

3.2. Achieve stable orthodontic treatment by maintaining a balance between these three tissue systems.

3.3. Improving the aesthetics of the individual.

4. APPLICABILITY

4.1. All DHA licensed Orthodontists and dental healthcare professionals engaged in orthodontic treatments.

5. **RECOMMENDATION ONE:** POST TREATMENT RECORDS

5.1. Extra oral and intraoral photos

5.2. Intraoral, panoramic, and/or cephalometric radiographs.

5.3. Dental casts

6. **RECOMMENDATION TWO:** SPECIAL CONSIDERATION

6.1. Retention plan of a particular patient depends on the patient's original condition, treatment objectives, the results achieved, and/or any limiting factors.

6.2. Completion of orthodontic treatment does not ensure the stability of the outcome. A number of factors such as; growth, maturation, aging, lack of compliance with the retention protocol, periodontal problems, persistence of oral habits, post treatment trauma, must be taken into consideration

7. **RECOMMENDATION THREE:** MAINTAINING PATIENT DENTAL HEALTH RECORDS

7.1. Ensure that the Dental Health Records are aligned with the DHA Guidelines for managing health records and Federal Law No. (2) for the year 2019, on the use of Information and Communications Technology (ICT) in healthcare, which is on the DHA website www.dha.gov.ae .

7.2. Protecting health information is extremely important for many reasons:

7.2.1. Patient's care: Patient records document the course of treatment and may provide data that can be used to evaluate the quality of care that is provided to the patient.

7.2.2. Communication: Records provide a mean of communication between the treating dentist and any other doctor who will care for that patient. Complete and accurate dental records contain enough information to

allow another provider who has no prior knowledge of the patient to know the patient's dental experience in the clinic.

7.2.3. Legal aspect: The dental records also protect the legal interests of all parties, it can be used in defence of allegations of malpractice, it can provide information to appropriate legal authorities (e.g. identification of a dead or missing person)

7.2.4. Research/Audit: Patient's dental record may provide material for continuing education, research, administrative oversight, quality assurance.

7.3. The principles for manual records also apply to electronic records.

7.4. Staffs are accountable for entries made and all electronic health records must be uniquely identifiable ensuring it is clear who updates each record. A shared identification code is not acceptable. As with manual records, staff must maintain the security of electronic records.

7.5. Electronic health records have to potential to be altered; alteration of original electronic records must be avoided.

7.6. Protocols should be in place and referred to in order to clarify access, ensure security and ensure confidentiality.

7.7. Electronic health records should clearly show the date and time of the record entry and identify the member of staff making the record entry in the absence of a signature.

7.8. There must also be a system to ensure the original information can still be accessed when additions or alterations are made.

8. RECOMMENDATION FOUR: RECORD RETENTION

8.1. For retention of the Dental Health Records refer to the DHA Guidelines for managing health records and Federal Law No. (2) of 2019 on Information and Communications Technology (ICT) in the Health field, which is on the DHA website https://www.dha.gov.ae.

8.2. Paper based Dental records and associated relevant material for e.g. casts and x-rays should be retained for ten (10) years for both UAE nationals and expatriate patients after the most recent patient visit/admission to the health facility. Such records may then be entered into an Image Processing System. Decision to maintain original records beyond this period is subject to the health facility management's decision and legal advice.

