

Module 1

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Expected learning outcomes and related competencies:

Demonstrate a basic understanding of orthodontic procedures including the necessary armamentarium and the role of the dental assistant.

1. Describe the design of a typical orthodontic practice.
2. Define, spell and pronounce the Key Words and Concepts
3. Identify and classify the different types of malocclusion.
4. Describe a habit and it's effect on the dentition
5. Discuss the biggest differences between adult and adolescent treatment.
6. Differentiate between interceptive and corrective phases of orthodontic treatment.
7. Describe the types of diagnostic records used in orthodontic treatment planning.
8. Differentiate between fixed and removable appliances.
9. Identify the components of the fixed appliance system.

Introduction Module Outline

- A Introduction
 1. The Orthodontic specialty practice
 2. The Orthodontic office
 3. The Orthodontic assistant
 4. Key Words And Concepts

- B. Facial and Dental Discrepancies
 1. Eruption and exfoliation of teeth
 2. Classification of Malocclusions

- C. Treatment Sequencing
 1. Diagnostic records
 2. Preventative Treatment
 3. Interceptive Treatment
 4. Comprehensive Treatment

- D. Role of the Auxiliary
 - 1. Diagnostic records
 - 2. Patient treatment
 - 3. Patient education
 - 4. Appliance wear/care instruction

- E. Dental Practice Act
 - 1. Scope of Practice
 - 2. Requirements for licensing
 - 3. DA, OAP Duties included and NOT included

- F. Infection Control
 - 1. Basic Infection Control
 - 2. Cross contamination
 - 3. Myths
 - 4. Common Q.s & A.s

Introduction to Orthodontics and patient information

This section introduces you to the specialty practice of orthodontics. Much of this material is available in patient education brochures and [Orthodontics: A Patient Education Guide](#) made available by the American Association of Orthodontists. Many orthodontists are also making informative material available online, some with accompanying photos or videos. The wealth of information available and its easy access has helped patients become more educated and informed regarding their options, care and the benefits of seeking such care. You will need to have a working knowledge of this information to assist the orthodontist both in treating and informing patients.

Definition

An orthodontist is a specialist in the diagnosis, prevention and treatment of dental and facial irregularities. They limit their practice to orthodontic treatment only. A general dentist may provide orthodontic services, just as they can perform the procedures of any other dental specialty, but without the additional training they cannot call themselves orthodontists.

All orthodontists are dentists, but only about six percent of dentists are orthodontists. Admission to orthodontic training programs is extremely competitive and selective. It takes many years to become an orthodontist and the educational requirements are demanding.

An orthodontist must complete college requirements before starting a three to five year graduate program at a dental school accredited by the American Dental Association

(ADA). After dental school, at least two or three academic years of advanced specialty education in an ADA-accredited orthodontic program are required to be an orthodontist. (The majority of accredited training programs are now three years in length.) The program includes advanced education in biomedical, behavioral and basic sciences and results in a master's degree, a certificate of training, or both.

The orthodontic student learns the complex skills required to manage tooth movement (orthodontics) and guide facial development (dentofacial orthopedics).

Only dentists who have successfully completed these advanced specialty education programs may call themselves orthodontists

The Orthodontic Assistant

For assistants looking for an area of dentistry with greater autonomy, orthodontics is the specialty of choice. The orthodontic assistant is able to participate in many 'hands-on' procedures. Depending upon the level of training (see section on The Dental Practice Act), the duties the orthodontic assistant is allowed to perform varies. They can include the taking of diagnostic records (intraoral and extraoral photos, study models, bite registrations, facebow transfers, digital or conventional x-rays), procedures during preliminary appointments (fitting of bands, preparing teeth for bonding), appliance adjustments (tying and untying arch wires), appliance removal (aiding with debonding and debanding procedures, removing cement and adhesive materials by hand or with the aid of ultrasonics), retention (checking fit and condition of retainers) and patient education (reviewing instructions on the wear and care of various active and retentive orthodontic appliances, oral hygiene, etc.) and motivation (wearing elastics, being on time for appointments, cooperating with headgear, appliance wear, etc).

The Orthodontic Office

Orthodontic offices are routinely designed differently than a general dental office. An 'open bay' floor plan is typically used (meaning few separating walls and individual treatment rooms or operatories) and is geared for accommodating a large number of patients at the same time.

The office may have various treatment areas designed for certain procedures to be taking place simultaneously. For example, diagnostic study models may be taken in one area, diagnostic x-rays in another, a treatment consultation may be occurring in another area, patients may be in an 'on deck' waiting area, waiting to use the tooth brushing room or to be seen for their periodic adjustment appointment, while adult patients may have their treatment in a more secluded treatment room (similar to the separate dental treatment rooms in a general dental office).

The schedule can be quite busy, especially in the afternoon, as the bulk of the patients will be of school age and most parents try to have their children miss as little school as possible. For this reason the longer appointments (placing of the orthodontic appliances (braces)) and the removal (debanding and debonding) often take place in the morning, while the shorter appointment (adjustments, reties, retainer checks, emergencies) take place in the afternoon.

Most orthodontic offices have a sizeable dental lab and may employ their own lab technician as diagnostic study models and appliances (e.g. retainers) are often made “in house”.

Orthodontic Terminology (Key Words and Concepts)

Throughout this module and others you will be exposed to terms and concepts that you will need to understand. This list is by no means exhaustive (see subsequent modules) and a good introductory textbook on orthodontics is highly recommended reading.

anterior tongue thrust - the tongue rests on the lingual surfaces of the maxillary teeth.

arch wire - a metal or coated (esthetic) wire that provides force when attached to the teeth (with elastic or steel ties) to the brackets or bands (which are bonded or cemented to the teeth).

auxiliary - attachment located on brackets and bands that hold arch wires and elastics

band - stainless steel ring attached to teeth (primarily molars and bicuspids) to hold the arch wire and auxiliaries for orthodontics. Typically has a facial bracket and may have a lingual attachment as well (i.e. a cleat or a sheath)

braces - another term for fixed orthodontic appliances.

bracket - a small device bonded to teeth to hold the arch wire to the teeth.

bruxism - Involuntary grinding or clenching of the teeth in movements other than chewing. This occurs most frequently during sleep. The grinding of teeth causes unnatural wear of the enamel and pressure on the periodontium.

Centric occlusion - occurs when the jaws are closed in a position that produces maximal stable contact between the occluding surfaces of the maxillary and mandibular teeth. In this position, the condyles are seated in an unstrained position in the glenoid fossa.

cephalometric radiograph - an extraoral radiograph of the bones and tissues of the head.

crossbite - condition that occurs when a tooth is not properly aligned facio-lingually with its opposing tooth or teeth.

crowding - condition that occurs when teeth are not properly aligned in the arch.

dentofacial - structures that include the teeth, jaws, and surrounding facial bones.

distocclusion - a class II malocclusion in which the mesiobuccal cusp of the maxillary first molar occludes mesial to the mesiobuccal groove of the mandibular first molar.

fetal molding - pressure applied to the jaw, causing a distortion.

fiberotomy - a minor surgical procedure that releases tiny elastic fibers around teeth.

frenectomy - a minor surgical procedure that removes or repositions a portion of the frenum.

functional appliance – fixed or removable appliance that repositions the jaws

functional occlusion - the term used to describe contact of the teeth during biting and chewing movements (also known as physiologic occlusion).

headgear - an external orthodontic appliance that is used to control growth and tooth movement.

ligature tie – a soft, light wire that can be used to hold the arch wire in its bracket.

linguoversion refers to the position of the maxillary incisors behind the mandibular incisors (anterior crossbite). Normally, the maxillary incisors slightly overlap the front of the mandibular incisors.

malocclusion - abnormal or malpositioned relationships of the maxillary teeth to the mandibular teeth when they are in centric occlusion (i.e. occlusion that is deviated from a class I normal occlusion).

mesioclusionion - a class III malocclusion in which the mesiobuccal cusp of the maxillary first molar occludes distal to the mesiobuccal groove of the mandibular first molar.

mouth breathing - may be the result of narrowing of the maxilla or blockage of the nasal airway. If present for a number of years it can cause a change in the dentofacial structure of the child.

occlusion - the natural contact of the maxillary and mandibular teeth in all positions.

open bite - a lack of vertical overlap of the maxillary incisors with the mandibular incisors, creating an opening of the anterior teeth.

orthodontics - specialty of dentistry designed to prevent, intercept, and correct skeletal and dental problems.

osteoblasts – cells responsible for the building up of bone

osteoclasts – cells responsible for the breakdown of bone

overbite - increased vertical overlap of the maxillary incisors with the mandibular incisors. In an extreme overbite, the mandibular incisors may not be visible. overjet is excessive protrusion of the maxillary incisors, causing space or distance between the facial surface of the mandibular incisors and the lingual surface of the maxillary incisors.

parafunction – function demanded of the teeth and jaws outside the norm (i.e. bruxism)

retainer - an appliance used for maintaining the positions of the teeth and jaws after orthodontic treatment.

separator - a device made from wire or elastic and used to separate teeth before fitting and placement of orthodontic bands.

space maintainer – fixed or removable appliance designed to prevent loss of space

tongue thrust swallowing - the tongue presses forward against the anterior teeth with each swallow, placing a forward pressure against the teeth

Chronology of Emergence and Exfoliation

It is important to have a general idea of what teeth you should expect to see in a patient's mouth at any given age. As you will come to learn, there can be a large age variation between individuals as far as when their deciduous teeth emerge, when they exfoliate and when the permanent teeth erupt.

Primary teeth - lateral and anterior views. see figures 1, 2

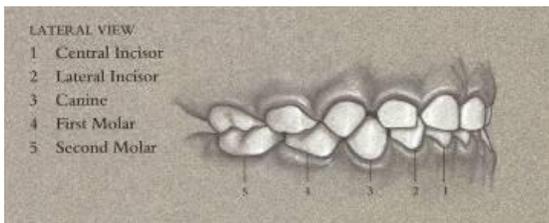


fig. 1

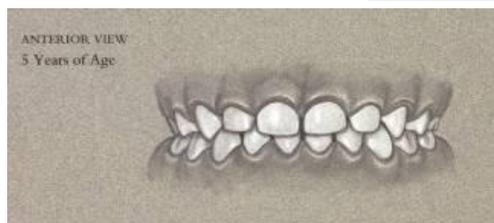


fig. 2

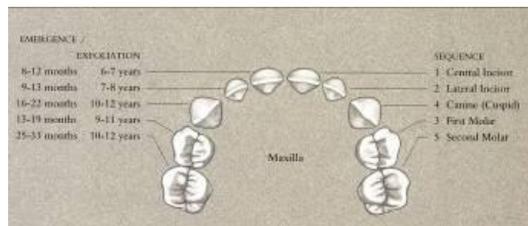


fig. 3

Mandibular arch – eruption. see figure 4

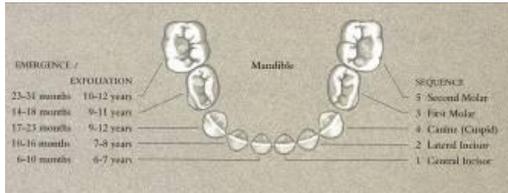


fig. 4

Permanent teeth – lateral and anterior views. see figures 5, 6

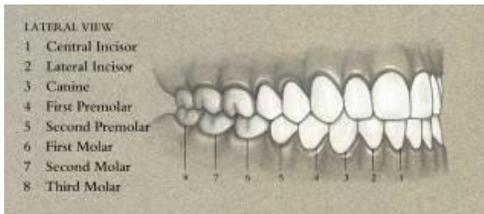


fig. 5

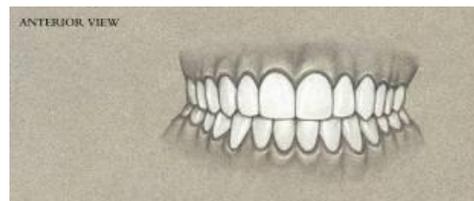


fig. 6

Maxillary arch – eruption. see figure 7

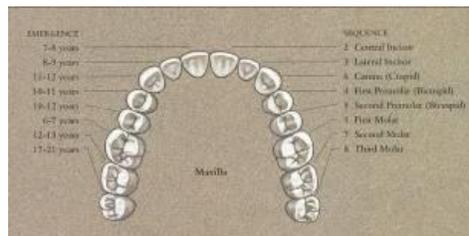


fig. 7

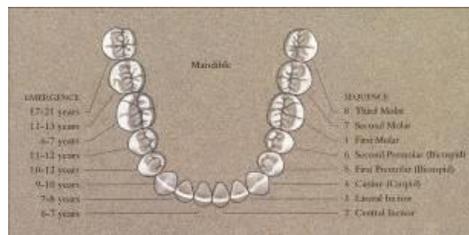


fig. 8

Tooth Numbering Systems

The orthodontic office will be communicating with many different general dental offices (as many offices may refer patients for specialty care), oral and maxillofacial surgery offices, as well as offices of other dental specialties. Referral forms will vary from office to office, but it is imperative that accurate information is being transmitted, especially when that information deals with the request for specific care, or perhaps removal of a specific tooth.

Numbering systems are used as a simplified means of identifying the teeth for charting and descriptive purposes. Three basic numbering systems are used, and the dental assistant must be familiar with each system.

