Clinical Practice Guidelines for Orthodontics and Dentofacial Orthopedics

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Introduction

Orthodontics and Dentofacial Orthopedics is a 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. Major responsibilities of orthodontic practice include the diagnosis, prevention, interception, and treatment of all forms of malocclusion of the teeth and associated alterations of their surrounding structures; the design, application, and control of functional and corrective appliances; and the guidance of the dentition and its supporting structures to attain and maintain optimal occlusal relations and physiologic and esthetic harmony among facial and cranial structures.

A specialist in orthodontics and dentofacial orthopedics meets educational standards established by the Commission on Dental Accreditation of the American Dental Association (ADA) and must possess advanced knowledge in biomedical, clinical, and basic sciences. This knowledge includes the biology of tooth movement, cephalometrics, orthodontic diagnosis, treatment planning, surgical orthodontics, biomechanical principles, the effects of growth and development on tooth movement, application of orthopedic forces to dentofacial structures, and patient management and motivation.

The American Association of Orthodontists (AAO) is the leading national organization of dentists who limit their practice to orthodontics and dentofacial orthopedics and is recognized by the ADA as the sponsoring organization of the national certifying board, the American Board of Orthodontics. The membership of the AAO includes the vast majority of practicing orthodontists in the United States and Canada. The AAO has the background, expertise, and professional responsibility to assist the dental profession and the public by developing clinical practice guidelines for orthodontics and dentofacial orthopedics. The AAO recognizes its role in upholding the public trust granted to it by presenting these clinical practice guidelines to help practitioners develop judgments on diagnosis, treatment planning, and timing of orthodontic and dentofacial orthopedic therapy. The primary concern of the AAO is the provision of high quality orthodontic care and the protection of the public.

Practice guidelines, as defined by the Institute of Medicine, are "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."

The Orthodontic Clinical Practice Guidelines for Orthodontics and Dentofacial Orthopedics presented in this document are condition based and are related to the International Classification of Diseases, Clinical Modification, 10th Edition (ICD 10 codes). This approach recognizes the need for integrated treatment of oral and dentofacial conditions rather than isolated treatment procedures. These guidelines are also directed toward the process of patient care and outline considerations related to diagnosis, treatment, and quality of care.

These guidelines were derived from a professional consensus, based on a review of relevant clinical and scientific literature, the expert opinion of educators, and the clinical experience of practicing orthodontists. Similar documents written by other organizations and publications related to guideline development were also reviewed.

There are various professionally accepted philosophies regarding orthodontic diagnosis, treatment, and retention. Because of the nature of the doctor-patient relationship, the practitioner,

who is actively engaged in treating the patient, is in the best position to evaluate and interpret the complexities, timing, and potential efficacy from among different philosophies and systems available. Deviations from these guidelines may be appropriate based on professional judgment and individual patient needs and preferences. Where a practitioner chooses to deviate from these guidelines (based on the circumstances of a particular patient or for any other reason) the practitioner is advised to note in the patient's record the reason for the procedure followed. Finally, it should be understood that adherence to these guidelines does not guarantee a successful treatment outcome.

The AAO recognizes that these guidelines may be used by insurance carriers and other payers, attorneys in malpractice litigation, and various entities with an interest in orthodontics. The Association encourages all interested persons to become familiar with the Guidelines. This document was not developed to establish standards of care or to be used for reimbursement or litigation purposes. The AAO cautions that these uses involve considerations that are beyond the scope of the Guidelines.

The professional conduct of members of the AAO is governed by the Principles of Ethics and Code of Professional Conduct of the AAO and the ADA.

Evidence-Based Dentistry

Definition

The following outline of orthodontic diagnostic and treatment considerations are evidence based recommendations. Evidence-based dentistry (EBD) is an approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidence relating to the patient’s oral and medical condition and history, with the dentist’s clinical expertise and the patient’s treatment needs and preferences.

Levels of Evidence

Rating systems exist to evaluate the strength of various study designs. The Centre for Evidence-based Medicine provides background information on this topic, as well as a commonly used table for the “Levels of Evidence.” In general, the levels of evidence, from strongest to weakest, are:

Meta-analysis
Systematic Review
Randomized Trial
Cohort Study
Case/Control Study
Case Series
Expert Opinion

Evidence-Based Practice

Evidence-based practice is assisted by critical evaluation of the body of literature on a specific topic. In particular, well-conducted systematic reviews and meta-analyses can provide guidance to assist orthodontists in clinical decision-making. Some resources for accessing evidence-based literature are:

1. AAO Evidence Based Orthodontic Research Website: A collection of systematic reviews, meta-analyses, practice guidelines, and summary statements on orthodontic topics.

2. The ADA Center for Evidence-based Dentistry: A website which houses information on evidence-based dentistry, as well as a listing of systematic reviews in dentistry. Additionally, this site provides links to other evidence-based resources.

3. PubMed: PubMed comprises more than 25 million citations for biomedical literature from MEDLINE, life science journals, and online books.

