

# **American Association of Orthodontists**

## *Clinical Practice Guidelines for Orthodontics and Dentofacial Orthopedics 2008*

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Date: December 5, 2008  
Approved by: 2009 House of Delegates

## Clinical Practice Guidelines for Orthodontics and Dentofacial Orthopedics 2008

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## **Introduction**

Orthodontics and Dentofacial Orthopedics is 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. 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 approximately 94% of practicing orthodontists in the United States. 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, 9th Edition (ICD-9Codes). 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 the many treatment philosophies and systems available. Deviations from these guidelines may be appropriate based on professional judgment and individual patient needs. 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.

### **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.

### *Diagnostic Records*

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. Where limited orthodontic procedures are anticipated, diagnostic records may vary from those associated with comprehensive care. Pretreatment unaltered diagnostic records for comprehensive orthodontic treatment should include the following to establish a baseline for documenting treatment and/or growth changes:

1. Extra 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 associated structures, and to identify any dental anomalies or pathology.
4. Cephalometric radiographs to permit evaluation of the size, shape, and positions of the craniofacial structures and dentition, and to aid in the identification of skeletal anomalies or pathology. Three-dimensional cone-beam computer tomography (CBCT) may be used as an alternate (imaging) source to obtain dentofacial 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. Technological advances such as CBCT scans fall in this category and may be assessed/read in their entirety by a qualified professional; the entire area encompassed by the scan is the responsibility of the practitioner.

### **Diagnosis and Treatment**

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. The plan should include:

1. A list of the patient's dental, facial, skeletal, functional, and/or psychosocial problems.
2. A differential diagnosis which coordinates the patient/parents/legal guardian's chief complaint with the clinical findings.
3. A written 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. This reassessment should take into consideration various limiting factors and establish short- and/or long-term objectives.

### **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 or functional, 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. Moreover, devices including osseointegrated implants, mini-screw implants, miniplates and other temporary anchorage devices may be used as adjuncts to facilitate the treatment outcome, in particular where maximum anchorage would be beneficial.

- I. Maxillary/Dentoalveolar Hyperplasia (Large Maxilla)
  - A. Diagnostic Considerations
    1. Anteroposterior
      - a. Excess Overjet
      - b. Distoclusion
      - c. Asymmetry
      - d. Mid-Face Protrusion
    2. Vertical
      - a. Long Face Height
      - b. Deep Overbite
      - c. Open Bite
      - d. Lip Incompetency
      - e. Asymmetry
    3. Transverse
      - a. Buccal Maxillary Crossbite (unilateral or bilateral; functional or structural)
      - b. Asymmetry
  - B. Treatment Options

1. Primary Dentition - Treatment Indicated Under Certain Circumstances, Appliances Vary
2. Mixed Dentition
  - a. Functional/Orthopedic Appliances
  - b. Fixed or Removable Orthodontic Appliances
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. Mesiocclusion
  - b. Anterior Crossbite (functional or structural)
  - c. Asymmetry
  - d. Mid-Face Deficiency
2. Vertical
  - a. Short Face Height
  - b. Deep Overbite
  - c. Open Bite
  - d. Lip Redundancy
  - e. Asymmetry
3. Transverse
  - a. Lingual Posterior Crossbite (unilateral or bilateral; functional or structural)
  - b. Asymmetry

### B. Treatment Options

1. Primary Dentition
  - a. Functional/Orthopedic Appliance
  - b. Fixed or Removable Orthodontic Appliance
2. Mixed 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. Mesioocclusion
  - c. Anterior Crossbite (functional or structural)
  - d. Macrogenia
  - e. Asymmetry
2. Vertical
  - a. Open Bite
  - b. Deep Overbite
  - c. Long Lower Facial Height
  - d. Asymmetry
3. Transverse
  - a. Posterior Crossbite (unilateral or bilateral; functional or structural)
  - b. Asymmetry

#### B. Treatment Options

1. Primary Dentition - Treatment Indicated Under Certain Circumstances, Appliances Vary
2. Mixed 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. Distocclusion
  - d. Asymmetry
2. Vertical
  - a. Open Bite
  - b. Deep Overbite
  - c. Short Lower Face Height
  - d. Long Lower Face Height
3. Transverse
  - a. Posterior Crossbite (unilateral or bilateral; functional or structural)
  - b. Asymmetry

- B. Treatment Options
  - 1. Primary Dentition - Functional/Orthopedic Appliance
  - 2. Mixed 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. 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

### **Anomalies of Tooth Position, Discrepancies of Tooth Size and Arch Length**

These conditions may appear in various combinations and are not limited to the following. Frequently used treatment options for these anomalies may include modification of tooth size, surgical exposure, extraction of primary or permanent teeth, 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
  - B. Treatment Options
    - 1. Primary Dentition
      - Fixed or Removable Space Maintainer
    - 2. Mixed 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
    - 4. Adult Dentition
      - Fixed or Removable Orthodontic Appliance
- II. Excessive Arch Length (Spacing)
  - A. Diagnostic Considerations

1. Facial-Lingual Displacement
  2. Axial Inclination of Teeth
  3. Fibrous Gingival Hyperplasia
  4. Frena
  5. Tooth Size
- B. Treatment Options
1. Primary Dentition - Treatment Rarely Indicated
  2. Mixed Dentition - Fixed or Removable Orthodontic Appliance
  3. Adolescent Dentition - Fixed or Removable Orthodontic Appliance
  4. Adult Dentition - Fixed or Removable Orthodontic Appliance
- III. Discrepancies of Arch Form
- A. Diagnostic Considerations
1. Asymmetry
  2. Interarch Coordination
  3. Abnormal Occlusal Planes: Curves of Wilson and Spee
- 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

*Abnormalities of Tooth Number Morphology, and Eruption Pattern*

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
- B. Treatment Options
1. Supernumerary Teeth
    - a. Surgical Intervention
    - b. Extraction
    - c. Fixed or Removable Orthodontic Appliance
  2. Missing Teeth
    - a. Space Maintenance
    - b. Fixed or Removable Orthodontic Appliance
    - c. Prosthetic Replacement of Teeth/Implants
    - d. Transplantation
    - e. Maintenance of Primary Teeth
    - f. Space Closure
  3. Ectopic Teeth
    - a. Fixed or Removable Orthodontic Appliance
    - b. Extraction
  4. Impacted Teeth
    - a. Surgical Intervention
    - b. Extraction
    - c. Fixed or Removable Orthodontic Appliance
  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 Extraction
  7. Ankylosed Teeth
    - a. Extraction
    - b. Surgical Luxation
    - c. Surgical Repositioning
    - d. Fixed or Removable Orthodontic Appliance
    - e. Retention with or without Coronal Modification
  8. Transposition
    - a. Fixed or Removable Orthodontic Appliance
    - b. Extraction

- c. Retention with or without Coronal Modification
  - d. Transplantation
- 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
- 13. Carious or Fractured Teeth
  - a. Reposition Tooth or Root
  - b. Fixed or Removable Orthodontic Appliance

### **Dentofacial Functional Abnormalities**

55 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. Grinding
    - f. Lip/Cheek Biting
    - g. Nail Biting
    - h. Foreign Objects (e.g., pipes, pens, pencils, musical instruments)
  - 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. 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, 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. 1. Lip Size and Function
  - a. Fixed or Removable Orthodontic Appliance
  - b. Therapeutic Exercises
  - c. Functional/Orthopedic Appliance
  - d. Surgery
- 2. 2. Tongue Size and Function
  - a. Fixed or Removable Orthodontic Appliance
  - b. Therapeutic Exercises
  - c. Functional/Orthopedic Appliance
  - d. Surgical Reduction
  - e. Lingual Frenectomy
- 3. 3. Deleterious Habits
  - a. Fixed or Removable Orthodontic Appliance
  - b. Functional/Orthopedic Appliance
  - c. Behavior Management
- 4. 4. Airway Obstruction
  - a. Medical Evaluation/Treatment
  - b. Functional/Orthopedic Appliance
  - c. Orthognathic Surgery
- 5. 5. Speech Disorders
  - a. Fixed or Removable Orthodontic Appliance
  - b. Referral for Evaluation/Treatment
- 6. 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.