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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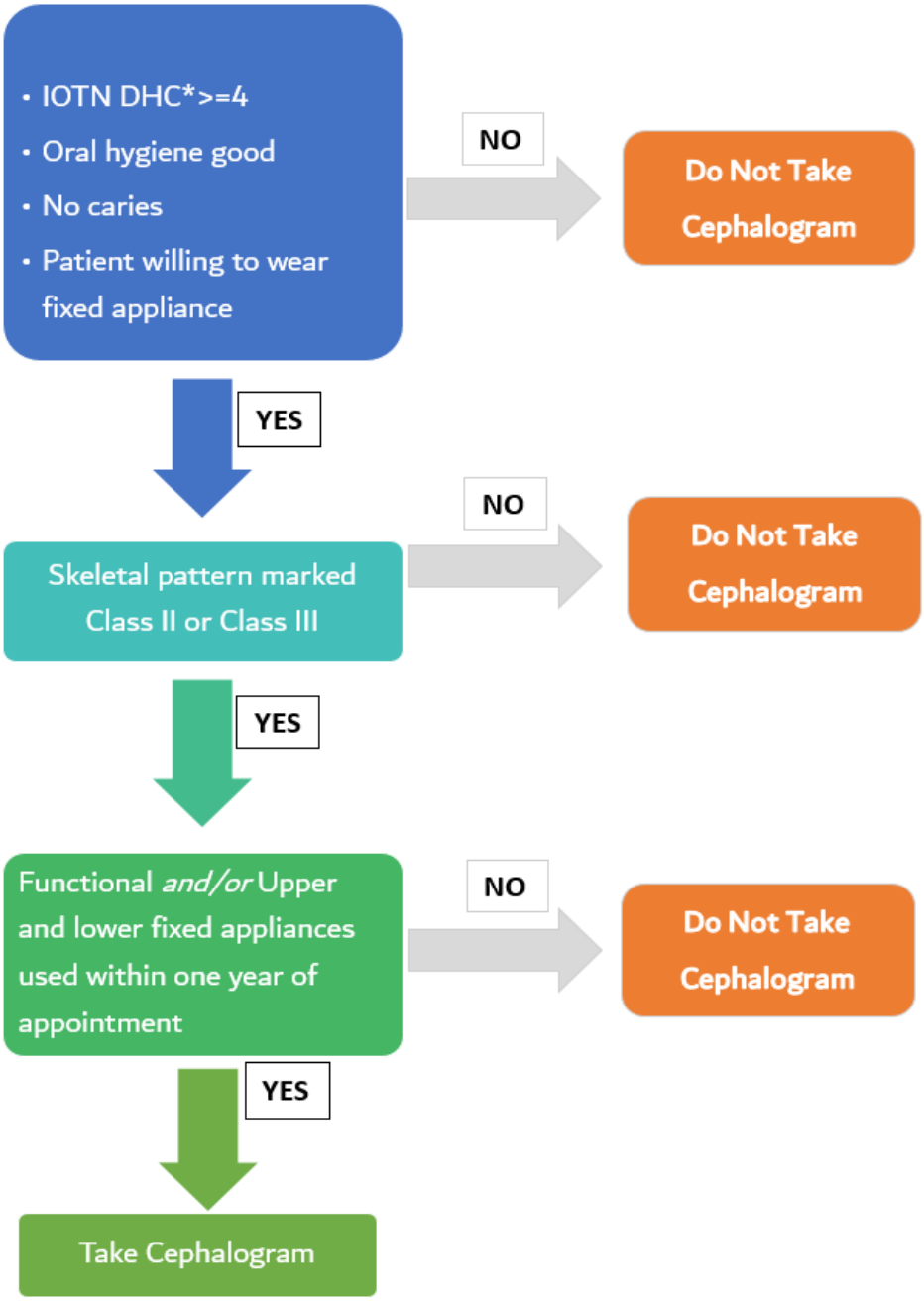
APPENDICIES