4. Cochrane Collaboration: An international nonprofit organization that develops evidence-based systematic reviews on health care interventions.

Pretreatment Considerations

A screening examination may be performed to determine the nature of the orthodontic problem, and to determine if and when treatment is indicated. When treatment is indicated, a comprehensive examination must be performed that should include:

Examination

A. Chief Complaint
The chief complaint or the reason for seeking treatment should be recorded as described by the patient, parent or legal guardian.

B. Medical and Dental History
An appropriate medical and dental history must be obtained as a part of the initial evaluation of the patient. If treatment is to be delayed until a future date, an updated history may be necessary. Patients/parents/legal guardians should be requested to advise the orthodontist of any change in the patient's health history.

C. Clinical Examination
A comprehensive clinical examination should include the following with all findings recorded in the patient's record:

1. An extraoral facial assessment to determine facial form, symmetry, soft-tissue harmony, and status of the perioral musculature. This determines deviations from normal regarding a patient's sagittal, vertical, and transverse maxillofacial relationships and to assess the relationship of the dentition to the facial structures.

2. An intraoral examination to assess the condition of the hard and soft tissues of the mouth, (including the periodontium) and the static and functional status of the patient's occlusion.

3. An evaluation of the temporomandibular joint and associated musculature to assess function and disease.

4. Verification of the presence of any oral parafunctional habits.

Diagnostic Records

Diagnostic records, along with a comprehensive examination and history, form the foundation upon which a diagnosis and treatment plan with options are built, and are a standard of orthodontic care.

Diagnostic records and tests will vary with the nature of the patient's condition but must be sufficient to identify the problems, formulate a diagnosis, and allow the development of an acceptable course of treatment goals. Where limited orthodontic procedures are anticipated, diagnostic records may vary from those associated with comprehensive care. Limited or comprehensive treatment encompasses all treatment techniques, including aligners or aligners in combination with fixed appliances and auxiliaries to significantly alter the alignment or occlusion and function. The gathering of appropriate diagnostic records should be considered a standard of care to allow for proper diagnosis, treatment plan and treatment rendered.

Pretreatment unaltered diagnostic records for comprehensive orthodontic treatment should include the following to establish a baseline for documenting pre-existing conditions, treatment and/or growth changes:

1. Extraoral and intraoral images (may include digital or video images) to supplement the clinical findings.

2. Dental casts (or digital models) to assess the inter-arch and intra-arch relationship of the teeth, to help determine arch length and width requirements, and to assess arch symmetry.

3. Intraoral and/or panoramic radiographs to assess the condition and developmental status of the teeth and hard tissue supporting structures, and to identify any dental anomalies or pathology.

4. Radiographic imaging to permit relative evaluation of the size, shape, and positions of the relevant hard and soft tissue craniofacial structures including the dentition, and to aid in the identification of skeletal anomalies and/or pathology. Three-dimensional cone-beam computed tomography (CBCT) may be used as an imaging source to obtain this information.

Referral

Practitioners must make a recommendation for referral of patients to general dentists, other dental specialists, physicians, or other health care practitioners whenever, in the judgment of a practitioner, referral would be in the best interest of a patient.

Diagnosis and Treatment Planning

Prior to the initiation of orthodontic treatment, a diagnosis of the patient's oral health condition must be made. A diagnosis allows for the development of a treatment plan that addresses the patient's chief complaint; medical and dental history, and dental, facial, skeletal, functional, and/or psychosocial problems.

After a diagnosis has been established, a treatment plan must be developed. Such a plan will facilitate coordination of the treatment objectives and the various methods available for addressing them. A well-documented treatment plan should be based on the findings from the medical and dental history, clinical examination, diagnostic records, a critical evaluation of the patient’s needs

and preferences, and the clinician's professional judgement and preferences. A documented plan should be a standard of care. The plan should include:

1. A list of the patient's dental, facial, skeletal, functional, and/or psychosocial problems.

2. A diagnosis which coordinates the patient/parents/legal guardian's chief complaint with the clinical findings.

3. A documented plan for therapy which includes treatment goals, appliance selection, sequencing and timing of treatment, coordination with other health care providers, and retention.

The treatment plan should be periodically reassessed throughout treatment with progress records taken as deemed appropriate by the clinician. This reassessment should take into consideration various limiting factors and establish short- and/or long-term objectives.

Diagnostic and Treatment Considerations for Anomalies of Jaw Size, Relationship of Jaw to Cranial Base, Dental Arch Relationship and Dental Alveolus

The following conditions may indicate the need for orthodontic or dentofacial orthopedic treatment. These conditions may be structural, functional or esthetic in nature and may appear in various combinations, and are not limited to the outline below. Frequently used treatment options, which may include the removal of primary or permanent teeth, are listed for each condition. Adjunctive procedures to those listed used to supplement anchorage needs and improve treatment outcomes include but are not limited to: osseointegrated implants, mini-screw implants, miniplates and other temporary anchorage devices.