## **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. 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 defects team, should evaluate those factors that may influence surgical management, assist in treatment planning, obtain baseline diagnostic records and perform orthodontic treatment.

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, 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. Timing of bone grafting of alveolar clefts 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/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 another provider during orthodontic treatment
14. Patient transferring from another provider where the previous treatment plan limits the quality of outcome
15. 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. 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.
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 necessary in conjunction with orthodontic treatment. Associated treatments carry additional risks 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 bisphosphonates. Bisphosphonates 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 bisphosphonates on an individual are not predictable. Long-term bisphosphonate use has been observed to decrease bone healing. It is possible that tooth movement and any surgery procedures within the jaws or bone surrounding the teeth may be difficult, and in some cases may result in osteonecrosis of the jaws.
19. The use of orally applied drugs, especially certain drugs of abuse such as tobacco, cocaine or amphetamines, may seriously compromise the gums and bone tissue around teeth which can be exacerbated by orthodontic treatment.

*Risks Associated with Adjunctive Procedures in Orthodontics*

The orthodontist may recommend certain procedures that are intended to enhance or facilitate the positive outcome of orthodontic therapy (i.e. temporary anchorage devises, soft tissue laser treatment, etc.). These procedures may involve certain risks and limitations, all of which may involve additional informed consent issues by practitioners providing the services.

### **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. Assessing the outcome of treatment is dependent upon the treatment goals and objectives, the condition being treated, the stage of the patient's dentofacial development, and the treatment provided. 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 cephalometric radiographs (CBCT as an alternative)
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
9. Good or improved temporomandibular function

#### *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
11. Poor or worsened temporomandibular function

### **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 and 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.

### **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.
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 occurs frequently.

### *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 transfer, reasonable efforts of both the transferring and accepting practitioner are necessary to effect an orderly transfer. It is recommended, and in some states required, to obtain a written release from the patient/parents/legal guardian prior to the transfer of the patient's records. It is preferable to send copies of the pertinent records directly to the new practitioner. The use of electronic media may facilitate this process. It is acceptable, but less desirable, to provide these records to the patient/parents/legal guardian. A patient's records should not be withheld due to an outstanding balance.
2. The transferring practitioner should ensure that all appliances are in good order. The patient/parents/legal guardian should be advised that extended periods of active orthodontic treatment without supervision can be detrimental, and an appointment with the new practitioner should be scheduled as soon as possible.
3. The patient/parents/legal guardian should be informed that there may be different approaches to treatment by different practitioners.
4. The transferring practitioner should make no statements that would undermine the establishment of a sound doctor-patient relationship with the accepting practitioner.
5. The transferring practitioner should be available for consultation by the accepting practitioner.

### *Recommendations to the Accepting Practitioner*

1. The accepting practitioner should review the patient's records, if available, prior to the development of a plan for continuation of treatment. In addition, the estimated time required to complete treatment and the financial arrangement for continuation of treatment should be discussed as soon as possible. Patients should be informed about their present oral health status without unprofessional comments about prior treatment.
2. Appropriate records documenting the status of the case at the time of transfer should be made.
3. A practitioner is not obligated to accept an orthodontic transfer patient. If a practitioner is unable or unwilling to accept the transfer patient, the practitioner may assist the patient/parents/legal guardian in finding another practitioner.
4. At the patient/parents/legal guardian's request, a practitioner may remove appliances from a patient not of record. If appropriate, previous practitioners should be consulted.

## **Patients Who Wish to Transfer because of Dissatisfaction with Current Orthodontist**

### *Recommendations to the transferring practitioner*

1. If it becomes known that a patient plans to leave an orthodontist's practice for another, the orthodontist should provide the name(s) of other orthodontists in the area.
2. Upon the patient's written request, copies of all treatment records should be forwarded to the accepting orthodontist, or to the patient, if requested. The original treating orthodontist should retain all original records. A reasonable and fair fee can be charged for record duplication. Treatment records should not be withheld because the patient/guardian has an outstanding balance.

### *Recommended procedures for accepting orthodontist*

1. Check to verify the patient received a copy of "Advice for the transferring orthodontic patient" form from the transferring orthodontist. If not, the patient should be given a copy.
2. Request copies of all treatment records and the AAO transfer form from the referring orthodontist.
3. Document thoroughly the patient's condition on starting treatment in the practice.
4. Be candid in assessing treatment progress to date. The orthodontist should refrain from any unnecessary remarks about the previous treatment that could be construed as negative.
5. If unable or unwilling to accept transfer patients, consider referring the patient to another AAO member.

## **Evidence-Based Dentistry**

### *Definition*

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*

Hierarchical rating systems exist to grade individual or multiple studies based on the type of study design and effectiveness in answering a specific question. Evidence levels follow a structured hierarchy of criteria for grading strength of evidence, and some include assessment of the study's methodological quality, precision of statistical data for the population being studied (internal validity), and other considerations.

Examples of evidence ranging from a high to low-level:

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

### *Best Evidence*

The highest level of evidence available represents the current best evidence for a specific clinical question. Based on a hierarchy of levels of evidence, meta-analysis and systematic reviews of randomized controlled trials constitute the highest levels of current best evidence, and expert opinion the lowest level of evidence.

### *Evidence-Based Clinical Recommendations*

Evidence-Based clinical recommendations are developed through critical evaluation of the collective body of evidence on a particular topic to provide practical applications of scientific information that can assist orthodontists in clinical decision-making. In addition to scientific journals, dental schools, and approved courses, sources of this information may be found in the following locations:

1. Cochrane Collaboration  
An international nonprofit organization that develops evidence-based systematic reviews on health care interventions
2. MEDLINE™  
The National Library of Medicine's searchable database of over 12 million indexed citations from more than 4,600 medical, dental, health and scientific journals  
Additional information is available through the AAO Library.

## **HIPAA**

The United States Department of Health and Human Services issued comprehensive privacy regulations in December 2000 (modified in 2002 and 2003) which originated in the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The rules are a set of federal regulations that affects the practice of orthodontics.

Under the rules (applicable in 2008), orthodontists may “use” and “disclose” a patient’s “protected health information” only as the patient permits or as allowed under the privacy rules. Even where the use and disclosure of such information is permissible, orthodontists must adopt policies and procedures to safeguard and limit the use and disclosure of the information to the “minimum necessary” level required to accomplish the intended purpose of the use or disclosure.

In the context of this law, “protected health information” is “individually identifiable information” and includes names, dates, phone/fax numbers, email addresses, home addresses, social security numbers, and demographic data. Employment records are excluded from the definition unless used in connection with the provision of treatment.

The use or disclosure of the information for any purpose requires the patient's/guardians's prior written permission except for the purpose of the patient's treatment, payments activities, and "health care operations", for the treatment activities of any health care provider, and for payment activities of other covered entities such as insurance companies.