Universal/National System

The system most often used in the United States is the Universal/National System, which was approved by the American Dental Association (ADA) in 1968. In this system the teeth are numbered from 1 to 32. Numbering begins with the upper right third molar (tooth #1), proceeds forward towards the central incisors and then works its way posteriorly to the upper left third molar (tooth #16). It then continues with the lower left third molar (tooth #17) and proceeds anteriorly and works back around to the lower right third molar (tooth #32).

The primary teeth are lettered with capital letters from A to T. Lettering begins with the upper right second primary molar (tooth A) and proceeds in the same fashion anteriorly and works around to the upper left deciduous second molar (tooth J). It then drops down to the lower left deciduous second molar (tooth K), comes forward and works back around to the lower right deciduous second molar (tooth T) (see figures 9a & 9b).

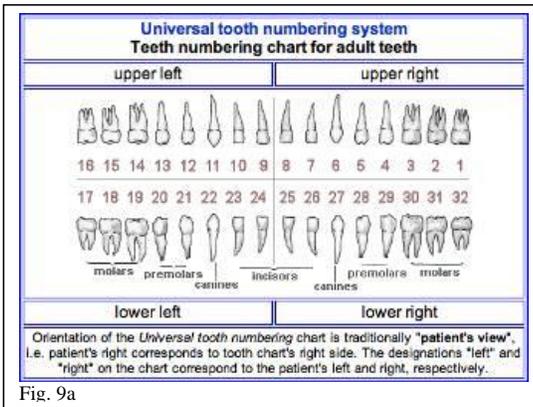


Fig. 9a

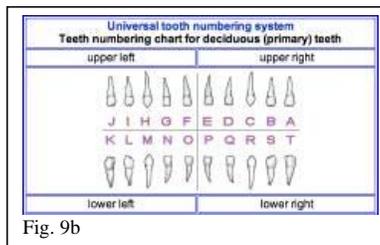


Fig. 9b

International Standards Organization (ISO) System

In 1996, the ADA also accepted the ISO system in addition to the Universal/National System. The ISO System is based on the Federation Dentaire Internationale (**FDI**) System and is used in most other countries (see figure 10).

The **ISO/FDI** system uses a two-digit tooth-recording system. The first digit indicates the quadrant, and the second digit indicates the tooth within the quadrant, with the numbering from the midline toward the posterior.

Permanent teeth are numbered as follows:

- The maxillary right quadrant is digit 1 and contains teeth #11 to #18
- The maxillary left quadrant is digit 2 and contains teeth #21 to #28
- The mandibular left quadrant is digit 3 and contains teeth #31 to #38
- The mandibular right quadrant is digit 4 and contains teeth #41 to #48.

Primary teeth are numbered as follows:

- The maxillary right quadrant is digit 5 and contains teeth #51 to #55
- The maxillary left quadrant is digit 6 and contains teeth #61 to #65
- The mandibular left quadrant is digit 7 and contains teeth #71 to #75
- The mandibular right quadrant is digit 8 and contains teeth #81 to #85.

The digits should be pronounced separately. For example, the permanent canines are teeth #1-3 (“number one-three”), #2-3 (“number two-three”), #3-3 (“number three-three”), and #4-3 (“number four-three”).

FDI Two-Digit Notation															
Permanent teeth															
upper right								upper left							
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
lower right								lower left							
Deciduous teeth (baby teeth)															
upper right								upper left							
			55	54	53	52	51	61	62	63	64	65			
			85	84	83	82	81	71	72	73	74	75			
lower right								lower left							

Fig. 10

Palmer Notation System

In the Palmer Notation System, each of the four quadrants is given its own tooth bracket made up of a vertical line and a horizontal line (see figure 11). The Palmer method is a

shorthand diagram of the teeth presented as if one is viewing the patient's teeth from in front of them. The teeth in the right quadrant would have the vertical midline bracket to the right of the tooth numbers or letters, just as when one is looking at the patient. The midline is to the right of the teeth in the right quadrant.

For example, if the tooth is a maxillary tooth, the number or letter should be written above the horizontal line of the bracket, thus indicating an upper tooth. Conversely, a mandibular tooth symbol should be placed below the line, indicating a lower tooth. The number or letter assigned to each tooth depends on its position relative to the midline. For example, central incisors, the teeth closest to the midline, have the lowest number, 1, for permanent teeth and the letter A for primary teeth. All central incisors, maxillary and mandibular, are given the number 1. All lateral incisors are given the number 2, all canines are given the number 3, first premolars are the number 4 and second premolars 5, first molars are 6, second molars are 7, and third molars are number 8.

Palmer notation															
Permanent Teeth															
upper right								upper left							
8J	7J	6J	5J	4J	3J	2J	1J	L1	L2	L3	L4	L5	L6	L7	L8
8j	7j	6j	5j	4j	3j	2j	1j	l1	l2	l3	l4	l5	l6	l7	l8
lower right								lower left							
Deciduous teeth (baby teeth)															
upper right								upper left							
								LA	LB	LC	LD	LE			
								lA	lB	lC	lD	lE			
lower right								lower left							

Fig. 11

Orthodontic Records and Treatment Planning

Prior to initiating a course of treatment certain information must be obtained. The first step in determining a treatment plan is for the orthodontist to learn as much about the orthodontic condition as possible. The patient's first orthodontic appointment is devoted to obtaining records. These records are needed for the orthodontist to make a diagnosis and devise a treatment plan.

Medical and Dental History

Careful medical and dental histories are necessary to provide a comprehensive understanding of the physical condition and to evaluate specific orthodontically related concerns. Typically there is a chief complaint, either from the patient, his or her parents or the referring dentist, specialist or other health care provider.

Physical Growth Evaluation

Because orthodontic treatment in children is closely related to growth stages, it is necessary to evaluate a child's physical growth status. Questions are asked about how rapidly the child has grown recently and about signs of sexual maturation. In general, females tend to have their adolescent growth spurt one to two years earlier than males. This can easily be detected with height measurements and the acceleration can be seen as early as nine and a half years old for females (typically ten and a half or eleven) or ten and a half for males (but, again, typically a bit later, closer to twelve and a half or thirteen (see figure 12).

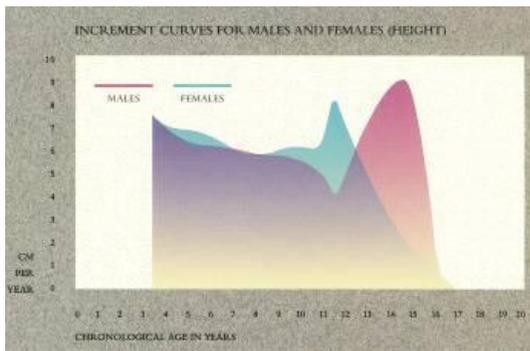


fig. 12

You will note in this chart that the mean age for the fastest increase in height is approximately at 11.5 years of age for girls and 14.5 for boys. As the child develops their mandibles go through a series of three growth spurts or accelerations (see figures 13, 14).

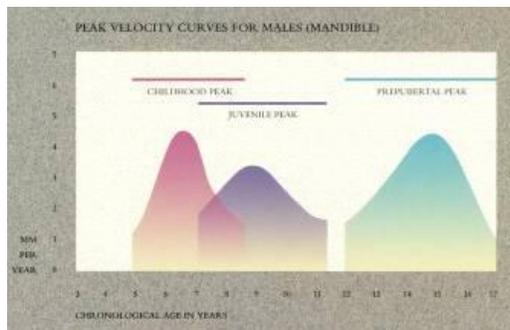


fig. 13

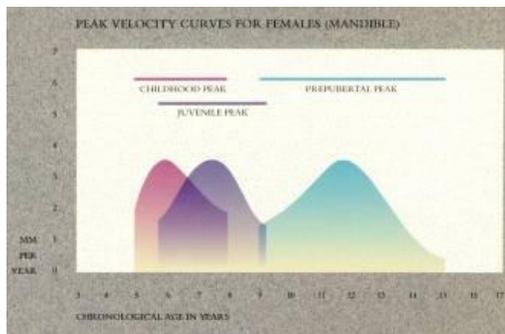


fig. 14

As orthodontists are attempting to improve both facial balance as well as dental alignment, they frequently try to take advantage of this. However, due to the individual variations that exist in the timing, amount and number of these accelerations it is quite difficult to predict mandibular growth in any one specific patient. It is for this reason that it is beneficial for a child to see an orthodontist as soon as a problem is recognized. This allows for corrective treatment to be initiated at the age that is best for that child.

Social and Behavioral Evaluation

Motivation for seeking treatment is very important. What does the patient expect as a result of treatment? How cooperative or uncooperative is the patient likely to be? A major motivation for orthodontic treatment for children is the parent's desire for treatment; however, it is essential that the child be willing and cooperative. The typical child accepts orthodontic treatment in a positive way.

Adults tend to seek orthodontic treatment for themselves for other reasons, including the need to improve personal appearance or function of the teeth. It is important to explore the reasons why an adult patient seeks treatment.

Clinical Examination

The purpose of the orthodontic clinical examination is to document, measure, and evaluate the facial aspects, the occlusal relationship, and the functional characteristics of the jaws. At the initial evaluation visit, the orthodontist decides which diagnostic records are required for the patient.

Evaluation of Facial Esthetics

A reasonable goal for orthodontic treatment is to recognize and improve facial symmetry by correcting disproportion.

In frontal evaluation, the face is examined for the following:

Bilateral symmetry

Size and proportion of midline to lateral structures

Vertical proportionality

In the profile evaluation, their profile relationship is analyzed for the following reasons:

To determine whether the jaws are proportionally positioned

To evaluate lip protrusion (excessive lip protrusion most often is caused by protrusion of the incisors)

To evaluate the vertical facial proportions and the mandibular plane angle

Evaluation of Oral Health

A thorough hard and soft tissue examination, as well as an oral hygiene assessment and prophylaxis, must be completed before any orthodontic treatment can begin.

Charting of periodontal pockets must be noted. If necessary, the patient is referred for the treatment of these problems before orthodontic treatment is started.

Evaluation of the Jaw and Occlusal Function

The orthodontist examines the patient's occlusion and palpates the TMJ to evaluate function. Lateral or anterior shifts of the mandible on closure are of special interest for orthodontic purposes as many practitioners feel the TMJs are the 'foundation of the occlusion.'

Diagnostic Records

Before the treatment plan can be completed, diagnostic records are required in the form of photographs, radiographs, and diagnostic study models.

Photographs

Photographs capture the color, shape, texture, and characteristics of intraoral and extraoral structures. Photography also is useful as an aid in patient identification, treatment planning, case presentation, case documentation, and patient education. Some offices may use computer programs that can morph pre treatment photos to give a reasonable estimate of what the face may look like after treatment. This is most commonly done when the malocclusion is so severe that both tooth movement and jaw movement (surgery) will be required.

Radiographs

The type of radiograph that is exposed most commonly for an orthodontic patient is the cephalometric radiograph. This extraoral radiograph makes it possible to evaluate the anatomic bases for malocclusion: skull, bones and soft tissue. (see figure 15)

Comment [1]:



fig. 15

... intervals before, during, and after treatment can be superimposed to study changes in jaw and tooth positions, due both to the growth that has occurred as well as the treatment that was rendered. They can also be used to determine when jaws have completed growth and subsequently when it is

permissible to proceed with orthognathic surgery (in patients where excessive jaw growth is the concern).

Advances in radiology have led to newer techniques (e.g. cone beam imaging) and many offices are taking advantage of the benefits of 3-dimensional images. From a single exposure any number of diagnostic images can be generated.

Cephalometric Analysis

Cephalometric analysis is not completed on the radiograph but instead is performed as a tracing or a computerized drawing that emphasizes the relationships among selected points. Cephalometric landmarks are represented as a series of points, making it possible for the orthodontist to compute mathematical descriptions and measurements of the status of the skull. From these measurements the orthodontist can analyze growth patterns and use this information to help determine which type of treatment should be provided for the patient.

Diagnostic Study Models

Diagnostic study models are used for the diagnosis and case presentation of the orthodontic patient. The diagnostic study model for orthodontics is commonly made from plaster or stone and is constructed in a precise and finished manner. Some offices routinely mount these models in an articulator which mimics the hinge axis of the patient's TMJ and orients their occlusion with respect to their 'jaw joints'. It involves a facebow transfer and interocclusal bite registration, typically taken in dead soft wax or via quick setting registration putty.

Case Presentation

The orthodontist reviews the information gathered and develops a treatment plan and cost estimate for the patient in preparation for the case presentation. Approximately one hour is reserved for the case presentation visit. If the patient is younger than 18 years of age, an adult who is responsible for the child should also be present. At this visit, the orthodontist uses the photographs, radiographs, cephalometric tracing, diagnostic models, and other aids to present the diagnosis and treatment plan. The presentation includes the approximate length of treatment and a clear statement of the responsibility of the patient in helping to ensure successful completion.

Once treatment has been accepted, the adult or the legal guardian signs a consent form. This consent form clearly states the information delineated during the case presentation. It covers risks, benefits and alternatives, and the risks and benefits of those alternatives as well.

Understanding Occlusion

To comprehend the importance of occlusion, it is necessary to understand differences among individuals in the of size and shape of the jaw, occlusions, and the reasons why some teeth become crowded. In most cases, malocclusion and dentofacial deformities result from moderate distortions of normal development. The orthodontic problems of most people result from the interaction of developmental, genetic, environmental, and functional influences.