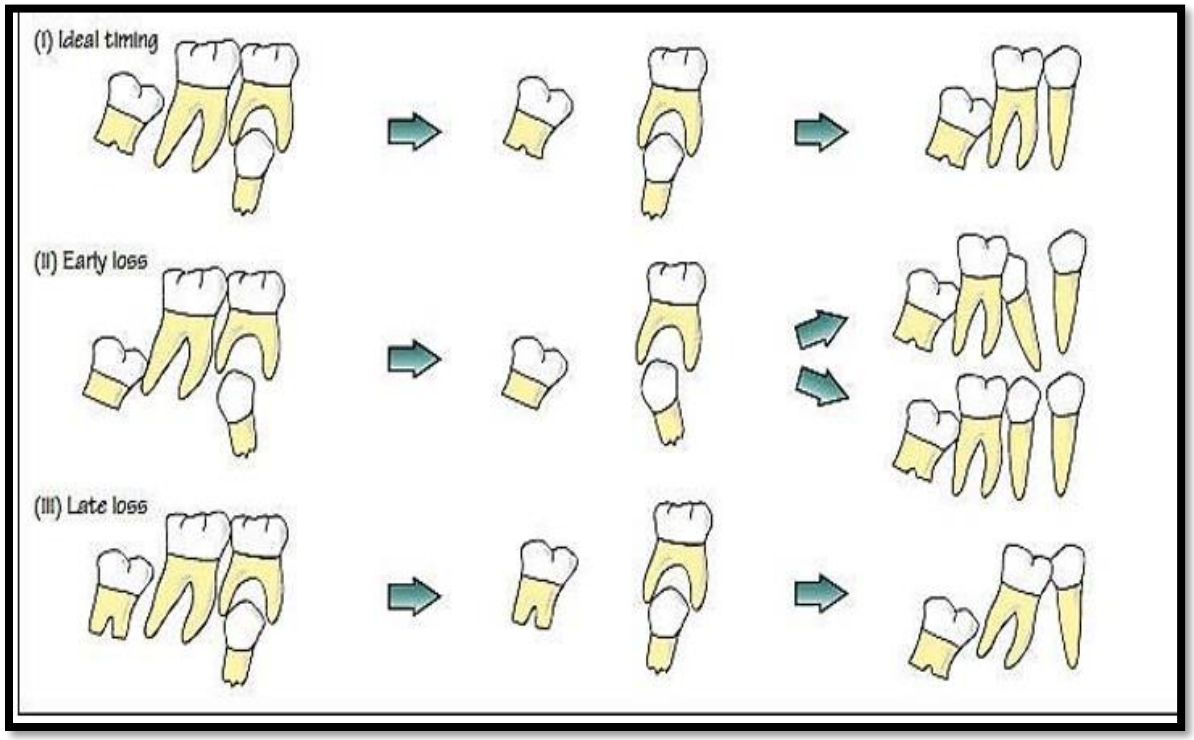
APPENDIX 1: FLOW CHART TO DERTERMINE REQUIREMENT OF PRE-TREATMENT CEPHALOGRAM



APPENDIX 2: RADIOGRAPHIC VIEWS AND THEIR FUNCTIONS IN ORTHODONTIC TREATMENT

	PROJECTION	FUNCTION
1.	Panoramic radiography or lateral oblique views	• Identification of the developing dentition • Confirmation of the presence/ absence of teeth
2.	Lateral Cephalometric View	• To assess skeletal pattern and labial segment angulation • Assessment of unerupted teeth
3.	Occlusal Views Generally Anterior Oblique occlusal of maxilla (standard occlusal) and mandibular anterior oblique occlusal	• Identification of abnormality/ potential pathology and to localise unerupted teeth • To obtain views of incisor region when lateral oblique films have been taken
4.	Occlusal Views Specifically a. Anterior Oblique occlusal of maxilla (standard occlusal) b. True occlusal of mandible	• Localization of tooth/teeth by vertical parallax involving: ➢ Anterior Oblique occlusal in combination with panoramic film Or ➢ Anterior Oblique occlusal in combination with a periapical film • Localization of unerupted teeth
5.	Periapicals	• To assess root morphology and angulation • To assess root resorption • To assess apical pathology • In combination with an oblique occlusal or second periapical, to localize unerupted teeth by parallax
6.	Bitewings	• To assess teeth of doubtful prognosis • Caries identification and assessment of periodontal bone levels
7.	Posteroanterior View	• Occasionally needed in patients with facial asymmetry and certain jaw anomalies.