The privacy rules also give patients certain rights (amending their protected health information, the right to an accounting of certain disclosures, etc.). According to the rules, the orthodontist needs to appoint a "privacy official" within the practice and to adopt a privacy policy so internal changes can be implemented and monitored in the practice.

The security rules require persons and entities covered by HIPAA to assess the potential risks to, and vulnerabilities of, their computer systems, protect against threats to information security or integrity, implement and maintain security measures, and ensure compliance with these safeguards. The specific security rules can be obtained at:

<http://www.cms.hhs.gov/HIPAAGenInfo/Downloads/HIPAAALaw.pdf>

The privacy regulations only apply to health care providers who transmit (or authorize third party to transmit on their behalf) protected health information electronically. The regulations do not apply to AAO members who transmit information in paper form or via facsimile. The rules require that appropriate administrative, technical and physical safeguards are put in place for patients' protection. The orthodontist must designate a privacy official who can develop and implement the privacy procedures and a contact person who is responsible for receiving complaints and can respond on matters concerning privacy. Orthodontists must provide privacy training to their staff members within a reasonable amount of time after commencement of employment and training should be documented. The privacy rules require that orthodontists follow the "minimum necessary" rule (obligating practitioners to make reasonable efforts to use, disclose, and obtain the minimum amount of protected information reasonably required to achieve the intended purpose) in relation to the use and disclosure of protected patient information, and reasonably safeguard such information to limit incidental uses and disclosures.

The AAO website provides further details on the need for a written consent to use protected information for treatment, payment or health care operations. The website also details what the consent form should contain, what rights are given to patients by the rules, information concerning the extent of the accounting of disclosure that must be given, information about the type of privacy notice that must be given, and when written authorization from the patient/guardian must be obtained. Practitioners are encouraged to consult the AAO HIPAA Compliance Manual found on the AAO website (<http://www.aomembers.org/legal/hipaa>).

## 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. (Appendix A)

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.

A reprint of the 1996 Clinical Practice Guidelines was published in 2001.

The Board of Trustees decided at their May 2007 meeting to appoint a task force to review and recommend changes to the AAO document “Clinical Practice Guidelines for Orthodontics and Dentofacial Orthopedics 2001.” The 2008 Guidelines will be made available on the AAO members’ website so they will be more easily accessible. The task force was also asked to recommend a protocol to regularly update these Guidelines.

The task force members were assigned in September 2007 (Appendix C). Conference calls and emails between November 2007 and June 2008 were used to make edits and additions to the 2001 Clinical Practice Guidelines. After all changes had been fully discussed and agreed upon by the task force members, they were circulated to all AAO Councils for input. The task force considered whether or not any additional changes were to be made prior to approval by legal counsel and the Board of Trustees. The 2009 AAO House of Delegates approved this version of the Clinical Practice Guidelines.

## **Appendix B**

### **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 be made to reflect increasing knowledge and experience. This will take into account future practice developments, basic science and clinical research findings, and clinical data on treatment outcomes. In this manner, the guidelines will continue to evolve and serve as an important resource to the dental profession.

The AAO is committed to revising this document biennially. The AAO President will select an AAO Board member to chair the task force. One council member from three councils will be appointed to the taskforce. Councils providing members to the taskforce will rotate each time the guidelines are updated. An AAO staff member will also be appointed to the task force. The AAO Board of Trustees task force will be authorized to make minor revisions from time to time. The Clinical Practice Guidelines will be an online document only.

## Appendix C – Clinical Practice Guidelines Task Force Members

### 1994 Task Force Members

Dr. Charles S. Tjersland, Chairman  
Dr. Rolf G. Behrents  
Dr. Thomas J. Cangialosi  
Dr. Rodney C. Dubois  
Dr. Raymond George, Sr.  
Dr. Arnold J. Hill  
Dr. Laurance E. Jerrold  
Dr. Terry R. Pracht  
Dr. Donald R. Poulton, Trustee Liaison  
Mr. Terry G. Wolf, Staff Liaison

### 2007 Task Force Members

Dr. David Turpin, Chair and Trustee Liaison  
Dr. Michael Foy  
Dr. Jeffery Johnson  
Dr. Douglas Klein  
Dr. Gary Opin  
Dr. Robert Prince  
Dr. O.H. Rigsbee  
Dr. Emile Rossouw  
Dr. Bhavna Shroff  
Ms. Jackie Hittner, Staff Liaison

## Selected References

‘\*’ – denotes reference could not be verified.

### Introduction

American Academy of Periodontology. Guidelines for periodontal therapy. Chicago: American Academy of Periodontology; 1993.

American Association of Endodontists. Appropriateness of care and quality assurance guidelines of the American Association of Endodontists. Chicago: American Association of Endodontists; 1994.

American Association of Oral and Maxillofacial Surgeons. Parameters of care for oral and maxillofacial surgery. A guide for practice, monitoring and evaluation (AAOMS Parameters of Care 92). *Journal of Oral and Maxillofacial Surgery* 1992;50(7 Suppl 2) : i-xvi, 1-174.

American Association of Orthodontists. American Association of Orthodontists bylaws and principles of ethics. St. Louis: American Association of Orthodontists; 1994.

American Association of Orthodontists. Glossary of dentofacial orthopedic terms. St. Louis: American Association of Orthodontists; 1993.

American Association of Orthodontists. Guidelines for quality assessment of orthodontic care. St. Louis: American Association of Orthodontists; 1988.

American Dental Association. Standards for advanced specialty education programs in orthodontics. Chicago: American Dental Association; 1991.

Field MJ, Lohr KN. Guidelines for clinical practice: from development to use. Washington, DC: National Academy Press; 1992.

ICD-9-CM: the International classification of diseases, 9<sup>th</sup> revision, clinical modification. 4th ed. New York: McGraw-Hill; 1995.

Lovelace SE. Guiding the profession. *CDA Journal of the California Dental Association* 1993;21:30-6.

### Pretreatment Considerations

Ackerman JL, Proffit WR. The characteristics of malocclusion: a modern approach to classification and diagnosis. *American Journal of Orthodontics* 1969;56:443-54.

\*Albino JE. Psychosocial aspects of malocclusion. New York: Behavioral Health; 1984. p. 918-26.

Baumrind S, Frantz RC. The reliability of head film measurements. *American Journal of Orthodontics* 1971;60:111-27.

Bottomly WK. Patient health status evaluation procedures for the dental profession. Part I - Dental/medical history. *Journal of Oral Medicine* 1976;Spec. No:5-7.

Burstone CJ. Application of bioengineering to clinical orthodontics. In: Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 235-267.

Dale JG. Interceptive guidance of occlusion, with emphasis on diagnosis. In: Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 291-379.

Downs WB. The role of cephalometrics in orthodontic case analysis and diagnosis. *American Journal of Orthodontics* 1952;38:162-82.

Forsberg CT, Burstone CJ, Hanley KJ. Diagnosis and treatment planning of skeletal asymmetry with the submental-vertical radiograph. *American Journal of Orthodontics* 1984;85:224-37.

Graber TM. Panoramic radiography in orthodontic diagnosis. *American Journal of Orthodontics* 1967;53:799-821.

Grave KC, Brown T. Carpal radiographs in orthodontic treatment. *American Journal of Orthodontics* 1979;75:27-45.