Development Causes

Disturbances of dental development can accompany major congenital defects however, they occur more frequently as isolated findings. The most commonly encountered developmental disturbances include the following:

congenitally missing teeth- *teeth never develop*

malformed teeth- *irregular formation of the teeth with defects in shape or color*

supernumerary teeth- *extra teeth develop in the jaws*

interferences with eruption *(i.e. an impaction in which eruption is blocked or the tooth is forced to erupt into an abnormal position)*

ectopic eruption- *teeth erupt in an unusual location in the jaws*

Genetic Causes

Genetic causes are responsible for malocclusion when there are discrepancies in the size of the jaw and/or the size of the teeth. This happens more commonly when the child inherits a small jaw from one parent and larger teeth from the other parent. If you have a congenitally missing tooth, it is likely that one of your parents or grandparents has the same missing tooth.

Environmental causes

Birth Injuries

Injuries can occur at birth in two major categories: fetal molding and trauma during birth.

Fetal molding occurs when an arm or leg of the fetus is pressed against another part of the body, such as when an arm is abnormally pressed against the mandible. This pressure can lead to distortion of rapidly growing areas.

Trauma during birth such as an injury to the jaw, may occur during the actual birth, particularly from the use of forceps in delivery.

Injury Throughout Life

Trauma to the teeth can occur at any time. Dental trauma can lead to the development of malocclusion in three ways:

- 1) Damage to permanent tooth buds when an injury to primary teeth has occurred
- 2) Movement of a tooth or teeth as a result of premature loss of a primary tooth
- 3) Direct injury to permanent teeth

Angle's Classification of Occlusion

Occlusion is defined as the relationship between the maxillary and mandibular teeth when the upper and lower jaws are in a fully closed position. Occlusion related

problems could affect the teeth, joints, and muscles of the head and neck and can lead to periodontal trauma.

Occlusion develops in a child as the primary teeth erupt. Habits such as thumb sucking or improper swallowing patterns can affect the occlusion.

Proper occlusion of erupting permanent teeth depends on the occlusion of the primary teeth as they exfoliate or are shed. Correction of improper occlusion is one of the goals of orthodontic treatment.

Angle's classification system was developed by Dr. Edward H. Angle (1855-1930; the founder and father of modern orthodontics) to describe and classify occlusion and malocclusion.

The basis of this system is that the permanent maxillary first molar is the key to occlusion. Angle's system assumes that the patient is occluding in a centric position. He classified the dentition into four groups: Normal occlusion and Class I, II and III malocclusion.

Normal occlusion – has the same first molar relationship of the Class I malocclusion, but the rest of the teeth are properly aligned (see figure 16).

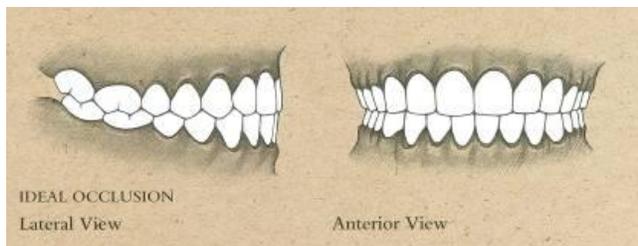


fig. 16

Class I malocclusion (neuroclussion) - the mesiobuccal cusp of the permanent maxillary first molar occludes with the mesiobuccal groove of the mandibular first molar but there is malalignment (e.g. crowding, see figure 17).

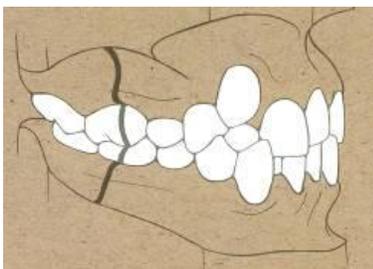


fig. 17

or spacing, see figure 18)

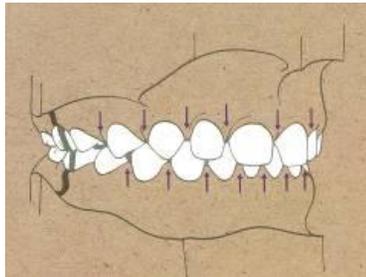


fig. 18

Class II malocclusion (distocclusion) - the mesiobuccal cusp of the first maxillary molar occludes mesial to the mesiobuccal groove of the mandibular first molar (e.g. the mandibular molars are posterior to the maxillary molars).

Divisions are as follows:

Class II Division 1. Distocclusion in which the maxillary incisors are typically in extreme labioversion (see figure 19).

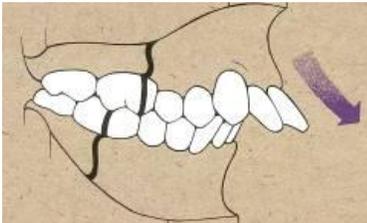


fig. 19

Class II Division 2. Distocclusion in which the maxillary central incisors are near normal anteroposteriorly or slightly in linguoversion, whereas the maxillary lateral incisors have tipped labially and mesially (see figure 20).

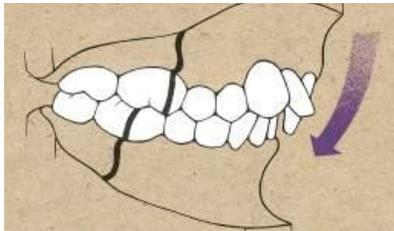


fig. 20

Subdivisions – When the distocclusion occurs on only one side of the dental arch, it is referred to as a subdivision of its division (e.g. Class II Div 2, subdivision right if the distocclusion exists only on the right).

Class III malocclusion (mesiocclusion) - The mesiobuccal groove of the mandibular first molar occludes mesial to the mesiobuccal cusp of the maxillary first molar (see figures 21, 22).

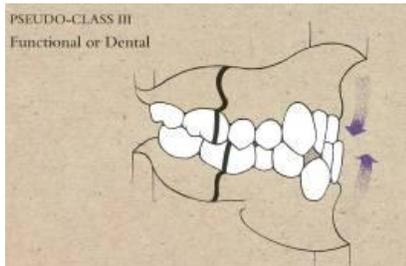


fig. 21

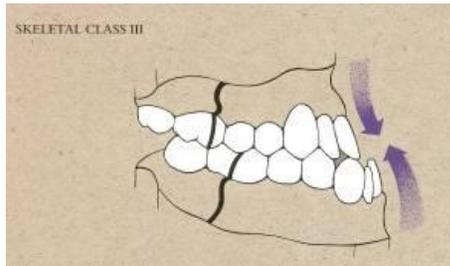


fig. 22

the

amount by which the molar relationship deviates from class I. The extent to which the cuspid occlusion deviates as well may be noted at the same time, again, possibly with the addition of millimeter measurements.

Compromised Occlusions

When a posterior tooth, such as a permanent first molar, is extracted and is not replaced, deterioration of the entire bite may occur:

1. Adjacent teeth drift into the extraction space; contacts between these teeth are lost; spaces develop, and food becomes lodged between the teeth.
2. The mandibular dentition collapses; a deep overbite occurs; proper contact with the maxillary teeth is lost, and the mandibular incisors impinge on the palatal mucosa ('impinging overbite').
3. The opposing maxillary molar overerupts and extrudes into the extraction space; the contacts between adjacent maxillary teeth are lost, and food becomes lodged between these teeth.
4. These conditions can result in periodontal disease and further loss of teeth.
5. With the occlusion now totally disrupted, cusp interferences may create a functional displacement of the mandible, resulting in possible involvement of the temporomandibular joint (see figure 23).

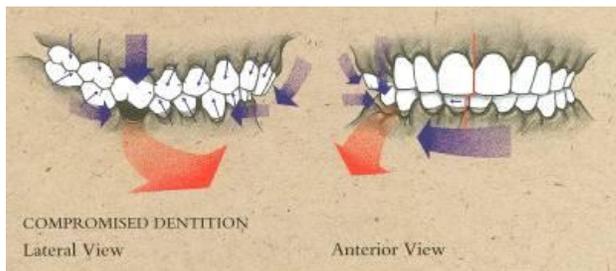


fig. 23

The following are possible adult conditions, some of which could have a negative impact on their occlusion.

discoloration of teeth - age related

occlusal wear – possibly from parafunction (e.g. grinding or bruxing) or from age

uneven wear - tipped teeth

interproximal wear - large contact areas

abrasion

recession

gingival inflammation

caries

root caries

recurrent caries

abscesses

extracted teeth

drifting teeth

tipped teeth

open contact areas

food impaction

periodontal degeneration

bone loss

injured teeth

discoloration of teeth - devitalized

root canal restorations

porcelain veneer restorations

osseointegrated implants

porcelain fused to metal crowns (PFM)

amalgam restorations

composite resin restorations

bridges

excessive overbite

congenital absence of third molars

supra-eruption of third molars

functional interferences

temporomandibular disorders

Crowding of the teeth - is the most common contributor to malocclusion. One or many teeth can be involved.

Hereditary – examples of tooth-size, jaw-size discrepancies that result in crowding that may require the extraction of certain permanent teeth for correction.

Premature exfoliation of one primary mandibular canine resulting in a dental midline discrepancy (see figure 24).

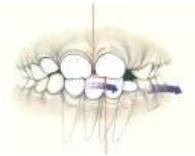


Fig. 24

Lingual displacement of one permanent mandibular lateral incisor resulting in a dental midline discrepancy. Ectopic eruption of a permanent maxillary first molar (see figure 25).



Fig. 25

Splayed maxillary lateral incisors resulting from crowding in the root area. Insufficient space for the unerupted permanent canines creates pressure on the roots of the incisors. Bulging of the mucosa area is frequently indicative of the situation (see figure 26).

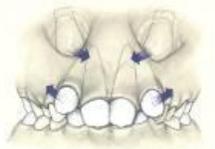


Fig. 26

Environment – examples of malposition of teeth that may be the result of environmental influences. These often may be corrected by the regaining of space and treated without the extraction of permanent teeth

Premature loss of the primary maxillary second molars with unfavorable drifting of the permanent molars, resulting in a lack of space for the erupting second premolars (see figure 27).



Fig. 27

Prolonged retention of the primary maxillary second molar, causing a deflection of the erupting first premolar and a lack of space for the permanent canine (see figure 28).



Fig. 28

Prolonged retention of the primary second molar associated with uneven resorption of its roots causing the permanent premolar to be displaced to one side out of alignment (see figure 29).



Fig. 29

Spacing of Teeth

Hereditary – examples of tooth-size, jaw-size discrepancies that result in spacing. These conditions may require the use of restorative dentistry in conjunction with orthodontic treatment for complete correction.

Congenital absence of a permanent maxillary right lateral incisor* and a relatively small left lateral incisor ('peg' lateral)** (see figure 30).



Fig. 30

Tooth size, jaw size discrepancy resulting from relatively small teeth (see figure 31).

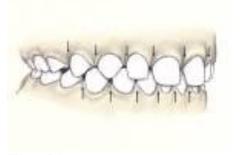


Fig. 31

Supernumerary tooth positioned between the permanent maxillary central incisors (see figure 32).



Fig. 32

Environment – examples of malposition of teeth that may be the result of environmental influences which may be corrected by the removal of the causative factor prior to or during orthodontic treatment.

Muscle imbalance of a strong tongue force on the inside of the teeth and a weak lip force on the outside resulting in a dental protrusion with spaces (see figure 33).

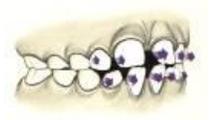


Fig. 33

An excessive amount of gingival tissue between the permanent maxillary central incisors (labial frenum) see figure 34.



Fig. 34

Unfavorable placement of the thumb and the lower lip behind the permanent maxillary incisors causing a dental protrusion with spaces.

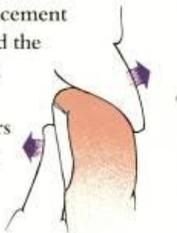


Fig. 35

see figure 35.

Classification of the Face – is done in the vertical and horizontal dimensions

Vertical – When we analyze a person’s face in the vertical orientation we observe two extreme types: High Angle (Hyperdivergent) and Low Angle (Hypodivergent). High Angle (hyperdivergent) – means that a line coincident with the base of the cranium crosses a line coincident with the lower border of the mandible at a relatively large angle and a Low Angle means that the angle is relatively small. Most faces are situated between these two extremes.

High Angle Characteristics (see figure 36).

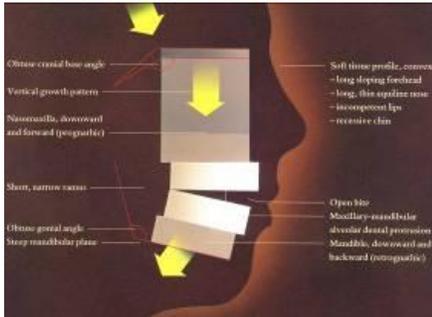


Fig. 36

- Narrow head (dolichocephalic)
- Long, narrow face (leptoprosopic)
- Anterior face height long relative to posterior
- Ectomorphic body type
- Stooped posture

Low Angle Characteristics (see figure 37).