I. Maxillary/Dentoalveolar Hyperplasia (Large Maxilla)

A. Diagnostic Considerations

1. Anteroposterior
   a. Mid-Face Protrusion
   b. Dentoalvelolar Protrusion
   c. Distoclusion
   d. Excess Overjet
   e. Asymmetry

2. Vertical
   a. Long, Lower Anterior Face Height
   b. Maxillary Vertical Excess
   c. Excessive Gingival Display
   d. Deep Overbite
   e. Open Bite
   f. Lip Incompetency
   g. Asymmetry

3. Transverse
   a. Buccal Maxillary Cross-bite (unilateral or bilateral; functional or structural)

b. Cant of the occlusal plane
c. Asymmetry

B. Treatment Options

1. Primary Dentition - Treatment Indicated Under Certain Circumstances, Appliances Vary

2. Transitional Dentition
a. Functional/Orthopedic Appliances
b. Fixed or Removable Orthodontic Appliances
c. Space Maintenance

3. Adolescent Dentition
a. Functional/Orthopedic Appliances
b. Fixed or Removable Orthodontic Appliances
c. Fixed Orthodontic Appliances Adjunctive to Orthognathic Surgery (surgery usually performed after majority of growth completed)

4. Adult Dentition
a. Fixed or Removable Orthodontic Appliances
b. Fixed Orthodontic Appliances Adjunctive to Orthognathic Surgery

II. Maxillary/Dentoalveolar Hypoplasia (Small Maxilla)

A. Diagnostic Considerations

1. Anteroposterior
a. Mid-Face Deficiency
b. Dentoalveolar Deficiency
c. Mesiocclusion
d. Anterior Cross-bite (functional or structural)
e. Negative Overjet
f. Asymmetry

2. Vertical
a. Short, Lower Anterior Face Height
b. Dentoalveolar Deficiency
c. Deep Overbite
d. Open Bite
e. Lip Redundancy
f. Asymmetry

3. Transverse
a. Lingual Posterior Cross-bite (unilateral or bilateral; functional or structural)
b. Occlusal Plane Cant
c. Asymmetry
d. Transverse Deficiency without Posterior Cross-bite

B. Treatment Options

1. Primary Dentition
    a. Functional/Orthopedic Appliance
    b. Fixed or Removable Orthodontic Appliance

2. Transitional Dentition
    a. Functional/Orthopedic Appliance
    b. Fixed or Removable Orthodontic Appliance

3. Adolescent Dentition
    a. Functional/Orthopedic Appliance
    b. Fixed or Removable Orthodontic Appliance

4. Adult Dentition
    a. Fixed or Removable Orthodontic Appliance
    b. Fixed Orthodontic Appliance Adjunctive to Orthognathic Surgery

III. Mandibular/Dentoalveolar Hyperplasia (Large Mandible)

A. Diagnostic Considerations

1. Anteroposterior
    a. Prognathic Facial Pattern
    b. Mesiocclusion
    c. Anterior Cross-bite (functional or structural)
    d. Macrogenia
    e. Asymmetry

2. Vertical
    a. Open Bite
    b. Deep Overbite
    c. Long Lower Facial Height/Steep Mandibular Plane Angle
    d. Asymmetry

3. Transverse
    a. Posterior Cross-bite (unilateral or bilateral; functional or structural)
    b. Asymmetry

B. Treatment Options

1. Primary Dentition - Treatment Indicated Under Certain Circumstances, Appliances Vary

2. Transitional Dentition
    a. Functional/Orthopedic Appliance
    b. Fixed or Removable Orthodontic Appliance

3. Adolescent Dentition
    a. Functional/Orthopedic Appliance
    b. Fixed or Removable Orthodontic Appliance

4. Adult Dentition

a. Fixed or Removable Orthodontic Appliance
b. Fixed Orthodontic Appliance Adjunctive to Orthognathic Surgery

IV. Mandibular/Dentoalveolar Hypoplasia (Small Mandible)

A. Diagnostic Considerations

1. Anteroposterior
   a. Mandibular Retrognathic Facial Pattern
   b. Excess Overjet
   c. Distoclusion
   d. Asymmetry

2. Vertical
   a. Open Bite
   b. Deep Overbite
   c. Short Lower Face Height
   d. Long Lower Face Height

3. Transverse
   a. Posterior Cross-bite (unilateral or bilateral; functional or structural)
   b. Asymmetry

B. Treatment Options

1. Primary Dentition - Functional/Orthopedic Appliance

2. Transitional Dentition
   a. Functional/Orthopedic Appliance
   b. Fixed or Removable Orthodontic Appliance

3. Adolescent Dentition
   a. Functional/Orthopedic Appliance
   b. Fixed or Removable Orthodontic Appliance
   c. Fixed Orthodontic Appliance Adjunctive to Orthognathic Surgery (surgery usually performed after majority of growth completed)

4. Adult Dentition
   a. Fixed or Removable Orthodontic Appliance
   b. Fixed Orthodontic Appliance Adjunctive to Orthognathic Surgery

Diagnostic and Treatment Considerations for Anomalies of Tooth Position, Discrepancies of Tooth Size, Arch Length, and Arch Form

These conditions may appear in various combinations and are not limited to the following. Frequently used treatment options, which may include the removal of primary or permanent teeth, are listed for each condition. Adjunctive procedures to those listed include modification of tooth size, restorative replacement, surgical exposure, and appropriate soft tissue surgery.