Greulich WW, Pyle SI. *Radiographic atlas of skeletal development of the hand and wrist*. 2<sup>nd</sup> ed. Stanford, CA: Stanford University Press; 1959.

Horowitz SL, Hixon EH. *The nature of orthodontic diagnosis*. St. Louis: C.V. Mosby Co.; 1966.

Kaplan RG. Standardization for serial intraoral photography. *American Journal of Orthodontics* 1979;75:431-7.

Kenealy P, Frude N, Shaw W. An evaluation of the psychological and social effects of malocclusion: some implications for dental policy making. *Social Science and Medicine* 1989;28:583-91.

Kenealy P, Hackett P, Frude N, Lucas P, Shaw W. The psychological benefit of orthodontic treatment. Its relevance to dental health education. *New York State Dental Journal* 1991;57:32-4.

Larheim TA, Svanaes DB. Reproducibility of rotational panoramic radiography: mandibular linear dimensions and angles. *American Journal of Orthodontics and Dentofacial Orthopedics* 1986;90:45-51.

Macgregor FC. Social and psychological implications of dentofacial disfigurement. *Angle Orthodontist* 1970;40:231-3.

McLain JB, Proffit WR. Oral health status in the United States: prevalence of malocclusion. *Journal of Dental Education* 1985;49:386-97.

Moyers RE. Standards of human occlusal development. Craniofacial growth series No. 5 Ann Arbor, MI: Center for Human Growth and Development, University of Michigan; 1976.

Proffit WR, Ackerman JL. Diagnosis and treatment planning in orthodontics. In: Graber TM, Vanarsdall RL. Orthodontics: current principles and techniques. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 3-95.

Richmond S. Recording the dental cast in three dimensions. American Journal of Orthodontics and Dentofacial Orthopedics 1987;92:199-206.

Ricketts RM. Perspectives in the clinical application of cephalometrics. The first fifty years. Angle Orthodontist 1981;51:115-50.

Riedel RA. An analysis of dentofacial relationships. American Journal of Orthodontics 1957;43:103-19.

Riolo ML, Moyers RE, McNamara JA Jr, Hunter WS. An Atlas of craniofacial growth. Craniofacial growth series No. 2 Ann Arbor, MI: Center for Human Growth and Development, University of Michigan; 1974.

Romriell GE, Streeper SN. The medical history. Dental Clinics of North America 1982;26:3-11.

Shaw WC. The influence of children's dentofacial appearance on their social attractiveness as judged by peers and lay adults. American Journal of Orthodontics 1981;79:399-415.

Shaw WC, Meek SC, Jones DS. Nicknames, teasing, harassment and the salience of dental features among school children. British Journal of Orthodontics 1980;7:75-80.

Steiner CC. Cephalometries in clinical practice. Angle Orthodontist 1959;29:8-29.

Stutts WF. Clinical photography in orthodontic practice. American Journal of Orthodontics 1978;74:1-31.

Terezhalmay GT, Schiff T. The historical profile. Dental Clinics of North America 1986;30:357-68.

Vanarsdall RL, Musich DR. Adult orthodontics: diagnosis and treatment. In: Graber TM, Vanarsdall RL. Orthodontics: current principles and techniques. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 750-834.

Walker RP. Computer applications in orthodontics. In: Graber TM, Vanarsdall RL. Orthodontics: current principles and techniques. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 268-290.

## **Diagnosis and Treatment**

*Anomalies of Jaw Size, Relationship of Jaw to Cranial Base, Dental Arch Relationship and Dental Alveolus*

Alexander RG, Sinclair PM, Goates LJ. Differential diagnosis and treatment planning for the adult nonsurgical orthodontic patient. *American Journal of Orthodontics* 1986;89:95-112.

Arvystas MG. Treatment of anterior skeletal open-bite deformity. *American Journal of Orthodontics* 1977;72:147-64.

Barrer HG. The adult orthodontic patient. *American Journal of Orthodontics* 1977;72:617-40.

Bell WH, Jacobs JD, Legan HL. Treatment of Class II deep bite by orthodontic and surgical means. *American Journal of Orthodontics* 1984;85:1-20.

Bell WH, Jacobs JD, Quejada JG. Simultaneous repositioning of the maxilla mandible and chin. Treatment planning and analysis of soft tissues. *American Journal of Orthodontics and Dentofacial Orthopedics* 1986;89:28-50.

Bishara SE, Staley RN. Maxillary expansion: clinical implications. *American Journal of Orthodontics and Dentofacial Orthopedics* 1987;91:3-14.

Burstone CR. Deep overbite correction by intrusion. *American Journal of Orthodontics* 1977;72:1-22.

Cangialosi TJ, Meistrell ME Jr, Leung MA, Ko JY. A cephalometric appraisal of edgewise Class II nonextraction treatment with extraoral force. *American Journal of Orthodontics and Dentofacial Orthopedics* 1988;93:315-24.

Cangialosi TJ. Skeletal morphologic features of anterior open bite. *American Journal of Orthodontics* 1984;85:28-36.

Carlotti AE, George R. Differential diagnosis and treatment planning of the surgical orthodontic class III malocclusion. *American Journal of Orthodontics* 1981;79:424-36.

Case CS. The question of extraction in orthodontia. *American Journal Orthodontics* 1964;50:660-91.

Chaconas SJ, de Alba y Levy JA. Orthopedic and orthodontic applications of the quad-helix appliance. *American Journal of Orthodontics* 1977;72:422-8. *American Journal of Orthodontics and Dentofacial Orthopedics*

Epker BN, Fish L. Surgical-orthodontic correction of open-bite deformity. *American Journal of Orthodontics* 1977;71:278-99.

Epker BN, Wolford LM, Fish LC. Mandibular deficiency syndrome II. Surgical considerations for mandibular advancement. *Oral Surgery, Oral Medicine, and Oral Pathology* 1978;45:349-63.

Frankel R, Frankel C. A functional approach to treatment of skeletal open bite. *American Journal of Orthodontics* 1983;84:54-68.

Gianelly AA, Arena SA, Bernstein L. A comparison of Class II treatment changes noted with the light wire, edgewise, and Frankel appliances. *American Journal of Orthodontics* 1984;86:269-76.

Glassman AS, Nahigian SJ, Medway JM, Aronowitz HI. Conservative surgical orthodontic adult rapid palatal expansion: sixteen cases. *American Journal of Orthodontics* 1984;86:207-13.

Glenn G, Sinclair PM, Alexander RG. Nonextraction orthodontic therapy: posttreatment dental and skeletal stability. *American Journal of Orthodontics and Dentofacial Orthopedics* 1987;92:321-8.

Graber LW. Chin cup therapy for mandibular prognathism. *American Journal of Orthodontics* 1977;72:23-41.

Graber TM. Functional appliances. In: Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 383-436.

Holdaway RA. A soft-tissue cephalometric analysis and its use in orthodontic treatment planning. Part II. *American Journal of Orthodontics* 1984;85:279-93.

Jacobson A. The "Wits" appraisal of jaw disharmony. *American Journal of Orthodontics* 1975;67:125-38.

Magness WB. The mini-visualized treatment objective. *American Journal of Orthodontics and Dentofacial Orthopedics* 1987;91:361-74.

Moyers RE, Bookstein, FL, Hunter, WS. Section II: Diagnosis. In: Moyers RE. *Handbook of orthodontics*. 4<sup>th</sup> ed. Chicago: Year Book Medical Publishers; 1988. p. 165-301.