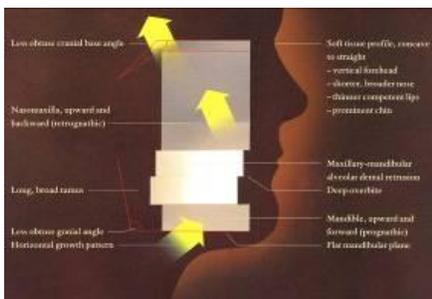


Fig. 37

- Wide head (brachycephalic)
- Short, broad face (euryprosopic)
- Anterior face height approximately equals posterior

- Mesomorphic to endomorphic body type
- Erect posture

Horizontal –

Class I

It is not sufficient to categorize orthodontic malocclusion on the basis of a classification of the teeth alone. The relationship with other craniofacial structures must also be taken into consideration. For instance, a Class I dentition may be associated with a variety of craniofacial features which might necessitate totally different treatment plans.

Class I malocclusions occur more frequently than either Class II or Class III. They constitute 55 percent of all malocclusions. This varies ethnically.

Possible combinations of Class I faces

1. **Maxillary–mandibular alveolar dental protrusion – teeth** (see figure 38). Also called 'bimaxillary protrusion', this is an example of a Class I dental malocclusion that may require the extraction of teeth for corrections
2. Maxillary-mandibular alveolar dental retrusion - teeth
3. Maxillary-mandibular prognathism – jaws
4. Maxillary-mandibular retrognathism – jaws

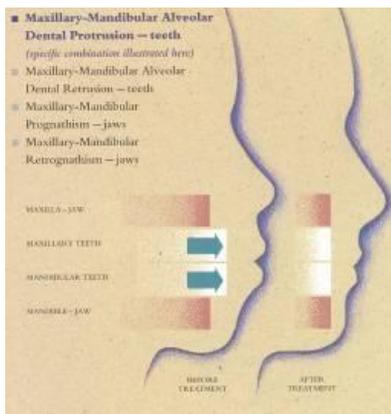


Fig. 38

Possible combinations of Class I faces

1. Maxillary–mandibular alveolar dental protrusion – teeth
2. **Maxillary-mandibular alveolar dental retrusion – teeth** (see figure 39). Also called 'bimaxillary retrusion', this is an example of a Class I dental malocclusion that is often treated without the extraction of teeth.
3. Maxillary-mandibular prognathism – jaws
4. Maxillary-mandibular retrognathism – jaws

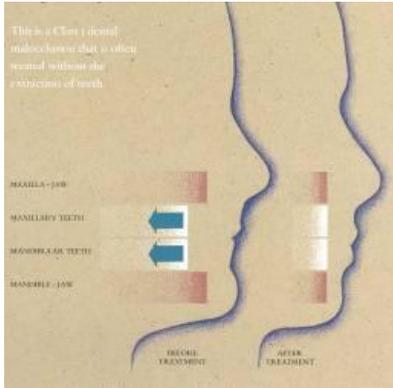


Fig. 39

Class II

Class II malocclusions constitute 32 percent of all malocclusions. Again, this will vary ethnically.

Possible combinations of Class II faces

1. **Maxillary alveolar dental protrusion – teeth** (see figure 40 which illustrates this specific combination, where only the protrusion of the upper teeth are contributing to the Class II malocclusion, the remaining possible contributing factors are within the range of normal. These Class II malocclusions are treated by orthodontic procedures and, due to the alveolar dental protrusion, may require the extraction of teeth)
2. Mandibular alveolar dental retrusion – teeth
3. Maxillary prognathism – jaws
4. Mandibular retrognathism - jaws

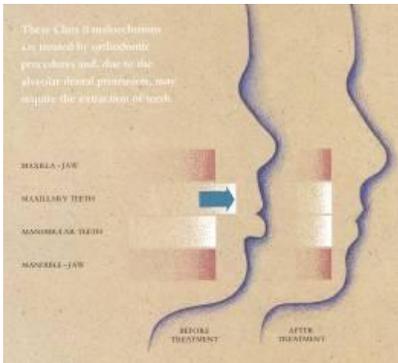


Fig. 40

Possible combinations of Class II faces

1. **Maxillary alveolar dental protrusion – teeth** (see figure 41 which illustrates this specific combination, where protrusion of the upper teeth and a retrognathic mandible (item 4 below) are both contributing to the Class II malocclusion and facial profile. This Class II malocclusion illustrates the need for early growth guidance.)
2. **Mandibular alveolar dental retrusion – teeth**

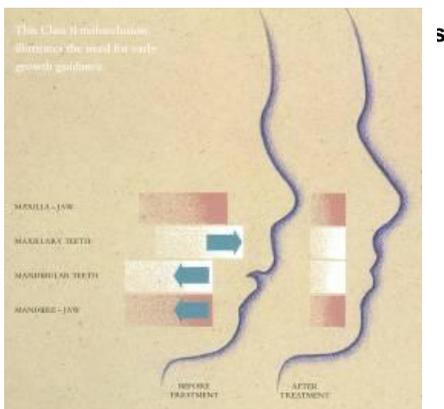


Fig. 41

Possible combinations of Class II faces

1. Maxillary alveolar dental protrusion – teeth
2. Mandibular alveolar dental retrusion – teeth
3. Maxillary prognathism – jaws
4. **Mandibular retrognathism – jaws** (see figure 42). These Class II malocclusions are more difficult to treat due to the skeletal disharmony and may require orthognathic surgery in conjunction with orthodontic treatment, as illustrated.

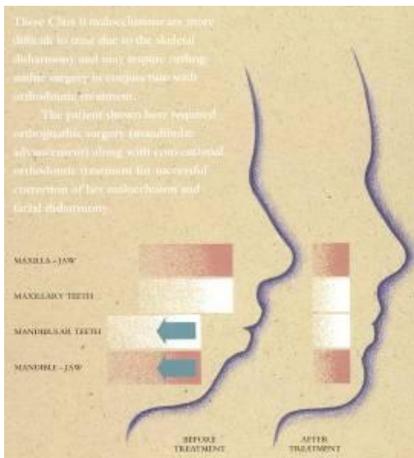


fig. 42

Class III

Class III

Class III malocclusions constitute 3 percent of all malocclusions. Like Class I and II, this percentage will vary ethnically.

Possible combinations of Class III faces

1. Maxillary alveolar dental retrusion – teeth
2. **Mandibular alveolar dental protrusion – teeth** (see figure 43). These Class III malocclusions are treated with orthodontic procedures which may require the extraction of teeth due to the alveolar protrusion).
3. Maxillary retrognathism – jaws
4. Mandibular prognathism – jaws

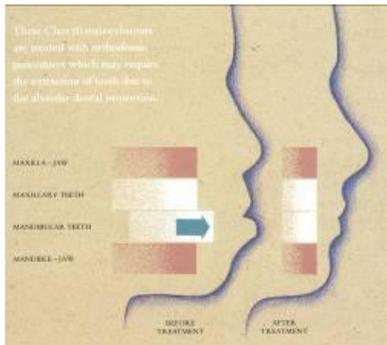


Fig. 43

Possible combinations of Class III faces

1. Maxillary alveolar dental retrusion – teeth
2. Mandibular alveolar dental protrusion – teeth
3. Maxillary retrognathism – jaws
4. **Mandibular prognathism – jaws** (see figure 44). These Class III malocclusions are more difficult to treat due to the skeletal disharmony and may require orthognathic surgery (when the jaw has finished growing) in conjunction with orthodontic treatment, as this illustration demonstrates).



Fig. 44

Treatment

Treatment protocol cannot be generalized. Early treatment (carried out prior to the emergence of all the permanent teeth) may be appropriate for some patients but not for others. The timing of treatment depends on the circumstances.

A. Interceptive guidance (I.G.) Active Treatment (A.T.) vs. One Phase (see figure 45).

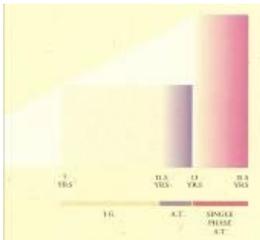


Fig. 45

B. First Phase, Interceptive treatment observation Second Phase, Active Treatment vs. One Phase (see figure 46).

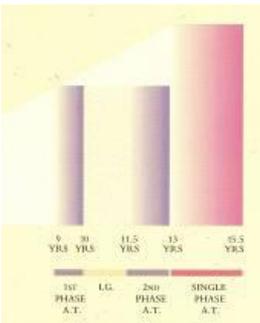


Fig. 46



Fig. 49

Early detection of genetic and congenital anomalies that may influence dental development.

Supervision of the natural exfoliation (shedding) of the primary teeth. If retained for too long, primary teeth may cause permanent teeth to erupt out of alignment or to be impacted.

Extraction of primary teeth that may be contributing to malalignment of the permanent dentition

Space management is important in orthodontic treatment. There are malocclusions that require the preservation of space during the developmental years. Others require the extraction of teeth to provide space.

Space Maintenance

Use of a space maintainer to save space for the eruption of permanent teeth. (see figures 50, 51).



Fig 50

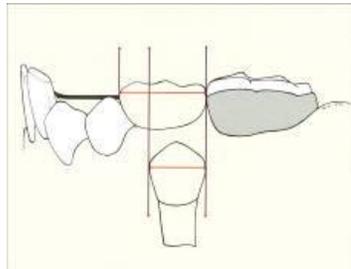


Fig 51

Space maintainers most often are cemented into place (to insure wear and avoid loss) and are retained until the permanent tooth erupts.

A thorough diagnosis should be carried out prior to the placement of a space maintainer, or the initiation of serial extraction, to determine if the patient's malocclusion is to be treated with or without the extraction of permanent teeth.

Serial Extractions

Typically reserved for a very specific type of malocclusion, i.e. when a decision has been made during the early mixed dentition that expansion is fruitless and that some permanent teeth will need to be removed. It can, however, also be used in less crowded malocclusions where it stops short of the removal of permanent teeth.

It is a planned sequence of tooth removal that can reduce crowding and irregularity during the transition from the primary to the permanent dentition. It will also allow the teeth to erupt over the alveolus and through keratinized tissue, rather than being displaced buccally or lingually. This sequence involves the timed extraction of primary and ultimately, when the crowding is severe, permanent teeth as well (as illustrated here).

Step 1 Crowded mixed dentition prior to serial extractions – the extraction of the primary canines (see figure 52).



Fig. 52

Step 2 The extraction of the primary first molars (see figure 53).

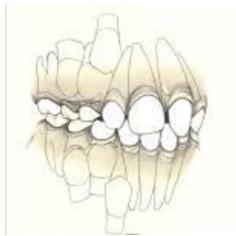


Fig. 53

Relieving the crowding in the apical area of the permanent lateral incisor by extracting the primary first molar accelerates the eruption of the first premolar, which may prevent the impaction of the canine. Timing is important, and it may be done in patients that are being treated either with or without extraction of permanent teeth.

Step 3 The extraction of the permanent first premolars (see figure 54).

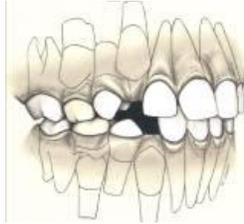


Fig. 54

Step 4 The extractions have been completed, patient is almost ready for appliances (braces) (see figure 55).

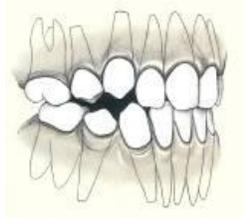


Fig. 55

Step 5 Appliance required to complete treatment (see figure 56).

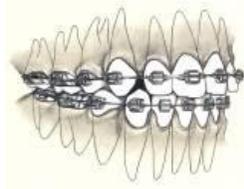


Fig. 56

Step 6 Treatment completed (see figure 57).

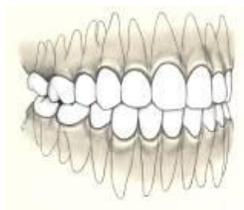
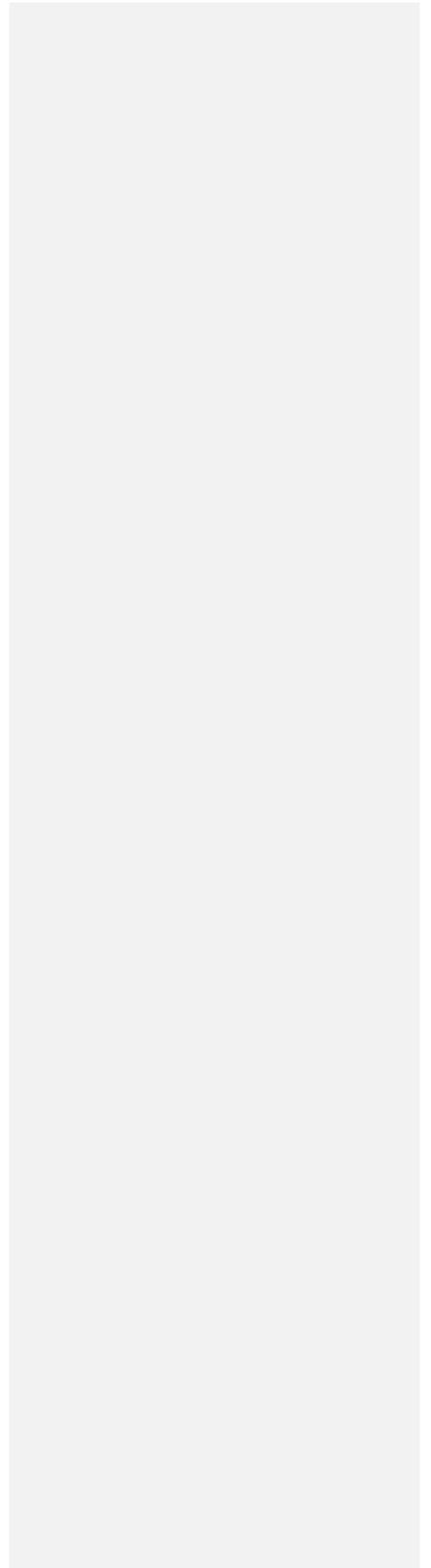


Fig. 57



B. First Phase, Interceptive Treatment / Observation / Second Phase, Active Treatment

Patients with protruding maxillary incisors may benefit from early treatment. The retraction of the incisors creates a more normal relationship between the lips, teeth tongue and jaws. It also reduces the risk of injury to the incisor teeth

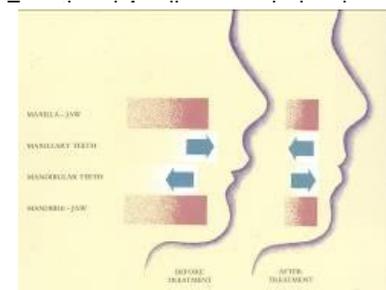


Illustration of how a functional appliance can be used (see figure 58).