I. Deficient Arch Length (Crowding)

A. Diagnostic Considerations
1. Facial-Lingual Displacement
2. Supra/Infra Eruption
3. Rotations
4. Impactions
5. Axial Inclination of Teeth (Anterior or Posterior)
6. Tooth Size
7. Premature Loss of Primary Teeth
8. Ankylosis
9. Supernumeraries and aplasias
10. Frenal attachments
11. Transpositions

B. Treatment Options

1. Primary Dentition
   a. Fixed or Removable Space Maintainer
   b. Extraction of primary teeth

2. Transitional Dentition
   a. Functional/Orthopedic Appliance
   b. Fixed or Removable Orthodontic Appliance
   c. Serial Extraction

3. Adolescent Dentition
   a. Fixed or Removable Orthodontic Appliance
   b. Functional/Orthopedic Appliance
   c. Extractions of Permanent or Remaining Primary Teeth

4. Adult Dentition
   a. Fixed or Removable Orthodontic Appliance
   b. Extraction of Permanent Teeth

5. Interdisciplinary Referral

II. Excessive Arch Length (Spacing)

A. Diagnostic Considerations

1. Skeletal Arch Size
2. Tooth Size
3. Congenitally Missing Teeth
4. Supernumeraries and Aplasias
5. Axial Inclination of Teeth
6. Facial-Lingual Displacement
7. Rotations
8. Fibrous Gingival Hyperplasia
9. Frenal Attachments

B. Treatment Options

1. Primary Dentition - Treatment Rarely Indicated
2. Transitional Dentition - Fixed or Removable Orthodontic Appliance
3. Adolescent Dentition - Fixed or Removable Orthodontic Appliance
4. Adult Dentition - Fixed or Removable Orthodontic Appliance
5. Interdisciplinary Referral

III. Discrepancies of Arch Form

A. Diagnostic Considerations

1. Asymmetry
2. Interarch Coordination
3. Abnormal Occlusal Planes: Curves of Wilson and Spee
4. Bi-level Occlusal Plane

B. Treatment Options

1. Primary Dentition - Fixed or Removable Orthodontic Appliance

2. Mixed Dentition
   a. Fixed or Removable Orthodontic Appliance
   b. Functional/Orthopedic Appliance

3. Adolescent Dentition
   a. Fixed or Removable Orthodontic Appliance
   b. Functional/Orthopedic Appliance

4. Adult Dentition
   a. Fixed or Removable Orthodontic Appliance
   b. Fixed Orthodontic Appliance Adjunctive to Orthognathic Surgery

Diagnostic and Treatment Considerations for Abnormalities of the Dentition (number, size, and shape), Vitality, Eruption Pattern, and Periodontal Support

Anomalies of tooth number, morphology or eruption pattern should be diagnosed and managed as soon as reasonably practical according to the particular requirements of each clinical situation. These conditions may appear in various combinations, and may indicate the need for orthodontic or dentofacial orthopedic treatment. Some of the frequently used treatment options may require a multidisciplinary approach and may include the extraction of primary or permanent teeth.

A. Diagnostic Considerations

1. Supernumerary Teeth
2. Missing Teeth
   a. Congenital (Anodontia)
   b. Pathologic
   c. Traumatic
   d. Extracted
3. Ectopic Erupting Teeth
4. Impacted Teeth
5. Eruption Anomalies

6. Over-Retained Primary Teeth
7. Ankylosed Teeth
8. Transposition
9. Atypical Crown Morphology
10. Premature Loss of Primary Teeth
11. Atypical Root Morphology
12. Root Resorption
13. Carious or Fractured Teeth
14. Character of Hard and Soft Tissue Supporting Structures
15. Tooth Vitality

B. Treatment Options

1. Supernumerary Teeth
   a. Surgical Intervention
   b. Extraction
   c. Fixed or Removable Orthodontic Appliance
   d. No Treatment

2. Missing Teeth
   a. Space Maintenance/Space Regaining
   b. Prosthetic Replacement of Teeth/Implants
   c. Transplantation
   d. Maintenance of Primary Teeth
   e. Space Closure
   f. Fixed or Removable Orthodontic Appliance

3. Ectopic Teeth
   a. Extraction
   b. Surgical Intervention
   c. Fixed or Removable Orthodontic Appliance

4. Impacted Teeth
   a. Surgical Intervention
   b. Extraction
   c. Fixed or Removable Orthodontic Appliance
   d. No Treatment