McNamara JA Jr, Hugu SA. The Frankel appliance (FR2): model preparation and appliance construction. *American Journal of Orthodontics* 1981;80:478-95.

McNamara JA Jr. An orthopedic approach to the treatment of Class III malocclusion in young patients. *Journal of Clinical Orthodontics* 1987;21:598-608.

McNamara JA. Mixed dentition treatment. In: Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 507-541.

Nahoum HI. Vertical proportions: a guide for prognosis and treatment in anterior open-bite. *American Journal of Orthodontics* 1977;72:128-46.

Pancherz H. A cephalometric analysis of skeletal and dental changes contributing to Class II correction in activator treatment. *American Journal of Orthodontics* 1984;85:125-34.

Pearson LE. Vertical control in fully-banded orthodontic treatment. *Angle Orthodontist* 1986;56:205-24.

Pearson LE. Treatment of a severe openbite excessive vertical pattern with an eclectic non-surgical approach. *Angle Orthodontist* 1991;61:71-6.

Pfeiffer JP, Grobety D. A philosophy of combined orthopedic-orthodontic treatment. *American Journal of Orthodontics* 1982;81:185-201.

Poulton DR, Ware WH. Increase in mandibular and chin projection with orthognathic surgery. *American Journal of Orthodontics* 1985;87:363-76.

Proffit WR, Ackerman JL. Diagnosis and treatment planning in orthodontics. In: Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 3-95.

Proffit WR, Ackerman JL, Fields HW. Section III: Diagnosis and treatment planning. In: Proffit WR. *Contemporary orthodontics*. 2<sup>nd</sup> ed. St. Louis: Mosby-Year Book; 1993. p. 139-264.

Richardson ER. Racial differences in dimensional traits of the human face. *Angle Orthodontist* 1980;50:301-11.

Riedel RA. An analysis of dentofacial relationships. *American Journal of Orthodontics* 1957;43:103-19.

Roth RH. The straight-wire appliance 17 years later. *Journal of Clinical Orthodontics* 1987;21:632-42.

Sakamoto T. Effective timing for the application of orthopedic force in the skeletal class III malocclusion. *American Journal of Orthodontics* 1981;80:411-6.

Skieller V, Bjork A, Linde-Hansen T. Prediction of mandibular growth rotation evaluated from a longitudinal implant sample. *American Journal of Orthodontics* 1984;86:359-70.

Stockli PW, Teuscher UM. Combined activator headgear orthopedics. In: Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 437-506.

Turpin DL. Befriend your oral and maxillofacial radiologist. *American Journal of Orthodontics and Dentofacial Orthopedics* 2007;131:697.

Wendell PD, Nanda R, Sakamoto T, Nakamura, S. The effects of chin cup therapy on the mandible: a longitudinal study. *American Journal of Orthodontics* 1985;87:265-74.

Wieslander L. Intensive treatment of severe Class II malocclusions with headgear-Herbst appliance in the early mixed dentition. *American Journal of Orthodontics* 1984;86:1-13.

Wieslander L, Lagerstrom L. The effect of activator treatment on class II malocclusions. *American Journal of Orthodontics* 1979;75:20-6.

Williams S, Andersen CE. The morphology of the potential Class III skeletal pattern in the growing child. *American Journal of Orthodontics* 1986;89:302-11.

Zachrisson BU. Bonding in orthodontics. In: Graber TM, Vanarsdall RL. Orthodontics: current principles and techniques. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 542-626.

*Anomalies of Tooth Position, Discrepancies of Tooth Size and Arch Length*

Bishara SE, Staley RN. Maxillary expansion: clinical implications. American Journal of Orthodontics and Dentofacial Orthopedics 1987;91:3-14.

Bolton WA. Disharmony in tooth size and its relation to the analysis and treatment of malocclusion. Angle Orthodontist 1958;28:113-30.

Bolton WA. The clinical application of a tooth-size analysis. American Journal Orthodontics 1962;48:504-29.

Clark JD, Williams JK. The management of spacing in the maxillary incisor region. British Journal of Orthodontics 1978;5:35-9.

Dale JG. Interceptive guidance of occlusion, with emphasis on diagnosis. In: Graber TM, Vanarsdall RL. Orthodontics: current principles and techniques. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 291-379.

Dewel BF. Serial extraction in orthodontics: indications, objectives, and treatment procedures. American Journal of Orthodontics 1954;40:906-26.

Howe RP, McNamara JA Jr, O'Connor KA. An examination of dental crowding and its relationship to tooth size and arch dimension. American Journal of Orthodontics 1983;83:363-73.

Jerrold L, Lowenstein LJ. The midline: diagnosis and treatment. American Journal of Orthodontics and Dentofacial Orthopedics 1990;97:453-62.

Lundstrom A. The aetiology of crowding of the teeth (based on studies of twins and on morphological investigations) and its bearing on orthodontic treatment (expansion or extraction). European Orthodontic Society Transactions 1951;176-91.

McKeown M. The diagnosis of incipient arch crowding in children. New Zealand Dental Journal 1981;77:93-96.

Mills LF. Arch width, arch length, and tooth size in young adult males. Angle Orthodontist 1964;34:124-9.

Mills LF. Epidemiologic studies of occlusion. IV. The prevalence of malocclusion in a population of 1,455 school children. Journal of Dental Research 1966;45:332-6.

Moorrees CF, Reed RB. Biometrics of crowding and spacing of the teeth in the mandible. American Journal of Physical Anthropology 1954;12:77-88.

Moyers RE. Standards of human occlusal development. Craniofacial growth series No. 5 Ann Arbor, MI: Center for Human Growth and Development, University of Michigan; 1976.

Peck H, Peck S. An index for assessing tooth shape deviations as applied to the mandibular incisors. *American Journal of Orthodontics* 1972;61:384-401.

Poulton DR. The influence of extraoral traction. *American Journal of Orthodontics* 1967;53:8-18.

Proffit WR, Ackerman JL, Fields HW. Section III: Diagnosis and treatment planning. In: Proffit WR. *Contemporary orthodontics*. 2<sup>nd</sup> ed. St. Louis: Mosby-Year Book; 1993. p. 139-264.

Sheridan JJ. Air-rotor stripping update. *Journal of Clinical Orthodontics* 1987;21:781-8.  
Spillane LM, McNamara JA. Arch width development relative to initial transpalatal width. *Journal of Dental Research - Abstracts of Papers* 1989;68:374 (abstract #1538).

Terwilliger KF. Treatment in the mixed dentition. *Angle Orthodontist* 1950;20:109-13.

Tweed CH. A philosophy of orthodontic treatment. *American Journal Orthodontics and Oral Surgery* 1945;31:74-103.

Tweed CH. *Clinical orthodontics*. St. Louis: C.V. Mosby; 1966.

*Abnormalities of Tooth Number, Morphology, and Eruption Pattern*

Andreasen JO, Paulsen HU, Yu Z, Bayer T, Schwartz O. A long-term study of 370 autotransplanted premolars. Part II. Tooth survival and pulp healing subsequent to transplantation. *European Journal of Orthodontics* 1990;12:14-24.

Becker A, Bimstein E, Shteyer A. Interdisciplinary treatment of multiple unerupted supernumerary teeth. Report of a case. *American Journal of Orthodontics* 1982;81:417-22.

Cangialosi TJ. Management of a maxillary central incisor impacted by a supernumerary tooth. *Journal of the American Dental Association* 1982;105:812-4.

\*Dibase D. Mucous membrane and delayed eruption. *Transactions of the British Society for the Study of Orthodontics* 1969/70;56:149-58.