Fig. 58

Problem

Low Angle (hypodivergent face)

Excessive Freeway Space

Maxillary Alveolar Dental Protrusion (protruding teeth)

Mandibular Alveolar Dental Retrusion (retruding teeth)

Short Anterior Face Height

The removable functional appliance is held in place by the teeth but the patient must posture their jaws to 'fit' into the appliance. There is still some debate on the exact mode of action, but it appears, as in this illustration, that the teeth are moved (retraction of the upper incisors, uprighting of the retruded lower incisors) while the posterior teeth are allowed to erupt, reducing the freeway space and increasing the anterior face height.

Headgears

There are many kinds of headgears. Each model, in its own specific way, constitutes a valuable auxiliary to treatment mechanics – if it is worn by the patient properly and with consistent regularity. The type and design of the headgear depends on the patient's specific problem, the treatment philosophy and the mechanotherapy involved.

Posterior pull – headgear that is inserted into the tubes on the upper first molar bands, can be used to retard forward growth of the upper jaw and move maxillary molars distally (see figure 59).

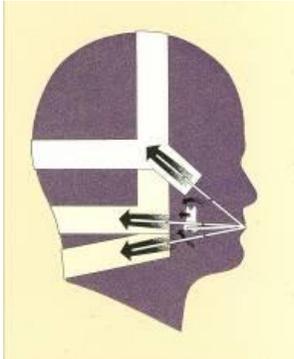


Fig. 59

Anterior pull ("J" hook type) – headgear hooks are inserted onto the arch wire, can be used to retract cuspids and intrude incisors (see figure 60).

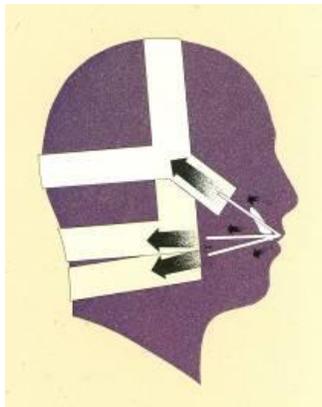


Fig. 60

Habits

Those that contribute to malalignment must be corrected if orthodontic treatment is to be successful. Thumb sucking, tongue thrusting, lip biting and mouth breathing are usually treated as early as possible. Functional problems such as mandibular displacement – often associated with anterior or posterior crossbites – are also best treated early.

Habit appliances are designed many different ways. Some designs are more successful than others. Much depends on the habit, the effects of the habit, the timing of the treatment and, most importantly, the cooperation of the patient.

Crossbites

There are many effective methods for correcting crossbites. There are also unfavorable responses to some methods. It is important to make a careful diagnosis in the beginning, and it is important to monitor the progress for unfavorable responses during treatment. For example, unfavorable extrusion of posterior teeth will create an openbite in the anterior area

C. One Phase (corrective orthodontics)

The first step in the preparation of treatment of a major orthodontic malocclusion is the placement of an appropriate appliance (braces). In Module 3 you will learn about this in detail. During each subsequent appointment, a system of directional forces is established. You will learn more about this in Module , where you will become proficient at tying in archwires using elastic modules, elastic chains and steel ligature ties. It is absolutely essential that the patient cooperates and becomes a part of that system if success is to be realized. Your role as an assistant to help with patient motivation and compliance cannot be overstated.

The scope of corrective orthodontics includes conditions that require the movement of teeth and the correction of malrelationships and malformations. These adjustments between and among teeth and facial bones are made by the application of fixed appliances with force and sometimes through stimulation and redirection of functional forces within the dentofacial structure. Corrective orthodontics includes the following:
Fixed appliances (e.g. cemented or bonded in place; cannot be removed by the patient)
Removable appliances for the correction or maintenance of orthodontic treatment.
Orthognathic surgery when the orthodontic problem is too severe to be corrected by movement of the teeth alone.

D. Adults

Adults frequently require a multi-disciplinary approach. It is especially important that the supporting structures of the teeth are healthy prior to orthodontic treatment (no inflammation). Consultation with the referring dentist or a periodontist regarding periodontal health may be necessary.

In response to the stimulus of pressure, cells within the bone and periodontal ligament differentiate to form specialized cells called osteoclasts, which are associated with bone resorption in advance of the moving tooth. In response to the stimulus of tension, other cells differentiate to form specialized cells called osteoblasts, which produce bone behind the moving tooth (see figure 61).

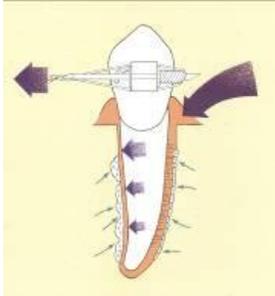


Fig. 61

Periodontal disease -
 Gingival inflammation
 Periodontal ligament infection
 Bone loss

Tooth must not be moved until periodontal infection is under control
 The periodontium should be in a healthy condition prior to orthodontic treatment

Many adult patients require some periodontal therapy prior to orthodontic treatment (see figure 62).

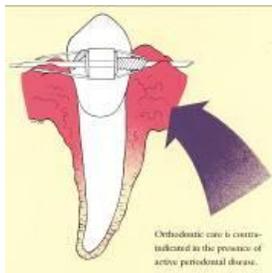


Fig. 62

Retention

Retaining appliances are usually required at the completion of the active phase of orthodontic treatment to stabilize the teeth in their new position while the supporting tissues are adapting. The wearing time varies from patient to patient and is determined by the orthodontist. In some instances, indefinite retention wear may be necessary.

Removable retaining appliance

Figure 63 depicts how excessive overjet of the maxillary incisors was corrected during the active phase of orthodontic treatment, and then is retained with a removable retainer.

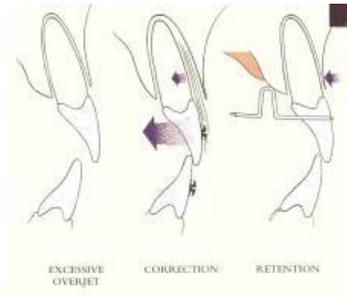


Fig. 63

Extensive collapse of the mandibular teeth may be associated with excessive muscular force. Since this muscle force does not disappear after orthodontic treatment, retention may be required for many years or indefinitely.

Fixed retaining appliance

Figure 64 depicts how an upper removable appliance with a 'bite plane' (added acrylic lingual to the maxillary incisors) is being used to prevent a return of the deep overbite. There is also a bonded lingual wire in place to prevent the lingual collapse of the lower incisors.

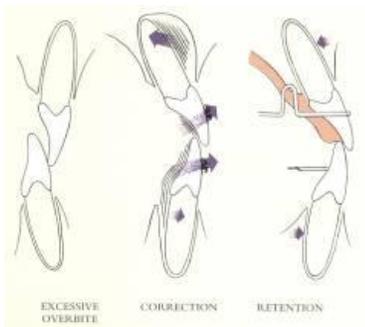


Fig. 64

Typically an orthodontic patient is not dismissed until the status of the third molars is resolved. The decision on the third molar removal is frequently a decision made in consultation with the referring dentist and/or with the input from an oral surgeon.

Patient cooperation

The most difficult challenge in orthodontic treatment is patient motivation. If the patient does not cooperate by following instructions, keeping the teeth clean, being on time for

and not missing appointments, and caring for the appliance properly, the most sophisticated treatment plan or appliance therapy will fail to produce a satisfactory result.

Dental Health Considerations

The ideal alignment of the teeth, optimal overbite and overjet of the anterior teeth, positive contact with proper positioning of the contact areas and favorable axial inclinations of all the teeth, enhance dental health.

Dental Disease

Malocclusion can contribute to dental decay and periodontal disease. When the teeth and tissues do not receive the benefits of normal occlusion and natural cleansing, proper plaque removal becomes difficult.

Each contact area has four embrasures:

Gingival

Occlusal, Incisal

Lingual

Buccal, Labial

Embrasures – provide spillways for food and prevent food impaction (see figures 65 & 66).

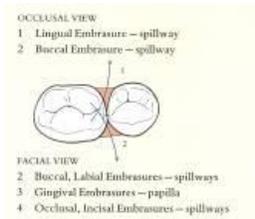


Fig. 65

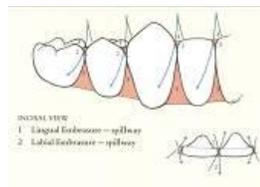


Fig. 66

Excessive Overbite

In severe cases the mandibular incisors contact the palatal mucosa lingual to the maxillary incisors, also known as an impinging deep bite (see figure 67). A removable appliance to help prevent this from recurring was shown in figure 64.

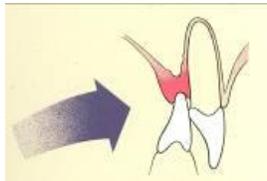


Fig. 67

Open Contact Area

Food impaction – trauma

Tipped Roots
Bone loss (see figure 68).



Fig. 68

Benefits of Orthodontic Treatment

Ideally, a healthy functional occlusion resulting from orthodontic treatment is characterized by canine protected occlusion, incisal guidance and absence of balancing side interferences.

Canine protected occlusion - desired

Only the right canines are contacting on the right excursion of the mandible (see figure 69).

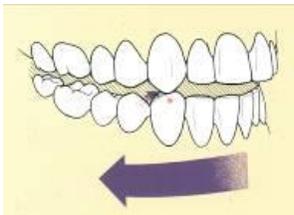


Fig. 69

Incisal Guidance – desired

When the mandible is moved forward with the teeth in contact, the incisal edges of the mandibular incisors touch, and are guided by, the lingual surface of the maxillary incisors (see figure 70).

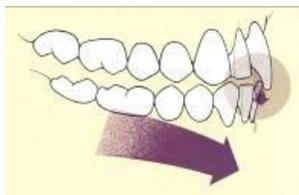


Fig. 70

Balancing Side Interference – not desired

Only the right second molars are contacting on the left excursion of the mandible. Canines are not contacting on either side (see figure 71).

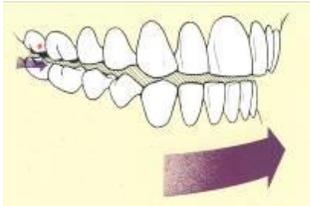


Fig. 71

Psychological Considerations

Severe malocclusion and dental facial deformities can be a social handicap. The impact of these types of problems may have a strong influence on a patients' self-esteem and their positive feelings about themselves.

Whether the patient is a teenage boy competing in high school, a college graduate about to begin a professional career, a young executive striving to establish their position in the business world, a young mother attempting to create an ideal image for their young children, a child standing on the threshold of a lifetime or a grandmother who is enjoying a senior position of respect and dignity within the family circle....a beautiful, healthy smile translates into happiness, invites communication, and opens the doors to success and fulfillment.

Patient Education

Following are descriptions and instructions that can be discussed with patients regarding various phases of their treatment (tooth brushing, wear of elastics, wear of headgear, adjunctive periodontal procedures, etc).

Common appliances and techniques used in treatment and patient information

Removable Appliances

The key to orthodontic treatment with a removable appliance is wearing it, not removing it!

Removable appliances often are not braces at all. Unlike conventional braces, which create pressure by being attached directly to the teeth, removable appliances are used in different ways. Some (i.e. functional appliances) are intended to influence growth of the jaws in order to effect changes in facial structure. Some are used to retain teeth in their corrected positions (i.e. retainers). In addition, they are often used before and in conjunction with fixed appliances (braces).

Still, removable appliances are not right for all orthodontic problems. It takes skill and experience to recognize conditions that will respond favorably to removable appliances.

Timing of such therapy also is very important. An orthodontic specialist is trained to make such treatment decisions.

They won't work if they are not worn.

Since removable appliances can easily be taken out by the patient, there may be a tendency not to wear them as prescribed. This means running the risk of having teeth, jaws and muscles move toward their original positions (relapse) or fail to move in the desired directions.

Some removable appliances require special cooperation and care. At first patients may notice an effect on eating and speaking. As with anything placed in the mouth, removable appliances may increase the flow of saliva. After the patient is used to wearing and caring for the appliance they will see how easy it is to follow simple instructions that will help them achieve and maintain a great smile.

Wear and Care tips

Patients should wear their appliance as directed by the orthodontist. It only works when it is being worn.

The appliances should be kept clean and in its protective case when not being worn. Patients are not to place them directly in their pocket or purse as they are fragile and may break or bend. Also, they are not to be put in a napkin or on the table while eating as this often leads to them being thrown away.