5. Eruption Anomalies
   a. Surgical Intervention
   b. Retention with or without Coronal Modification
   c. Extraction
   d. Fixed or Removable Orthodontic Appliance
   e. Referral for Medical Evaluation

6. Over-Retained Primary Teeth
   a. Extraction

7. Ankylosed Teeth
   a. Extraction
   b. Surgical Luxation and/or Repositioning

c. Fixed or Removable Orthodontic Appliance
d. Retention with or without Coronal Modification

8. Transposition
   a. Extraction
   b. Retention with or without Coronal Modification
   c. Transplantation
   d. Fixed or Removable Orthodontic Appliance

9. Atypical Tooth Morphology
   a. Retention with or without Coronal Modification
   b. Extraction
   c. Fixed or Removable Orthodontic Appliance

10. Premature Loss of Primary Teeth
   a. Space Maintenance
   b. Fixed or Removable Orthodontic Appliance

11. Atypical Root Morphology
   a. Monitor Radiographically
   b. Extraction

12. Root Resorption
   a. Monitor Radiographically
   b. Extraction
   c. Stabilization
   d. Treatment Alternative of Initiating Rest Periods

13. Carious or Fractured Teeth
   a. Reposition Tooth or Root
   b. Monitor Radiographically
   c. Extraction
   d. Fixed or Removable Orthodontic Appliance

Diagnostic and Treatment Considerations for Dentofacial Functional Abnormalities

Dentofacial functional abnormalities may occur in combination with other dentofacial conditions and should be diagnosed and managed according to the particular requirements of each clinical situation. Correction or control of functional problems may involve alteration of behavior patterns, may require orthodontic/dentofacial orthopedic treatment, or multidisciplinary treatment. The influence of functional abnormalities on dentofacial development is variable, and cause and effect relationships are difficult to determine.

A. Diagnostic Considerations

1. Lip Size and Function

2. Tongue Size and Function
   a. Abnormal Tongue Function
   b. Ankyloglossia
   c. Microglossia or Macroglossia

3. Deleterious Habits
    a. Thumb, Finger or Lip Sucking
    b. Pacifier Sucking
    c. Tongue Thrust/Sucking
    d. Clenching
    e. Clenching and Bruxism
    f. Lip/Cheek Biting
    g. Nail Biting
    h. Foreign Objects (e.g., pipes, pens, pencils, musical instruments)
    i. Smoking and/or Drug Usage

4. Airway Obstruction
    a. Nasopharyngeal Morphology
    b. Sleep Apnea
    c. Allergies
    d. Pathology

5. Speech Disorders

6. Mandibular Dysfunction
    a. Dental Interferences
    b. Skeletal Abnormalities
    c. Neuromuscular Abnormalities
    d. Temporomandibular Dysfunction

7. Trauma

8. Temporomandibular Disorders

    Temporomandibular disorders represent a broad range of conditions which involve medical, dental, and psychological factors. Such disorders may be associated with stress, habits, emotional disorders, structural malrelationships, oro-facial pain, trauma to the face or head, occlusal disharmonies, and medical problems associated with osteoarthritis, rheumatoid arthritis, or viral disease. These factors may be associated with temporomandibular disorders in one individual with no symptomatology or pathology in another.

B. Treatment Options

1. Lip Size and Function
    a. Fixed or Removable Orthodontic Appliance
    b. Therapeutic Exercises/Myofunctional Therapy
    c. Functional/Orthopedic Appliance
    d. Surgery

2. Tongue Size and Function
    a. Fixed or Removable Orthodontic Appliance
    b. Therapeutic Exercises/Myofunctional Therapy
    c. Functional/Orthopedic Appliance
    d. Surgical Reduction
    e. Lingual Frenectomy

3. Deleterious Habits
   a. Behavior Management
   b. Functional/Orthopedic Appliance
   c. Therapeutic Exercises
   d. Fixed or Removable Orthodontic Appliance

4. Airway Obstruction
   a. Referral for Evaluation/Treatment/Surgery
   b. Functional/Orthopedic Appliance
   c. Orthognathic Surgery

5. Speech Disorders
   a. Fixed or Removable Orthodontic Appliance
   b. Referral for Evaluation/Treatment/Myofunctional Therapy

6. Mandibular Dysfunction
   a. Occlusal Equilibration (Modification of Tooth Form)
   b. Fixed or Removable Orthodontic Appliance
   c. Fixed Orthodontic Appliance Adjunctive to Surgery
   d. Functional/Orthopedic Appliance

7. Temporomandibular Disorders
   Numerous treatment modalities, including orthodontics, have produced beneficial results in the management of temporomandibular disorders. However, no singular treatment modality may necessarily be definitive for any particular patient. There is no scientific proof that any particular method of orthodontic treatment, whether involving extraction or non-extraction, has any causative effect on temporomandibular disorders. There is no reliable method for predicting or preventing future temporomandibular disorders in any particular individual.