Ericson S, Kurol J. Early treatment of palatally erupting maxillary canines by extraction of the primary canines. *European Journal of Orthodontics* 1988;10:283-95.

Joondeph DR, McNeill RW. Congenitally absent second premolars: an interceptive approach. *American Journal of Orthodontics* 1971;59:50-66.

Kennedy DB, Turley, PK. The clinical management of ectopically erupting first permanent molars. *American Journal of Orthodontics and Dentofacial Orthopedics* 1987;92:336-45.

Kurol J, Bjerklind K. Treatment of children with ectopic eruption of the maxillary first permanent molar by cervical traction. *American Journal of Orthodontics* 1984;86:483-92.

Kurol J, Thilander B. Infraocclusion of primary molars and the effect on occlusal development, a longitudinal study. *European Journal of Orthodontics* 1984;6:277-93.

Mitchell L, Bennett TG. Supernumerary teeth causing delayed eruption-a retrospective study. *British Journal of Orthodontics* 1992;19:41-6.

Moorrees CFA. The dentition of the growing child; a longitudinal study of dental development between 3 and 18 years of age. Cambridge: Harvard University Press; 1959.

Paulsen HU, Andreasen JO, Schwartz O. Pulp and periodontal healing, root development and root resorption subsequent to transplantation and orthodontic rotation: a long term study of autotransplanted premolars. *American Journal of Orthodontics and Dentofacial Orthopedics* 1995;108:630-40.

Peck S, Peck L. Classification of maxillary tooth transpositions. *American Journal of Orthodontics and Dentofacial Orthopedics* 1995;107:505-17.

Primosch RE. Anterior supernumerary teeth - assessment and surgical intervention in children. *Pediatric Dentistry* 1981;3:204-15.

Pulver P. The etiology and prevalence of ectopic eruption of the maxillary first permanent molar. *ASDC Journal of Dentistry for Children* 1968;35:138-46.

Sandler JP. An attractive solution to unerupted teeth. *American Journal of Orthodontics and Dentofacial Orthopedics* 1991;100:489-93.

Schatz JP, Joho JP. Indications of autotransplantation of teeth in orthodontic problem cases. *American Journal of Orthodontics and Dentofacial Orthopedics* 1994;106:351-7.

Vardimon AD, Graber TM, Drescher D, Bourauel C. Rare earth magnets and impaction. *American Journal of Orthodontics and Dentofacial Orthopedics* 1991;100:494-512.

### *Dentofacial Functional Abnormalities*

American Association of Orthodontists House of Delegates. Resolution Number 58-93, May 1993.

American Association of Orthodontists. Glossary of dentofacial orthopedic terms. St. Louis: American Association of Orthodontists; 1993.

Andrianopoulos MV, Hanson ML. Tongue-thrust and the stability of overjet correction. *Angle Orthodontist* 1987;57:121-35.

Baumrind S, Korn EL, Isaacson RJ, West EE, Molthen R. Superimpositional assessment of treatment-associated changes in the temporomandibular joint and the mandibular symphysis. *American Journal of Orthodontics* 1983;84:443-65.

Behrents RG, White RA. TMJ research: responsibility and risk. *American Journal of Orthodontics and Dentofacial Orthopedics* 1992;101:1-3.

Bushey RS. Adenoid obstruction of the nasopharynx. In: Moyers RE, McNamara, JA, Ribbens, KA. Naso-respiratory function and craniofacial growth: this volume includes the proceedings of a sponsored symposium, honoring Professor Robert E. Moyers held February 23 and 24, 1979, in Ann Arbor, Michigan. Craniofacial growth series No. 9 Ann Arbor, MI: Center for Human Growth and Development, University of Michigan; 1979. p. 199-232.

Dibbets JM, van der Weele LT. The prevalence of joint noises as related to age and gender. *Journal of Craniomandibular Disorders* 1992;6:157-60.

Fields HW, Warren DW, Black K, Phillips CL. Relationship between vertical dentofacial morphology and respiration in adolescents. *American Journal of Orthodontics and Dentofacial Orthopedics* 1991;99:147-54.

Graber TM. The "three M's": Muscles, malformation, and malocclusion. *American Journal of Orthodontics* 1963;49:418-50.

Graber TM. Postmortems in posttreatment adjustment. *American Journal of Orthodontics* 1966;52:331-52.

Grummons D. *Orthodontics for the TMJ-TMD patient*. Scottsdale, Ariz.: Wright, & Co. Publishers; 1994.

Harvold EP, Tomer BS, Vargervik K, Chierici G. Primate experiments on oral respiration. *American Journal of Orthodontics* 1981;79:359-72.

Haryett RD, Hansen FC, Davidson PO. Chronic thumb sucking. A second report on treatment and its psychological effects. *American Journal of Orthodontics* 1970;57:164-78.

Ingervall B. Orthodontic treatment in adults with temporomandibular dysfunction symptoms. *American Journal of Orthodontics* 1978;73:551-9.

Jones AG, Bhatia S. A study of nasal respiratory resistance and craniofacial dimensions in white and West Indian black children. *American Journal of Orthodontics and Dentofacial Orthopedics* 1994;106:34-9.

Kerr WJ, McWilliam JS, Linder-Aronson S. Mandibular form and position related to changed mode of breathing- a five-year longitudinal study. *Angle Orthodontist* 1989;59:91-6.

Larsson EF, Dahlin KG. The prevalence and the etiology of the initial dummy- and finger-sucking habit. *American Journal of Orthodontics* 1985;87:432-5.

Linder-Aronson S. Adenoids. Their effect on mode of breathing and nasal airflow and their relationship to characteristics of the facial skeleton and the dentition. A biometric, rhinomanometric and cephalometro-radiographic study on children with and without adenoids. *Acta Oto-Laryngologica. Supplement (Oslo)* 1970;265:1-132.

Linder-Aronson S. Effects of adenoidectomy on dentition and nasopharynx. *Transactions. European Orthodontic Society* 1972;177-86.

Linder-Aronson S, Leighton BC. A longitudinal study of the development of the posterior nasopharyngeal wall between 3 and 16 years of age. *European Journal of Orthodontics* 1983;5:47-58.

Linder-Aronson S, Woodside DG, Hellsing E, Emerson W. Normalization of incisor position after adenoidectomy. *American Journal of Orthodontics and Dentofacial Orthopedics* 1993;103:412-27.

Mason RM. Orthodontic perspectives on orofacial myofunctional therapy. *International Journal of Oral and Maxillofacial Surgery* 1988;14:49-55.

McNeill C. *Cranio-mandibular disorders: guidelines for evaluation, diagnosis, and management.* Chicago: Quintessence Publishing Company; 1990.

Morgan DH, Hall WP, Vamvas SJ. *Diseases of the temporomandibular apparatus: a multidisciplinary approach.* St. Louis: Mosby, 1977.

Moss JP. The soft tissue environment of teeth and jaws. An experimental and clinical study: part 1. *British Journal of Orthodontics* 1980;7:107-37.

Niinimaa V, Cole P, Mintz S, et al. Oronasal distribution of respiratory airflow. *Respiration Physiology* 1981;43:69-75.

Proffit WR. Lingual pressure patterns in the transition from tongue thrust to adult swallowing. *Archives of Oral Biology* 1972;17:555-63.

Roth RH. Functional occlusion for the orthodontist. Part III. *Journal of Clinical Orthodontics* 1981; 15:174-9, 182-98.