The appliance is not to be placed in hot water or near high heat if it is made of plastic or acrylic. It can warp, and it is flammable.

Patients are instructed to place their name and telephone number on their appliance carrying case in case they are lost or misplaced. As removable appliances take time to replace the additional time may prolong their active treatment, and a replacement charge is common practice.

Typical Removable Appliances

The most common removable appliance is the 'retainer'. It is worn after the braces are removed to hold the teeth in their corrected positions until the bones and gums adapt to the change.

Patients are asked to wear their retainers exactly as instructed by the orthodontist; otherwise, the teeth may move toward their original positions and the benefits of wearing braces will be lost.

The retention process does take time. The orthodontist will determine how long each individual patient needs to wear their retainers. The time varies with individual patients. Some children and adults may need retainers for an extended period of time to make sure no shifting of the teeth occurs. Depending upon the patient's situation, wearing time may range from a year or more of full-time wear to only part-time wear. On occasion, indefinite or permanent retention may be necessary. Under certain circumstances, retainers also may be used for other minor corrections.

Instructions for wear of retainers

1. Wear them. That means in the mouth, not in a pocket or purse. Retainers are effective only if the patient faithfully follows the orthodontist's instructions.

2. Keep them clean. After meals all parts of the retainer should be cleaned with a brush as instructed. If the patient is unable to brush they should be sure to rinse the retainers and their mouth. If the lower retainer is attached to their teeth, it is important to clean under the wire with dental floss as instructed and demonstrated by the orthodontist. Mineral buildup can often be ameliorated by soaking the appliance in white vinegar to loosen the deposits that can then be removed by routine cleaning with a toothbrush and toothpaste.

3. Handle them with care. Retainers are easy to lose. They fall out of pockets and purses. They should be kept in a retainer case for safety. Later, if instructed to leave them out part of the time, they are to be kept in a safe place where they won't get damaged. Some orthodontists may recommend the retainer be kept in a moist environment when not being worn. When they are just lying around, they have a way of falling on the floor and being stepped on, or even being picked up, or chewed on, by pets.

Several examples of 'functional appliances' include the "Activator," "Bionator," "Herbst," and "Frankel." These types of appliances usually are used with young patients who are still growing. The purpose of these types of appliances is to reposition the jaws and control the tongue, lips and cheeks to keep them from interfering with tooth position. "Bite Planes" and "Thumb Guards" are types of removable appliances that control habits such as tooth grinding or clenching, tongue thrusting and thumb or finger sucking. These appliances are used until the harmful habit has stopped.

Clicking popping or pain around the ear in the temporomandibular joint sometimes may be alleviated by certain removable appliances called "Splints" which may allow the jaw muscles and teeth to assume a more comfortable relationship. These conditions may require the dentist and orthodontist to work together to diagnose and treat the problem.

Palatal Expansion

Palatal expansion is a combination of tooth movement and jaw expansion. It works by widening the two halves of the upper jaw, called the palate. The two halves are joined together by a 'suture' in the middle of the roof of the mouth. The orthodontist custom makes an expander for each patient. An expander can be fixed or removable. The expander is attached to the upper back teeth and eases the suture apart, which makes the upper jaw wider. As the jaw expands, new bone fills in between the two halves of the palate. This process is called distraction osteogenesis. Expansion can take a few weeks to a few months, depending on the amount of expansion required for an individual patient.

A Rapid palatal expander (RPE), also known as a rapid maxillary expander (RME), is generally worn from four to six months. During the first few weeks of wear it is necessary to expand (activate) the appliance. Depending on the appliance, the RPE may require activation with a special key or wrench. The orthodontist will provide detailed instructions on how to activate the appliance and operate it properly to achieve the desired results.

Palatal expansion improves the way the upper and lower jaws and the upper and lower teeth work. It widens the jaw so there is sufficient room for permanent upper and lower teeth to come in. Expansion can make the final smile broader and more attractive. Without expansion, and depending on the problem, permanent teeth may not have enough space to come in; or the lower jaw could grow out of proportion, which could require corrective surgery as an adult. Left untreated, a narrow palate can lead to excessive wearing of the teeth or the need for extensive dental work as an adult.

The orthodontist will advise the patient or parent on the need for expansion and which type of expansion is best suited to correct the problem. Expansion is easiest and results are most stable when performed on the growing child or teen.

Age alone, however is not the best predictor of when a palatal expansion should be used. Ideally a patient should still be growing. The orthodontist may analyze the growth plates on a hand-wrist x-ray to help determine skeletal maturation and whether a patient is still growing. Patients who have completed growth may require surgically-assisted rapid palatal expansion.

The orthodontist will recommend the type of expansion appliance necessary. Different appliances require different activation techniques. The orthodontist will provide specific instructions on how to expand the appliance and how often to expand it.

It may take a few days to get used to the palatal expander. Chewing, swallowing and talking may be awkward at first. The mouth and nose may be sore or may tingle. Some patients report a slight headache. The orthodontist may recommend over-the-counter analgesics to relieve discomfort.

After a few days of expanding, the patient may notice space between the front teeth. This is a sign that the appliance is working and the palate is being expanded.

Most patients require full orthodontic treatment (braces) following palatal expansion.

Care of the expansion appliance.

The expander should be brushed whenever teeth are brushed. Patients should rinse their mouth with water after eating or after drinking a beverage with sugar. Removable expanders should be brushed and rinsed each time the appliance is taken out of the mouth.

Elastics

Successful orthodontic treatment primarily depends on two things: constant pressure and time. Sometimes it takes added force to move teeth and jaws into their correct positions. Elastics, also called rubber bands, have the pull to make that happen. But they won't work without the patient wearing them. Therefore, to achieve the desired results, the patient must carefully follow the instructions they receive regarding their placement and use. Any time missed in wearing will only make the treatment take longer.

Patients are responsible for placing the elastics on their braces between appointments. They are to make sure they wear them as they were instructed. They are to remove them only when brushing their teeth, gums and braces after meals. They are then to place them back on immediately, unless different instructions have been given.

Patients are to always carry elastics with them, so if one breaks they can replace it right away. If their supply runs low they are to contact the office to pick up more or possibly have some mailed to them.

If a patient happens to forget to insert their elastics one day, they are not to double up the next day - just follow the regular instructions.

Elastics get tired. When they lose their stretch, elastics don't provide the proper pressure on the teeth and jaws. It is therefore very important to change them as directed, even when they are not broken.

Elastics may cause the teeth to hurt a little at first. That is because the teeth are moving, which is the goal. Usually the tenderness lasts a day or two. Not wearing the elastics as instructed will only make the tenderness last longer, and make the tooth movement take more time.

If the patient has any problems - like elastics breaking frequently, a wire or a band loosening, or a hook breaking off - they are to call the office immediately. Patients should not wait until their next scheduled appointment. These problems need to be corrected as soon as possible.

Orthodontic Headgear- can be a very important part of the treatment for certain patients. Its purpose is to achieve the best possible correction of their orthodontic problem.

Headgears create special forces that guide the growth of the face and jaws. They are also used to move teeth into better positions or to prevent teeth from moving when they are not supposed to.

Regular use of the headgear achieves the best results. That is why it is important for the patient to follow the instructions on the number of hours each day it should be worn. Forgetting will just make the treatment take longer, and it may even affect the final results.

Patients are to take proper care of the headgear and bring it with them to every appointment.

The teeth may be tender or even slightly loose the first few days the headgear is worn. This tenderness will disappear as the patient adjusts to the new pressure, so they should not be discouraged.

If the patient continues to be uncomfortable for more than a few days they should contact the orthodontist right away.

The wear of a headgear may not be much fun, but it is necessary for their treatment. If they follow the instructions exactly, they will be finished sooner than they think. The

short-term sacrifice they make now will well be worth the healthy, beautiful smile that they will have for a lifetime.

Facebow type - Consists of a metal bow that fits into the tubes on the back teeth and a band that fits behind the neck or over the head to provide pressure to the facebow.

“J” Hook type - consists of a metal wire with a loop on the end that attaches to hooks or eyelets on the archwire. Sometimes the loops are opened to slide over the archwire and pull directly against one or more teeth on either side. The “J” hook is attached to a head cap that fits over the patients head or to a neck strap to prove force or pressure on the teeth.

Safety instructions:

1. Always be careful to remove the headgear as show by the orthodontist. If the headgear is removed carelessly, the part that fits into their mouth and attaches to their teeth could injure their cheeks, lips, face, or even their eyes.
2. Never try to remove the headgear until the straps have been disconnected.
3. Never try to lift the headgear over the face.
4. Never wear the headgear when running or playing sports. This includes rough-and-tumble games. Accidents can occur even when the patient is just having fun.
5. Never allow anyone to grab or pull on the headgear. Brothers, sisters, or friends who do not wear headgear may not understand the dangers involved, even in play.

Adjunctive Periodontal Procedures for Successful Orthodontic Treatment

The goal of orthodontic treatment is to provide patients with a functional bite and a healthy, beautiful smile that’s good for life. The orthodontist works with the general dentist and other dental specialists, as necessary, to achieve this goal. Sometimes orthodontic treatment alone is not enough to address all of the problems that exist in a patient’s mouth, so the orthodontist may enlist the aid of the general dentist or dental specialists to provide additional treatment before, during or after orthodontic treatment.

If an adjunctive (additional) treatment is recommended by the orthodontist the patient may be referred to their general dentist or pediatric dentist, a periodontist, an oral and maxillofacial surgeon or a prosthodontist for the procedure.

Frenectomy

A frenectomy is a minor surgical procedure that removes or repositions a portion of the frenum where there is excessive or particularly thick tissue.

The term “frenum” refers to the fibrous gum tissue that connects the lips, cheeks or tongue to the gums.

A frenectomy is most often performed for patients who have a gap (diastema) between their upper two front teeth that may be caused by the frenum. The procedure repositions or removes some of the tissue to allow the diastema to close and stabilizes the teeth so the space can remain closed. Patients with a thick frenum may need the procedure to relieve tension that otherwise could eventually cause gums to recede. A

frenectomy may be recommended to achieve optimal results from orthodontic treatment. The orthodontist is in the best position to advise if the procedure is indicated and, if so, when it should be performed.

Fiberotomy

A fiberotomy is a minor surgical procedure that releases tiny elastic fibers around teeth. For some patients, these fibers cause teeth to turn, or rotate, significantly. The procedure may be recommended as an additional measure to maintain the functional bite and healthy, beautiful smile achieved through orthodontic treatment.

Patients whose teeth had a high degree of rotation before orthodontic treatment may need a fiberotomy. Such teeth have a strong tendency to relapse, or return to their original positions, due to the “memory” of the elastic fibers. This “memory” may work to return the teeth to their pre-treatment positions. A fiberotomy releases the elastic fibers to minimize rotational relapse after braces or other orthodontic appliances are removed. The orthodontist will base the recommendation for a fiberotomy on his/her education and clinical experience. The orthodontist is in the best position to advise on the timing of this treatment.

Retainers may still be needed to maintain alignment of the teeth following treatment.

Gingivoplasty

A gingivoplasty is an adjunctive, or additional procedure that may be performed separate from, or often, at the same time, as a fenectomy or fiberotomy. A gingivoplasty can be a removal or sculpting of gingival (gum) tissue, to correct a “gummy” smile, or to balance uneven gum heights.

The orthodontist may also recommend a gingivoplasty if there is hyperplastic tissue. This condition can be caused by: poor oral hygiene (especially during orthodontic treatment) some medications, or some illnesses.

Some patients may opt for a gingivoplasty if they have a “gummy” smile. This kind of gingivoplasty is often referred to as “crown lengthening.” It uncovers normal tooth surfaces that are concealed by excess gum tissue, and contributes to a more beautiful smile.

Patients whose gums are uneven may be candidates for a gingivoplasty to sculpt and even out the height of the gums. The result is a balanced, symmetrical appearance of the teeth.

The orthodontist will advise when a gingivoplasty should be performed, whether during or immediately following orthodontic treatment.

Interproximal reduction

To help patients achieve a healthy new smile the orthodontist may feel that interproximal reduction, making some of the teeth slightly narrower, will contribute to the successful outcome of their orthodontic treatment. It may also contribute to long-term stability of the results after the braces are removed. It involves removal of some of the outer tooth surface (enamel) usually between teeth that touch. It has been used in orthodontics since the 1940s. It is also known as slenderizing, stripping, enamel reduction, reproximation and selective reduction.

Whatever the name, the intentions are the same - to acquire more space for the teeth, to bring the teeth into alignment, to improve the bite or to make the teeth more attractive. Sometimes interproximal reduction is done alone, but it is usually done in combination with orthodontic appliance treatment (fixed or removable). Sometimes it is even done in conjunction with tooth extractions. Sometimes it is done following orthodontic treatment to establish stability. Many times front teeth are contoured during or after orthodontic treatment to create a balanced and harmonious appearance of the teeth.

The health of the patient's teeth and gums is of utmost concern to the orthodontist. Studies among patients who have had interproximal reduction show that the procedure does not make teeth more susceptible to tooth decay. Nor does the procedure predispose gums to gum disease. Occasionally, some patients may experience some sensitivity to hot or cold. Overall, the results are generally positive.