Orthodontic Considerations for Craniofacial Anomalies, Cleft Lip and Palate

Management of patients with these and other anomalies is, in many cases, best provided by a multidisciplinary team of dentists and physicians and other healthcare professionals. The optimal time for the first evaluation of these patients is within the first few days of life, and referral for team evaluation and management is appropriate at any age. Treatment plans should be developed and implemented on the basis of team recommendations. The orthodontist, as a member of the craniofacial team, should obtain baseline diagnostic records, assist in treatment planning, and perform orthodontic treatment as needed taking into account those factors that may influence surgical management of the patient.

For patients at risk for developing malocclusion or maxillomandibular discrepancy, diagnostic records should be collected at appropriate intervals. Depending on the goals to be accomplished, alternating periods of treatment and retention may be necessary beginning at birth. For example, patients with cleft lip and cleft palate may require presurgical maxillary orthopedics to improve the position of the maxillary alveolar segments prior to lip and palate closure. Later in life, timing of bone grafting of alveolar clefts to unify the segments should be determined by the stage of dental development and with the collaboration of the orthodontist and surgeon.

Treatment Objectives and Limiting Factors

Goals

The goals of orthodontic treatment are optimum dentofacial function, health, stability and esthetics. While these goals are desirable, it should be recognized that individual patients have problems, concerns and conditions which may prevent the attainment of optimal results in every case, and that the non-attainment of some of the goals of orthodontic treatment in a particular patient is no indication of negligence by the orthodontist even when no limiting factors are present.

Limiting Factors

Orthodontic treatment results may be affected by extenuating circumstances beyond the practitioner's control. These limiting factors should be documented in the patient's record when they occur and the patient/parent/guardian should be informed. The following are some of the more common limiting factors affecting orthodontic therapy:

1. Severity of the pretreatment condition
2. Pretreatment agreement to pursue limited objectives
3. Abnormal skeletal morphology or growth, during or after treatment
4. Abnormal size, shape, or number of teeth
5. Aberrant tooth eruption patterns
6. Patient's failure to initiate timely treatment, continue or complete treatment
7. Compromised periodontal tissues
8. Persistent deleterious habits or abnormalities of muscle function relating to the dentofacial complex
9. Inability or unwillingness of the patient to cooperate with treatment (e.g., the wear and/or care of appliances, oral hygiene measures, diet, or keeping appointments)
10. Failure to complete all recommended aspects of treatment
11. Poor quality, untimely or inappropriate integration of other recommended or required dental and/or medical services
12. Medical complications or underlying systemic conditions
13. Patient transferring to or from another provider during orthodontic treatment
14. Incomplete correction or relapse of orthognathic surgical procedures

Treatment Consultation and Informed Consent

A discussion must be held with the patient/parents/legal guardian utilizing lay terminology to provide sufficient information for the responsible party to accept or reject the proposed treatment plan. This discussion must be documented and should include:

1. A description of the diagnosis and treatment plan.
2. A discussion of reasonable alternative treatments.
3. The relevant risks, compromises, and limitations associated with the proposed treatment plan and alternative treatments.
4. A discussion of any portion of the treatment plan that will require the services of other dental or medical health care providers and the anticipated effects of such services on the orthodontic treatment plan.
5. The prognosis related to all treatment plans, including the option of no treatment.
6. A discussion of the patient's responsibility relating to the care (e.g., maintaining periodic recall visits with their general dentist).
7. An estimate of the duration of active treatment and retention.

8. A signed agreement regarding informed consent and the financial arrangements may be considered.

Risks Associated with Orthodontic Treatment

All forms of medical and dental treatment, including orthodontics, involve some risks and/or limitations. Fortunately, in orthodontics, serious complications are infrequent. The orthodontist should determine which potential risks to disclose to the patient in the exercise of sound professional judgment given the clinical condition of the patient. Due to the length of orthodontic treatment, conditions may arise which are coincident, but not caused by orthodontic treatment. Some of the risks associated with orthodontic treatment include:

1. Tooth decay, or permanent markings (decalcification).
2. The length of the roots of teeth may become shortened. This may be of no clinical significance or may require the discontinuance of orthodontic treatment with subsequent interdisciplinary treatment to stabilize the teeth. In some cases root shortening may be pre-existing.
3. The health of the bone and periodontal support of the teeth may be affected.
4. The teeth and/or jaws have a tendency to change their positions after treatment.
5. Temporomandibular joint problems may appear concurrently with orthodontic treatment, but may not be related to the treatment.
6. The vitality of a tooth may be compromised.
7. Orthodontic appliances may irritate or damage the oral tissues and may cause injury if accidentally swallowed or aspirated.
8. Dental materials, instruments, and equipment may result in damage or injury to the oral tissues, face and/or eyes.
9. Accidents during treatment or patient misuse of orthodontic appliances may result in injury to the oral tissues, face and/or eyes.
10. Oral surgery, orthognathic surgery or other adjunctive medical, surgical or dental procedures may be recommended and/or necessary in conjunction with orthodontic treatment. Associated treatments carry additional risks, limitations and additional informed consent issues which must be discussed with the patient/parents/legal guardian by the health care practitioner providing the service.
11. Orthodontic appliances may cause attrition, flaking or fracturing of tooth structure.
12. When orthodontic appliances are removed, fracture and/or damage to the teeth may result.
13. Medical or psychosocial conditions may result in compromised results or dissatisfaction with treatment.
14. Orthodontic materials may cause allergic reactions in some individuals.
15. Patients may be dissatisfied with their dental or facial esthetics at the conclusion of treatment due to unrealistic expectations or perceptions.
16. Abnormal growth during or after treatment may produce undesirable results.
17. Treatment time may be extended and results compromised due to unforeseen circumstances and poor patient cooperation.
18. Tooth movement during orthodontics may be adversely affected for patients receiving certain pharmaceuticals as they have the potential to slow tooth movement and may lengthen treatment time. The effects of these medications may be severe enough to stop tooth movement which may result in removal of appliances regardless of tooth positions. The effects of certain pharmaceuticals on an individual are not predictable.

19. The use of orally applied drugs, especially certain drugs of abuse such as cocaine or amphetamines, may seriously compromise the gums and bone tissue around teeth which can be exacerbated by orthodontic treatment.

Post Treatment Evaluation and Outcomes Assessment

The effects of orthodontic treatment should be evaluated retrospectively with reference to the pretreatment condition. Consistent re-evaluation of treatment results along with continued review of treatment modalities and their effectiveness will serve to provide the public with the highest quality of orthodontic care. Assessments of the outcome of treatment are dependent in part upon the treatment goals and objectives, the condition being treated, the stage of the patient's dentofacial development, the treatment provided and the patient’s compliance as well as tissue response to the therapy performed. Limiting factors must be considered when evaluating treatment and outcomes.

Post Treatment Records

Post treatment unaltered records provide information for the quantitative and qualitative assessment of treatment changes as well as for education, research, and quality assurance. Post treatment records may include, but are not limited to:

1. Extra and intraoral images (digital, still or video images)
2. Dental casts (hard copy or digital format)
3. Intraoral, panoramic, and/or radiographic imaging to permit relative evaluation of the size, shape, and positions of the relevant hard and soft tissue craniofacial structures including the dentition.
4. Other indicated procedures or tests

Positive Outcomes of Treatment

1. Satisfaction of the patient's chief complaint
2. Well aligned teeth
3. Good or improved occlusal function
4. Good or improved dental and facial esthetics
5. Good or improved environment for dentofacial development
6. Desirable modification of the size, shape, and position of the jaw(s)
7. Stability of the treatment results
8. Good or improved dental and periodontal health

Negative Outcomes of Treatment

1. The patient's chief complaint was not satisfied
2. Poorly aligned teeth
3. Poor or unimproved occlusal function
4. Poor or unimproved dental and facial esthetics
5. Premature root resorption (primary teeth)
6. Excessive root resorption (permanent teeth)
7. Loss of periodontal support
8. Clinically significant decalcification or dental caries
9. Unsatisfactory modification of the size, shape, and position of the jaws
10. Instability of the treatment results

Retention

1. A retention plan must be established after reviewing the patient's original condition, treatment objectives, the results achieved, and/or any limiting factors.
2. Completion of orthodontic treatment does not ensure the stability of the result. Future treatment may be recommended when post treatment changes occur, which may be due to growth, maturation, aging, lack of compliance with the retention protocol, periodontal problems, oral habits and post treatment trauma, among other factors.
3. Post treatment changes may be minimized with an indefinite retention wear protocol.

Record Keeping

The keeping and preserving of a patient's dental record is necessary to the goal of providing high quality orthodontic treatment. Prudent record keeping is the foundation for planning and maintaining the continuity of patient care. It also provides documentary evidence of the evaluation and diagnosis of the patient's condition, the treatment plan, the treatment provided, referrals made, and follow up care. It also documents communications with the patient, other health care providers and any other third parties. The dental record also protects the legal interests of all parties. In addition, a patient's dental record may provide material for continuing education, research, administrative oversight, billing, and quality assurance.

1. Treatment procedures, changes in the treatment plan, patient compliance, treatment difficulties, and other important aspects of treatment must be recorded and maintained. Copies of related correspondence and appropriate release forms must also be maintained as part of the patient's record.
2. Documentation must be written, dictated, or computer annotated; maintained concurrently; and kept chronologically with any changes conspicuously noted.
3. The original records are usually considered the property of the practitioner. Laws regarding patient record access, duplication and transfer vary from state to state. Practitioners can obtain clarification from their state regulatory agency.
4. Electronic/digital records have the potential to be altered. Alteration of original electronic/digital records must be avoided. Credible computer software either prevents this or records any alteration of an original electronic/digital record. However, enhancement of images is allowed as long as these are duly labeled and saved as separate images. Enhancement of other electronic/digital records, such as radiographs, to enable better identification of landmarks and/or dentoskeletal anomalies is permissible; however, the original cannot be altered. It is the responsibility of the practitioner to protect the sanctity of all patient records as prescribed by all local, state and federal laws.