Sadowsky S, BeGole EA. Long-term status of temporomandibular joint function and functional occlusion after orthodontic treatment. *American Journal of Orthodontics* 1980;78:201-12.

Stringert HG, Worms FW. Variations in skeletal and dental patterns in patients with structural and functional alterations of the temporomandibular joint: a preliminary report. *American Journal of Orthodontics* 1986; 89:285-97.

Subtelny JD. Oral habits - studies in form, function and therapy. *Angle Orthodontist* 1973;43:349-83.

Tamari K, Murakami T, Takahama Y. The dimensions of the tongue in relation to its motility. *American Journal of Orthodontics and Dentofacial Orthopedics* 1991;99:140-6.

Vig KW. Orthodontic considerations applied to craniofacial dysmorphology. *Cleft Palate Journal* 1990;27:141-5.

Vig PS, Sarver DM, Hall DJ, Warren DW. Quantitative evaluation of nasal airflow in relation to facial morphology. *American Journal of Orthodontics* 1981;79:263-72.

Vig PS, Showfety KJ, Phillips C. Experimental manipulation of head posture. *American Journal of Orthodontics* 1980;77:258-68.

Watson RM Jr, Warren DW, Fischer ND. Nasal resistance, skeletal classification and mouth breathing in orthodontic patients. *American Journal of Orthodontics* 1968;54:367-79.

Williamson EH. Temporomandibular dysfunction in pretreatment adolescent patients. *American Journal of Orthodontics* 1977;72:429-33.

*Craniofacial Anomalies, Cleft Lip and Palate*

American Cleft Palate-Craniofacial Association. Parameters for evaluation and treatment of patients with cleft lip/palate or other craniofacial anomalies. *Cleft Palate Craniofacial Journal* 1993;30 Suppl:S1-16.

Gorlin RJ, Pindborg JJ. *Syndromes of the head and neck*. New York: McGraw-Hill; 1964.

Graber TM. Craniofacial morphology in cleft palate and cleft lip deformities. *Surgery, Gynecology and Obstetrics* 1949;88:359-69.

Horowitz SL, Hixon EH. *The nature of orthodontic diagnosis*. St. Louis: C.V. Mosby Co.; 1966.

Iyer VS, Desai DM. Acceptable deviations in normal dentitions. *Angle Orthodontist* 1963;33:253-7.

Jacobson BN, Rosenstein SW. Early maxillary orthopedics for the newborn cleft lip and palate patient. An impression and an appliance. *Angle Orthodontist* 1984;54:247-63.

Johnson AL. *Basic principles of orthodontia*. Dental Cosmos 1923;65:503-518.

Kernahan DA, Rosenstein SW. *Cleft lip and palate: a system of management*. Baltimore: Williams & Wilkins, 1990.

Moyers RE. Standards of human occlusal development. Craniofacial growth series No. 5 Ann Arbor, MI: Center for Human Growth and Development, University of Michigan; 1976.

Popovich F, Thompson GW. Craniofacial templates for orthodontic case analysis. *American Journal of Orthodontics* 1977;71:406-20.

Rollnick BR, Pruzansky S. Genetic services at a center for craniofacial anomalies. *Cleft Palate Journal* 1981;18:304-13.

Rosenstein SW. Early habilitation of the cleft lip and palate child. In: Johnston LE. *New vistas in orthodontics*. Philadelphia: Lea & Febiger; 1985. p. 320-40.

Ross RB. Treatment variables affecting facial growth in complete unilateral cleft lip and palate. *Cleft Palate Journal* 1987;24:5-77.

Shprintzen RJ, Siegel-Sadewitz VL, Amato J, Goldberg RB. Anomalies associated with cleft lip, cleft palate, or both. *American Journal of Medical Genetics* 1985;20:585-95.

Turvey TA, Vig K, Moriarty J, Hoke J. Delayed bone grafting in the cleft maxilla and palate: a retrospective multidisciplinary analysis. *American Journal of Orthodontics* 1984;86:244-56.

Vig KW, Turvey TA. Orthodontic-surgical interaction in the management of cleft lip and palate. *Clinics in Plastic Surgery* 1985;12:735-48.

### **Treatment Objectives and Limiting Factors**

Bolton WA. Disharmony in tooth size and its relation to the analysis and treatment of malocclusion. *Angle Orthodontist* 1958;28:113-30.

Gianelly AA, Arena SA, Bernstein L. A comparison of Class II treatment changes noted with the light wire, edgewise, and Frankel appliances. *American Journal of Orthodontics* 1984;86:269-76.

Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994.

Little RM, Riedel RA, Artun J. An evaluation of changes in mandibular anterior alignment from 10 to 20 years postretention. *American Journal of Orthodontics and Dentofacial Orthopedics* 1988;93:423-8.

Little RM. Stability and relapse of dental arch alignment. *British Journal of Orthodontics* 1990;17:235-41.

Nance HN. The limitations of orthodontic treatment: I. Mixed dentition diagnosis and treatment. *American Journal of Orthodontics and Oral Surgery* 1947;33:177-223.

Nance HN. The limitations of orthodontic treatment: II. Diagnosis and treatment in the permanent dentition. *American Journal of Orthodontics and Oral Surgery* 1947;33:253-301.

Proffit WR. *Contemporary orthodontics*. 2<sup>nd</sup> ed. St. Louis: Mosby-Year Book; 1993.

Sharpe W, Reed B, Subtelny JD, Polson A. Orthodontic relapse, apical root resorption, and crestal alveolar bone levels. *American Journal of Orthodontics and Dentofacial Orthopedics* 1987;91:252-8.

Strang RHW. Conditions influencing the prognosis. In: Strang RHW. *A textbook of Orthodontia*. 2<sup>nd</sup> ed. Philadelphia: Lea & Febiger; 1943. p. 233-5.

Tirk TM. Limitations in orthodontic treatment. *Angle Orthodontist* 1965;35:165-77.

van der Linden FPGM. Over de achtergronden van success en mislukking bij de behandeling van angle klasse II/I-afwijkingen [Success and Failures after Treatment of Angle Class II/I Anomalies]. *Nederlands Tijdschrift voor Tandheelkunde* 1964;71:505-20. [Dutch]

\*van der Linden FPGM. Possibilities and Limitations of Orthodontic Appliances. *Studieweek*, 1965.

### **Treatment Consultation and Informed Consent**

Artun J. Caries and periodontal reactions associated with long-term use of different types of bonded lingual retainers. *American Journal of Orthodontics* 1984;86:112-8.

Copeland S, Green LJ. Root resorption in maxillary central incisors following active orthodontic treatment. *American Journal of Orthodontics and Dentofacial Orthopedics* 1986;89:51-5.

Davidson WM, Sheinis EM, Shepherd SR. Tissue reaction to orthodontic adhesives. *American Journal of Orthodontics* 1982;82:502-7.

Geiger AM. Mucogingival problems and the movement of mandibular incisors: a clinical review. *American Journal of Orthodontics* 1980;78:511-27.

Gorelick L, Geiger AM, Gwinnett AJ. Incidence of white spot formation after bonding and banding. *American Journal of Orthodontics* 1982;81:93-8.

Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994.

Horowitz SL, Hixon EH. Norms, classification, and treatment goals. In: Horowitz SL, Hixon EH. *The nature of orthodontic diagnosis*. St. Louis; C.V. Mosby Co.; 1966. p. 325-43.