How the procedure works:

1. The orthodontist will identify which teeth are to be slenderized
2. Enamel is removed from the sides of each tooth, where the tooth comes in contact with neighboring teeth. The enamel may be removed manually or with the aid of a specially designed dental hand piece.
3. The orthodontist carefully removes the desired amount of enamel, leaving each tooth with sufficient enamel to remain healthy and sound.
4. In performing enamel reduction, the doctor carefully creates needed space that will allow teeth to be placed so that the bite is improved and the teeth take on a pleasing appearance.
5. Desired positioning can be achieved after teeth are slenderized.

When deciding if reshaping of teeth is to a patient's advantage, the orthodontist will consider such factors as the size and shape of the teeth, their positions and alignment, and the patient's facial features. Front teeth form the framework upon which the lips rest, and their positions play an important role in facial appearance. Sometimes the orthodontist may suggest the removal of teeth to enhance the facial appearance.

Education and experience in evaluating facial characteristics allow the orthodontist to develop a treatment goal that produces a healthy bite, which can contribute to nice-looking teeth and facial attractiveness.

The removal of the enamel generally causes no discomfort for most patients because there are no nerve endings in the outer layer of the tooth.

After the teeth have been slenderized, they are smoothed and polished. Your doctor may recommend a topical fluoride treatment, as well as daily use of a fluoride rinse to help the teeth maintain their resistance to decay.

Where indicated, interproximal reduction will help the orthodontist position the teeth for good function and good looks. In some cases, enough space can be created so that teeth do not need to be removed. After the braces are removed, the more slender teeth are more likely to stay where the orthodontist has moved them.

Toothbrushing and Braces

With orthodontic appliances (braces) in place, proper oral hygiene (brushing and flossing) will take some extra time and effort.

When the braces are removed everyone wants the teeth to look their best, so the patient must be their smile's best friend. They can do this by brushing, rinsing and looking, making sure the teeth and braces are spotlessly clean.

Plaque is the problem. It is a sticky, white substance that collects on the teeth while eating. It is made up of bacteria, food and saliva. If plaque and trapped food are left on the teeth and around the braces, they can cause swollen gums, bad breath, marks on the teeth (decalcification, or 'white' lesions), and cavities. Plaque can also discolor the teeth and make them look yellow.

The patient should use the kind of toothbrush and toothpaste the orthodontist recommends and use them often. If possible, the patient is to brush after every meal, especially if they have eaten anything sticky or sweet. If they cannot brush, they should be sure to at least rinse their mouth well with water.

What is most important is that at least once every day the patient should vigorously brush their teeth and braces until they are spotlessly clean. This takes extra time so most patients do it at night before they go to bed. Whatever time is chosen they must make absolutely sure their teeth and braces are as clean as they can get them.

Patients are to remove every trace of plaque and trapped food from all the surfaces of their teeth, and under the wires using techniques and aids demonstrated by the orthodontist. They must pay very close attention to brushing the gum line because plaque left there will make the gums sore and swollen, which will make brushing even more difficult. This is also the time when the patient should use the extra things recommended such as dental floss, special brushes, mouthwashes and oral irrigators. After brushing the patient should rinse really well then inspect the teeth and braces to make sure they are spotless. This should be done by looking at them closely in a well-lighted mirror. This is very important because patients can't feel plaque but they can usually see it. Patients may have to brush and rinse two or three times before all the plaque is gone. This may sound hard but nobody wants straight teeth with cavities or permanent marks.

Timing of Treatment

Age 1 - Good dental health begins

The American Dental Association (ADA) recommends that a child first visit the family dentist by their first birthday. Even though all of a child's primary (baby) teeth usually have yet to erupt it's an excellent time to lay the foundation for a lifetime of good dental habits.

At this early age, the child's teeth can be examined and cleaned without discomfort. This allows the child's first experience with the dentist to be a positive one. That in turn begins to establish a good attitude toward dental care and future visits.

At the first checkup, the patient and child will likely receive instructions on proper toothbrushing and advice on the importance of a proper diet. Thereafter, regular visits are necessary for detecting problems early and maintaining good dental health.

Age 7 - Another important visit

The American Association of Orthodontists (AAO) recommends that every child first visit an orthodontist at age 7. This may surprise parents because orthodontic treatment is generally associated with adolescence. An early examination, however, is very important to ensure the maximum dental health for a child.

The following warning signs may indicate that the child should have an orthodontic examination as soon as possible:

Difficulty in chewing

Open-mouth breathing

Thumb or finger sucking

Overlapping or crowding of erupting permanent teeth

Jaws that tend to click or pop

A developing underbite, overbite, protruding front teeth, or other abnormal bite development.

Although age 7 is the best time for the majority of children to have their first orthodontic examination, a visit at even a younger age is advisable if a particular problem has been noted by the parent, family dentist, or child's physician.

The Benefits of Early Diagnosis

Orthodontists can improve smiles at any age, but there is usually a best age for treatment to begin. An early examination allows the orthodontic specialist to determine how and when a child's particular problem should be treated for maximum improvement with the least time and expense. In some cases, early treatment achieves results that are unattainable once the face and jaws have finished growing.

The First Visit

An orthodontic examination at age 7 does not always result in immediate treatment. After evaluating the child, the orthodontist may simply want to check the child periodically while the permanent teeth erupt and the jaws and face continue to grow. If, however, the child has a problem, the orthodontist may recommend interceptive treatment. These limited measures are used to guide facial growth and tooth eruption, thereby preventing more serious problems from developing. Early intervention frequently makes the completion of treatment at a later age easier and less time consuming.

Types Of Orthodontic Problems

The technical term for teeth and jaws that do not fit and work together properly is 'malocclusion', which means, 'bad bite'. Most malocclusions are inherited, but some are acquired.

Inherited problems include crowding of teeth, too much space between teeth, extra or missing teeth, and a wide variety of other irregularities of the jaws and face.

Acquired malocclusions can be caused by thumb or finger sucking, tongue thrusting, the airway being restricted by tonsils or adenoid tissue, dental disease, or premature loss of primary or permanent teeth.

Whether inherited or acquired, many of these problems affect not only alignment of the teeth but also facial appearance. It is also important to note that orthodontic problems

can be present behind perfectly acceptable smiles. An orthodontic specialist is especially qualified to diagnose existing or potential conditions that require treatment.

The Importance of Treatment

Every parent wants their child to have a beautiful smile - and every child ought to have a healthy one. The orthodontist's goal is to achieve both for the patient.

Untreated malocclusions may contribute to conditions which cause tooth decay, diseased gums, bone destruction, loss of teeth, and jaw joint problems. The increase cost of dental care to treat these problems after they develop may actually exceed the cost of orthodontic treatment.

In addition, uncorrected problems can affect a child's speech, general health, and self-esteem.

A child's self-confidence almost always increases when his or her smile is improved.

This can lead to greater success in all areas of the child's life. Therefore, the value of a beautiful smile should never be underestimated.

Adult Orthodontics: A Healthy, Beautiful Smile At Any Age

Orthodontic treatment is about a change for the better, no matter what the patient's age. It can give the patient the confidence and pride that comes with straight teeth and a great smile. But the orthodontist has another equally important treatment goal - to improve the health of your teeth and gums.

The fact is, when left untreated, many orthodontic problems may become worse. When you have a malocclusion ('bad bite'), your teeth may be crowded, spaced or not fit together correctly. Crowded teeth are hard to clean and maintain. Given time, crowding may contribute to tooth decay, gum disease and even tooth loss. Bad bites can also result in abnormal wearing of tooth surfaces, difficulty in chewing and damage to supporting bone and gum tissue. Poor tooth alignment can contribute to pain in the jaw joints.

Today's technology makes people wearing braces feel better about how they look.

Metal brackets are much smaller than they used to be. Even less noticeable are braces made of ceramic or plastic. And lingual braces (braces that go behind your teeth) may be appropriate in some cases. The recent development of clear plastic tray aligners has given the orthodontist another option that may be appropriate for certain patients.

No matter what type of braces, or which technique is used, the patient will need to make a few adjustments to treatment.

Chewing ice and certain treats, such as caramels and peanut brittle, will be off-limits.

Also their mouth and teeth may be a little tender after adjustments. And, of course, it is especially important that the patient visits their family dentist for regular check-ups.

A consultation with an orthodontist is the best way to determine if a patient can benefit from orthodontic treatment. Remember, the biological process involved in tooth movement is the same in both adults and children. The condition of the patient's teeth, gums and supporting bone is the most important factor in determining the potential for improving a patient's smile and dental health.

After an initial examination the orthodontist will be able to tell the patient what their treatment will likely involve and its approximate cost. If they decide to proceed the next

step involves making diagnostic records. These often include impressions for study casts, special x-rays and photographs.

Every person's malocclusion is different. After carefully analyzing the nature of the needed correction, the orthodontist will recommend the best course of treatment for improving their smile and oral health.

The cost of orthodontic treatment will depend on many factors, including the severity of the problem, its complexity and length of treatment. The orthodontist will be glad to discuss the cost with patients before the treatment begins.

Patients are finding that braces are more affordable today than ever. Most orthodontists have a variety of convenient payment plans. Often there are combined plans available for parents and children who have treatment at the same time. In addition, many dental insurance plans now include orthodontic benefits.

Orthodontics and Surgery: When treatment calls for a specialized partnership.

The upper and lower jaws are the foundations by which the teeth are supported. Sometimes, when the jaws are too short, or long, too wide or narrow, braces alone can't completely correct a bad bite (malocclusion).

And, in addition to affecting a person's appearance, an improper bite can lead to serious problems, such as abnormal tooth wear, periodontal disease, and possible joint pain.

Orthodontists correct crooked teeth and bad bites. For problems related to jaw formation and misalignment (skeletal problems), an oral surgeon may be needed.

When both conditions come into play, it is common for an orthodontist and oral surgeon to work together.

Some severe cases can only be corrected with a combination of orthodontics and surgery. The orthodontist, working with the oral surgeon, designs a combined treatment plan. Depending on the problem, treatment by other dental specialists may also be required.

This teamwork between the orthodontist, the family dentist and other dental specialists provides better dental health for thousands of patients who are rewarded with straight teeth, bright smiles and facial symmetry - a beautiful combination of shape, form, position and function.

There are many types of jaw development and alignment problems. Some are inherited, some are growth problems, and some are caused by an accident or other trauma. The most commonly corrected problems included:

a protruding upper or lower jaw (one that sticks out too far)

a retruding chin (one that is too far back)

an unsightly display of gum tissue above the upper front teeth (a 'gummy' smile)

an inability to achieve lip contact when the lips are relaxed

an elongated face

asymmetry (facial imbalance)

cleft palate (in young children)

Most orthodontic patients undergo an initial period of orthodontic treatment to align the teeth so they will fit together properly after surgery is performed. The orthodontist and oral surgeon will schedule surgery after the teeth have been properly aligned.

Usually, braces or other orthodontic devices used to align the teeth before surgery are left in place during the surgical procedure to help stabilize the teeth and jaws. After surgery there is usually an additional period of orthodontic treatment to bring teeth into their final, desired positions, complementing the new facial symmetry.

While the prospect of undergoing surgery as part of the overall treatment plan may seem daunting, it really is not uncommon. The rewards for such treatment can be very dramatic. Following completion of orthodontic treatment and surgery the patient will enjoy better dental health and have a better facial appearance. Best of all, the patient will have a more beautiful smile that reflects a happier, healthier patient for the rest of their life.

Personal Benefits of Orthodontics

Improving Your Smile, Improve Your Self-Esteem

While others sometimes judge us by the way we look, there are other more compelling reasons for considering orthodontic treatment. Your dental health has an effect on your overall health and comfort. And how you feel about how you look also plays a role in your quality of life. When you feel unattractive because of crooked teeth or jaws that don't meet properly, you may become self-conscious and preoccupied with your appearance. You may cover your mouth when speaking or laughing, hesitate to smile, or attempt to hide your facial appearance.

Orthodontic treatment can improve your dental health and change your facial appearance for the better, and it can boost your self-esteem. It can provide you with the chance to participate in improving the way you look. Patients often feel more self-confident even before treatment is completed.

As you see yourself looking better, you may find yourself feeling better and enjoying a better quality of life. With an attractive smile, you can face your career and your personal relationships with confidence.

A Healthy Smile, A Healthy Outlook

Orthodontic treatment can improve dental health as it improves your looks. Straight, well-aligned teeth are easier to clean and maintain. Correcting orthodontic problems can help prevent tooth decay, gum disease and even tooth loss. With a smile that is truly healthy, you feel better about yourself and your interactions with others.

How To Find An Orthodontist Near You.

When you're looking for an orthodontist, remember: all active members of the American Association of Orthodontists (AAO) are uniquely qualified specialists. Each has met the exacting standards of education and experience required to be an orthodontist by the American Dental Association and by the American Association of Orthodontists for membership.

Partnership: You, Your Orthodontist And Your Dentist.

Achieving healthy, beautiful smiles is a team effort that involves the orthodontist, the family dentist, the patient (and the parents, if the patient is young) and, as needed, other dental specialists. The orthodontist provides the expertise, the treatment plan and the techniques to straighten teeth and align the jaws. The family dentist helps make sure

that the teeth and gums stay clean and healthy. The patient must cooperate by following the dentist's and the orthodontist's instructions carefully so that the teeth and jaws move in the way desired and on the prescribed schedule.

Because dental hygiene is so important, regular visits to the family dentist must continue every six months during orthodontic treatment (or more often, if recommended). It is essential that the patient avoid food which may damage orthodontic appliances. The patient must also maintain a healthy, nutritional diet to achieve the best possible results from treatment. A good diet provides essential nutrients to bones and tissues undergoing change during orthodontic treatment.