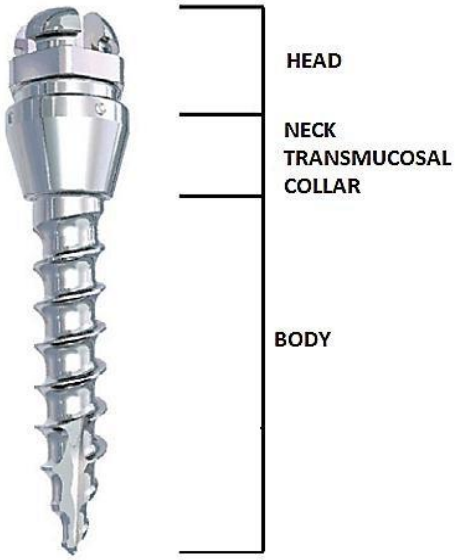
APPENDIX 3: THE CONSEQUENCES OF EXTRACTING THE MANDIBULAR FPM IN DIFFERENT TIMINGS.



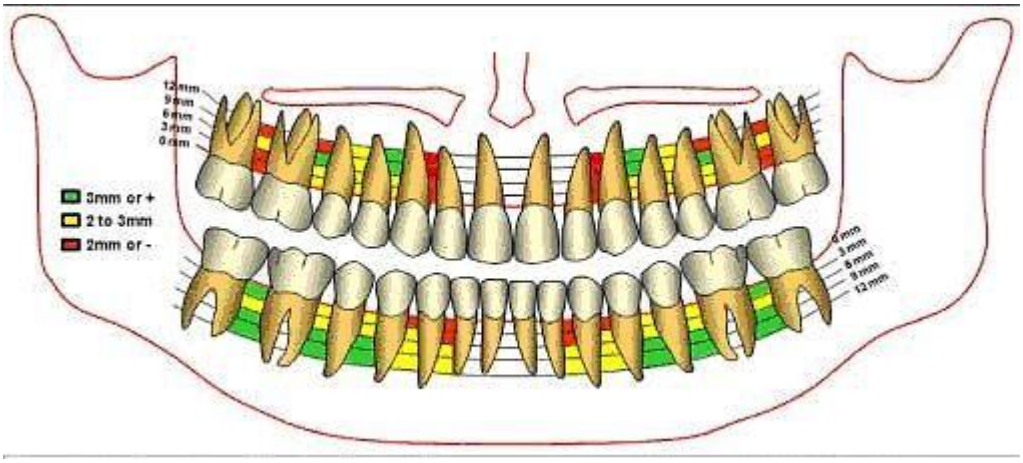
APPENDIX 4: SUMMARY OF TEETH REQUIRING EXTRACTION FOR FPM WITH DIFFERENT TYPES OF MALOCCLUSIONS

Tooth requiring Extraction	Acceptable overjet and dental alignment	Acceptable overjet and crowding in buccal segments only	Unacceptable overjet and/or space required for labial segment crowding	Reverse overjet
Upper 6	Compensate to aid mandibular space closure. Balancing unnecessary as centerline shift is unlikely in an uncrowded arch.	Compensation and balancing required, assuming the crowding is symmetrical.	Seek specialist orthodontic opinion options regarding maxillary FPM include: Retain FPM until second molars erupt. A maxillary holding appliance can be used to prevent overeruption of the maxillary FPM. Compensate. Later distalization therapy can be used to regain space, or two premolars units can be extracted if the third molars are developing. Balance to prevent centerline shift.	Refer for specialist opinion regarding necessity to compensate. Balance if crowding exists.
Lower 6	Compensating and balancing unnecessary	Balance only	Retain FPMs until second molars erupt. Balance to prevent centerline shift	Refer to specialist.

APPENDIX 5: ANATOMY OF MINI IMPLANTS



APPENDIX 6: SITE OF INSERTION OF MINISCREW



Red areas indicate dangerous site,

Yellow areas indicate average risk while

Green areas are the most favourable site.