Jerrold L. Informed consent in orthodontics. *American Journal of Orthodontics and Dentofacial Orthopedics* 1988;93:251-8.

Johnson AL. Basic principles of orthodontia. *Dental Cosmos* 1923;65:503-518.

Langford SR, Sims MR. Upper molar root resorption because of distal movement. Report of a case. *American Journal of Orthodontics* 1981;79:669-79.

Machen DE. Legal aspects of orthodontic practice: risk management concepts. Alternative treatment plans. *American Journal of Orthodontics and Dentofacial Orthopedics* 1991;99:91-2.

Moyers RE. Standards of human occlusal development. Craniofacial growth series No. 5 Ann Arbor, MI: Center for Human Growth and Development, University of Michigan; 1976.

Popovich F, Thompson GW. Craniofacial templates for orthodontic case analysis. *American Journal of Orthodontics* 1977;71:406-20.

Proffit WR. Contemporary orthodontics. 2<sup>nd</sup> ed. St. Louis: Mosby-Year Book; 1993.

Remington DN, Joondeph DR, Artun J, Riedel, RA, Chapko MK. Long-term evaluation of root resorption occurring during orthodontic treatment. *American Journal of Orthodontics and Dentofacial Orthopedics* 1989;96:43-6.

Rinchuse DJ, Rinchuse DJ, Sosovicka MF, Robison JM, Pendleton R. Orthodontic treatment of patients using bisphosphonates: a report of 2 cases. *American Journal of Orthodontics and Dentofacial Orthopedics* 2007;131:321-6.

Rizzoli R, Bulet N, Cahall D, Delmas PD, Eriksen EF, Felsenberg D, Grbic J, Jontell M, Landesberg R, Laslop A, Wollenhaupt M, Papapoulos S, Sezer O, Sprafka M, Reginster JY. Osteonecrosis of the jaw and bisphosphonate treatment for osteoporosis. *Bone* 2008;42:841-7.

Younis O, Hughes DO, Weber FN. Enamel decalcification in orthodontic treatment. *American Journal of Orthodontics* 1979;75:678-81.

Zachrisson BU. Bonding in orthodontics. In: Graber TM, Vanarsdall RL. *Orthodontics: current principles and techniques*. 2<sup>nd</sup> ed. St. Louis: Mosby; 1994. p. 542-626.

### **Post Treatment Evaluation and Outcomes Assessment**

American Association of Orthodontists. Guidelines for quality assessment of orthodontic care. St. Louis: American Association of Orthodontists; 1988.

Bader JD. Variation, treatment outcomes, and practice guidelines in dental practice. *Journal of Dental Education* 1995;59:61-95.

Boyd RL. Two-year longitudinal study of a peroxide-fluoride rinse on decalcification in adolescent orthodontic patients. *Journal of Clinical Dentistry* 1992;3:83-7.

Chateau M, Demoge PH. Evaluation of long term results of orthodontic therapy. *International Dental Journal* 1961;11:29-46.

Goto S, Boyd RL, Nielsen L, Iizuka T. Long-term followup of orthodontic treatment of a patient with maxillary protrusion, severe deep overbite and thumb-sucking. *Angle Orthodontist* 1994;64:7-12.

Graber TM. Postmortems in posttreatment adjustment. *American Journal of Orthodontics* 1966;52:331-52.

Korkhaus G (moderator). Posttreatment appraisal of orthodontic results. *European Orthodontic Society Transactions* 1961;73-97.

Little RM, Riedel RA, Engst ED. Serial extraction of first premolars-postretention evaluation of stability and relapse. *Angle Orthodontist* 1990;60:255-62.

Little RM, Riedel RA, Stein A. Mandibular arch length increase during the mixed dentition: postretention evaluation of stability and relapse. *American Journal of Orthodontics and Dentofacial Orthopedics* 1990;97:393-404.

Little RM, Riedel RA. Postretention evaluation of stability and relapse-mandibular arches with generalized spacing. *American Journal of Orthodontics and Dentofacial Orthopedics* 1989;95:37-41.

McReynolds DC, Little RM. Mandibular second premolar extraction-postretention evaluation of stability and relapse. *Angle Orthodontist* 1991;61:133-44.

Pennsylvania Dental Association. Quality assessment guidelines. Harrisburg, PA: Pennsylvania Dental Association; 1993.

Riedel RA, Little RM, Bui TD. Mandibular incisor extraction-postretention evaluation of stability and relapse. *Angle Orthodontist* 1992;62:103-16.

Sadowsky C, Theisen TA, Sakols EI. Orthodontic treatment and temporomandibular joint sounds-a longitudinal study. *American Journal of Orthodontics and Dentofacial Orthopedics* 1991;99:441-7.

Wade DB. Outcomes assessed by orthodontic programs. *American Journal of Orthodontics and Dentofacial Orthopedics* 1994;106:109.

## **Retention**

Behrents RG. A treatise on the continuum of growth in the aging craniofacial skeleton. [thesis] Ann Arbor, MI: University of Michigan; 1984.

Kaplan H. The logic of modern retention procedures. *American Journal of Orthodontics and Dentofacial Orthopedics* 1988;93:325-40.

Little RM, Riedel RA, Artun J. An evaluation of changes in mandibular anterior alignment from 10 to 20 years postretention. *American Journal of Orthodontics and Dentofacial Orthopedics* 1988;93:423-8.

Little RM, Wallen TR, Riedel RA. Stability and relapse of mandibular anterior alignment-first premolar extraction cases treated by traditional edgewise orthodontics. *American Journal of Orthodontics* 1981;80:349-65.

Lopez-Gavito G, Wallen TR, Little RM, Joondeph DR. Anterior open-bite malocclusion: a longitudinal 10-year postretention evaluation of orthodontically treated patients. *American Journal of Orthodontics* 1985;87:175-86.

Reitan K. Tissue rearrangement during retention of orthodontically rotated teeth. *Angle Orthodontist* 1959;29:105-13.

Reitan K. Principles of retention and avoidance of posttreatment relapse. *American Journal of Orthodontics* 1969;55:776-90.

Sondhi A, Cleall JF, BeGole EA. Dimensional changes in the dental arches of orthodontically treated cases. *American Journal of Orthodontics* 1980;77:60-74.

Zachrisson BU. Adult retention: a new approach. In: Graber LW, Graber TM. *Orthodontics, state of the art, essence of the science*. St. Louis: Mosby; 1986. p. 310-27.

### **Record Keeping**

American Association of Orthodontists. *Orthodontics a patient education guide*. St. Louis: American Association of Orthodontists; 1991.

Eash C. Personnel file and recordkeeping. *American Journal of Orthodontics and Dentofacial Orthopedics* 1994;105:610-1.

Jerrold L. Dental records and record keeping. *American Journal of Orthodontics and Dentofacial Orthopedics* 1993;104:98-9.

Machen DE. Legal aspects of orthodontic practice: risk management concepts. Excellent diagnostic informed consent practice and record keeping make a difference. *American Journal of Orthodontics and Dentofacial Orthopedics* 1990;98:381-2.

Morin DR. The patient's records and the defense of dental malpractice claims. *American Journal of Orthodontics and Dentofacial Orthopedics* 1992;102:569-70.

### **Transfer of Orthodontic Patients**

American Association of Orthodontists. *American Association of Orthodontists bylaws and principles of ethics*. St. Louis: American Association of Orthodontists; 1994.

American Association of Orthodontists. Guidelines for transfer of orthodontic cases. St. Louis: American Association of Orthodontists; 1993.