Transfer of Orthodontic Patients

Because of the time required to complete orthodontic treatment, the transfer of care from one practitioner to another is a common occurrence.

Recommendations to the Transferring Practitioner

1. Practitioners should attempt to arrange for the continuation of orthodontic treatment of their patients with as little interruption as possible. Regardless of the reason for

1 transfer, reasonable efforts of both the transferring and accepting practitioner are
2 necessary to effect an orderly transfer. It is recommended, and in some states
3 required, to obtain a written release from the patient/parents/legal guardian prior to
4 the transfer of the patient's records. It is preferable to send copies of the pertinent
5 records directly to the new practitioner. The use of electronic media may facilitate
6 this process. It is acceptable, but less desirable, to provide these records to the
7 patient/ parents/legal guardian. A patient's records should not be withheld due to an
8 outstanding balance.
9 2. The transferring practitioner should ensure that all appliances are in good order.
10 The patient/parents/legal guardian should be advised that extended periods of
11 active orthodontic treatment without supervision can be detrimental, and an
12 appointment with the new practitioner should be scheduled as soon as possible.
13 3. The patient/parents/legal guardian should be informed that there may be different
14 approaches to treatment by different practitioners.
15 4. The patient/parents/legal guardian should be informed that there may be different
16 fees with treatment by different practitioners.
17 5. The transferring practitioner should make no statements that would undermine the
18 establishment of a sound doctor-patient relationship with the accepting practitioner.
19 6. The transferring practitioner should be available for consultation by the accepting
20 practitioner.
21 7. The transferring practitioner should provide appropriate financial information in
22 advance or immediately upon request to the accepting practitioner.
23
24 *Recommendations to the Accepting Practitioner*
25
26 1. The accepting practitioner should review the patient's records, including the
27 previous financial arrangements if available, prior to the development of a plan for
28 continuation of treatment. In addition, the estimated time required to complete
29 treatment and the financial arrangement for continuation of treatment should be
30 discussed as soon as possible. Patients should be informed about their present oral
31 health status without unprofessional comments about prior treatment.
32 2. Appropriate records documenting the status of the case at the time of transfer
33 should be made.
34 3. A practitioner is not obligated to accept an orthodontic transfer patient. If a
35 practitioner is unable or unwilling to accept the transfer patient, the practitioner may
36 assist the patient/parents/legal guardian in finding another practitioner.
37 4. At the patient/parents/legal guardian's request, a practitioner may remove
38 appliances from a patient not of record. If appropriate, previous practitioners
39 should be consulted.
40
41 Members should be aware of the following documents written by the AAO Legal Counsel:
42
43 1. Second Opinions
44 2. Terminating the Doctor/Patient Relationship
45 3. Patient Records and Record Keeping
46
47

Appendix A

Historical Development

At its November 1993 meeting, the AAO Board of Trustees directed the AAO Council on Orthodontic Health Care (COHC) to study the feasibility of developing clinical practice guidelines for orthodontics. The council met in January 1994 and proposed a business plan for the development of Guidelines, which was considered at the February 1994 meeting of the AAO Board of Trustees. It was the consensus of the AAO Board of Trustees to develop guidelines utilizing the expertise within the AAO. A task force was appointed.

The task force met three times between July 1994 and January 1995 and wrote draft guidelines. A copy of draft guidelines was sent to all active AAO members in April 1995 for review. Open forums were held at the 1995 AAO Annual Session and at the meetings of all eight AAO constituent societies during August-November 1995. The task force met again in December 1995 to revise the draft guidelines based on feedback received in 1995. The December 1995 revised draft guidelines were widely circulated in January 1996 for comment. The task force reviewed the comments and a revised draft of the guidelines was distributed to the AAO House of Delegates members, the Board of Trustees and other leaders of organized orthodontics in April 1996. An open forum was held at the 1996 AAO Annual Session for comments on the revised draft guidelines. The revised draft guidelines were approved by the Board of Trustees, a House of Delegates Reference Committee and by the House of Delegates. The Clinical Practice Guidelines were printed in 1996 and were made available to AAO members.

Updating of Clinical Practice Guidelines

The American Association of Orthodontists considers its Clinical Practice Guidelines to be a living document. The existence of this document is intended to stimulate improvement in the practice of orthodontics by identifying areas where knowledge is incomplete or inadequate. The AAO recognizes the dynamic nature of orthodontics and dentofacial orthopedics and the necessity for updating the guidelines to reflect the evolving science and art of orthodontics. Revisions to the document, with opportunities for AAO member input, will occur periodically.

Appendix B

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