Introduction to The Dental Practice Act

Effective July 1, 2009, the Dental Board of California (DBC) is now the regulatory board for licensed Dentists (DDSs), Registered Dental Assistants (RDAs) and Registered Dental Assistants in Extended Functions (RDAEFs) health care professionals.

Our mission is to protect the health and safety of consumers.

The Board

- **Licenses qualified dental health care professionals;**
- **Takes action to enforce compliance of the Dental Practice Act and State of California laws;**
- **Strives to enhance the education of consumers and licensees.**

The Dental Practice Act is published by the The Dental Board of California, whose mission statement is as follows:

The Dental Board of California's mission is to protect and promote the health and safety of consumers by licensing those dental health care professionals who demonstrate competency, taking action to enforce compliance with the Dental Practice Act and the laws of the State of California, and enhancing the education of licentiates and consumers.

The Board also has a vision statement, which is as follows:

The Dental Board of California will be the leader in promoting the highest standard of orofacial health care and ethical behavior while ensuring access to care for the people of California.

The DBC has a website (<http://www.dbc.ca.gov>) where up to date information can be obtained regarding any changes in the laws or regulations that govern the profession of dentistry.

The Dental Practice Act itself is a set of laws and regulations that oversees and guides the practice of dentistry in the state of California. It is available for purchase from their website.

***CA Dental Practice Act with Related Statutes and Regulations* is a handy and portable compilation of selected laws and regulations that affect the dental industry. Published in cooperation with the CA Dental Board, this is a must have reference manual!**

The pertinent information, with regards to dental assisting, are the designations that exist (Dental Assistant, Registered Dental Assistant, Orthodontic Assistant Permit), levels of training that must be accomplished to attain these designations (including state required courses and examinations) and the scope of practice (or allowable duties) that each designation allows the assistant to perform. They can be found at their website, and are included below:

As used in this article:

(a) "Board" means the Dental Board of California.

(b) "Direct supervision" means supervision of dental procedures based on instructions given by a licensed dentist, who must be physically present in the treatment facility during the performance of those procedures.

(c) "General supervision" means supervision of dental procedures based on instructions given by a licensed dentist but not requiring the physical presence of the supervising dentist during the performance of those procedures.

1749.1. In addition to any other examination required by this article, the board may require applicants for licensure under this article to successfully complete an examination in California law and ethics.

1750. (a) A dental assistant is a person who may perform basic supportive dental procedures as authorized by this article under the supervision of a licensed dentist and who may perform basic supportive procedures as authorized pursuant to subdivision (b) of Section 1751 under the supervision of a registered dental hygienist in alternative practice.

(b) The supervising licensed dentist shall be responsible for determining the competency of the dental assistant to perform allowable functions.

1750. (a) A dental assistant is an individual who, without a license, may perform basic supportive dental procedures, as authorized by Section 1750.1 and by regulations adopted by the board, under the supervision of a licensed dentist. "Basic supportive

dental procedures" are those procedures that have technically elementary characteristics, are completely reversible, and are unlikely to precipitate potentially hazardous conditions for the patient being treated.

(b) The supervising licensed dentist shall be responsible for determining the competency of the dental assistant to perform the basic supportive dental procedures, as authorized by Section 1750.1.

(c) The employer of a dental assistant shall be responsible for ensuring that the dental assistant who has been in continuous employment for 120 days or more, has already successfully completed, or successfully completes, all of the following within a year of the date of employment:

(1) **A board-approved course in the Dental Practice Act.**

(2) **A board-approved course in infection control.**

(3) **A course in basic life support** offered by an instructor approved by the American Red Cross or the American Heart Association, or any other course approved by the board as equivalent and that provides the student the opportunity to engage in hands-on simulated clinical scenarios.

(d) The employer of a dental assistant shall be responsible for ensuring that the dental assistant maintains certification in basic life support.

The duties approved for a Dental Assistant (DA) are as follows:

1750.1. (a) A dental assistant may perform the following duties under the general supervision of a supervising licensed dentist:

(1) Extra-oral duties or procedures specified by the supervising licensed dentist, provided that these duties or procedures meet the definition of a basic supportive procedure specified in Section 1750.

(2) Operate dental radiography equipment for the purpose of oral radiography if the dental assistant has complied with the requirements of Section 1656.

(3) Perform intraoral and extraoral photography.

(b) A dental assistant may perform the following duties under the direct supervision of a supervising licensed dentist:

(1) Apply nonaerosol and noncaustic topical agents.

(2) Apply topical fluoride.

(3) Take intraoral impressions for all nonprosthodontic appliances.

(4) Take facebow transfers and bite registrations.

(5) Place and remove rubber dams or other isolation devices.

(6) Place, wedge, and remove matrices for restorative procedures.

(7) Remove post-extraction dressings after inspection of the surgical site by the supervising licensed dentist.

(8) Perform measurements for the purposes of orthodontic

treatment.

(9) Cure restorative or orthodontic materials in operative site with a light-curing device.

(10) Examine orthodontic appliances.

(11) Place and remove orthodontic separators.

(12) Remove ligature ties and archwires.

(13) After adjustment by the dentist, examine and seat removable orthodontic appliances and deliver care instructions to the patient.

(14) Remove periodontal dressings.

(15) Remove sutures after inspection of the site by the dentist.

(16) Place patient monitoring sensors.

(17) Monitor patient sedation, limited to reading and transmitting information from the monitor display during the intraoperative phase of surgery for electrocardiogram waveform, carbon dioxide and end tidal carbon dioxide concentrations, respiratory cycle data, continuous noninvasive blood pressure data, or pulse arterial oxygen saturation measurements, for the purpose of interpretation and evaluation by a supervising licensed dentist who shall be at the patient's chairside during this procedure.

(18) Assist in the administration of nitrous oxide when used for analgesia or sedation. A dental assistant shall not start the administration of the gases and shall not adjust the flow of the gases unless instructed to do so by the supervising licensed dentist who shall be present at the patient's chairside during the implementation of these instructions. This paragraph shall not be construed to prevent any person from taking appropriate action in the event of a medical emergency.

(c) Under the supervision of a registered dental hygienist in alternative practice, a dental assistant may perform intraoral retraction and suctioning.

(d) The board may specify additional allowable duties by regulation.

(e) **The duties of a dental assistant or a dental assistant holding a permit in orthodontic assisting or in dental sedation do not include any of the following procedures unless specifically allowed by law:**

(1) Diagnosis and comprehensive treatment planning.

(2) Placing, finishing, or removing permanent restorations.

(3) Surgery or cutting on hard and soft tissue including, but not limited to, the removal of teeth and the cutting and suturing of soft tissue.

(4) Prescribing medication.

(5) Starting or adjusting local or general anesthesia or oral or parenteral conscious sedation, except for the administration of nitrous oxide and oxygen, whether administered alone or in combination with each other and except as otherwise provided by law.

(f) The duties of a dental assistant are defined in subdivision (a) of Section 1750 and do not include any duty or procedure that only an orthodontic assistant permitholder, dental sedation assistant permitholder, registered dental assistant, registered dental assistant in extended functions, registered dental hygienist, or registered dental hygienist in alternative practice is allowed to perform.

(g) This section shall become operative on January 1, 2010.

Orthodontic Assistant Permit (OAP)

750.2. (a) On and after January 1, 2010, the board may issue an orthodontic assistant permit to a person who files a completed application including a fee and provides evidence, satisfactory to the board, of all of the following eligibility requirements:

(1) Completion of at least 12 months of work experience as a dental assistant.

(2) Successful completion of a board-approved course in the Dental Practice Act and a board-approved, course in infection control.

(3) Successful completion of a course in basic life support offered by an instructor approved by the American Red Cross or the American Heart Association, or any other course approved by the board as equivalent.

(4) Successful completion of a board-approved orthodontic assistant course, which may commence after the completion of six months of work experience as a dental assistant.

(5) Passage of a written examination administered by the board after completion of all of the other requirements of this subdivision. The written examination shall encompass the knowledge, skills, and abilities necessary to competently perform the duties specified in Section 1750.3.

(b) A person who holds an orthodontic assistant permit pursuant to this section shall be subject to the same continuing education requirements for registered dental assistants as established by the board pursuant to Section 1645 and the renewal requirements of Article 6 (commencing with Section 1715).

1750.3. **A person holding an orthodontic assistant permit** pursuant to Section 1750.2 **may perform the following duties** under the direct supervision of a licensed dentist:

(a) All duties that a dental assistant is allowed to perform.

(b) Prepare teeth for bonding, and select, preposition, and cure orthodontic brackets after their position has been approved by the supervising licensed dentist.

(c) Remove only orthodontic brackets and attachments with removal

of the bonding material by the supervising licensed dentist.

(d) Size, fit, and cement orthodontic bands.

(e) Remove orthodontic bands and remove excess cement from supragingival surfaces of teeth with a hand instrument.

(f) Place and ligate archwires.

(g) Remove excess cement with an ultrasonic scaler from supragingival surfaces of teeth undergoing orthodontic treatment.

(h) Any additional duties that the board may prescribe by regulation.

A Registered Dental Assistant (RDA)

In order to obtain an RDA license:

1752.1. (a) The board may license as a registered dental assistant a person who files an application and submits written evidence, satisfactory to the board, of one of the following eligibility requirements:

(1) Graduation from an educational program in registered dental assisting approved by the board, and satisfactory performance on a written and practical examination administered by the board.

(2) For individuals applying prior to January 1, 2010, evidence of completion of satisfactory work experience of at least 12 months as a dental assistant in California or another state and satisfactory performance on a written and practical examination administered by the board.

(3) For individuals applying on or after January 1, 2010, evidence of completion of satisfactory work experience of at least 15 months as a dental assistant in California or another state and satisfactory performance on a written and practical examination administered by the board.

(b) For purposes of this section, "satisfactory work experience" means performance of the duties specified in Section 1750.1 in a competent manner as determined by the employing dentist, who shall certify to such satisfactory work experience in the application.

(c) The board shall give credit toward the work experience referred to in this section to persons who have graduated from a dental assisting program in a postsecondary institution approved by the Department of Education or in a secondary institution, regional occupational center, or regional occupational program, that are not, however, approved by the board pursuant to subdivision (a). The credit shall equal the total weeks spent in classroom training and internship on a week-for-week basis. The board, in cooperation with the Superintendent of Public Instruction, shall establish the minimum criteria for the curriculum of nonboard-approved programs. Additionally, the board shall notify those programs only if the program's curriculum does not meet established minimum criteria, as

established for board-approved registered dental assistant programs, except any requirement that the program be given in a postsecondary institution. Graduates of programs not meeting established minimum criteria shall not qualify for satisfactory work experience as defined by this section.

(d) In addition to the requirements specified in subdivision (a), each applicant for registered dental assistant licensure on or after July 1, 2002, shall provide evidence of having successfully completed board-approved courses in radiation safety and coronal polishing as a condition of licensure. The length and content of the courses shall be governed by applicable board regulations.

(e) In addition to the requirements specified in subdivisions (a) and (d), individuals applying for registered dental assistant licensure on or after January 1, 2010, shall demonstrate satisfactory performance on a written examination in law and ethics administered by the board and shall provide written evidence of successful completion within five years prior to application of all of the following:

(1) A board-approved course in the Dental Practice Act.

(2) A board-approved course in infection control.

(3) A course in basic life support offered by an instructor approved by the American Red Cross or the American Heart Association, or any other course approved by the board as equivalent.

(f) A registered dental assistant may apply for an orthodontic assistant permit or a dental sedation assistant permit, or both, by submitting written evidence of the following:

(1) Successful completion of a board-approved orthodontic assistant or dental sedation assistant course, as applicable.

(2) Passage of a written examination administered by the board that shall encompass the knowledge, skills, and abilities necessary to competently perform the duties of the particular permit.

(g) A registered dental assistant with permits in either orthodontic assisting or dental sedation assisting shall be referred to as an "RDA with orthodontic assistant permit," or "RDA with dental sedation assistant permit," as applicable. These terms shall be used for reference purposes only and do not create additional categories of licensure.

(h) Completion of the continuing education requirements established by the board pursuant to Section 1645 by a registered dental assistant who also holds a permit as an orthodontic assistant or dental sedation assistant shall fulfill the continuing education requirements for the permit or permits.

Allowable duties for a Registered Dental Assistant (RDA)

1752.4. (a) A registered dental assistant may perform all of the following duties:

- (1) All duties that a dental assistant is allowed to perform.
 - (2) Mouth-mirror inspections of the oral cavity, to include charting of obvious lesions, existing restorations, and missing teeth.
 - (3) Apply and activate bleaching agents using a nonlaser light-curing device.
 - (4) Use of automated caries detection devices and materials to gather information for diagnosis by the dentist.
 - (5) Obtain intraoral images for computer-aided design (CAD), milled restorations.
 - (6) Pulp vitality testing and recording of findings.
 - (7) Place bases, liners, and bonding agents.
 - (8) Chemically prepare teeth for bonding.
 - (9) Place, adjust, and finish direct provisional restorations.
 - (10) Fabricate, adjust, cement, and remove indirect provisional restorations, including stainless steel crowns when used as a provisional restoration.
 - (11) Place post-extraction dressings after inspection of the surgical site by the supervising licensed dentist.
 - (12) Place periodontal dressings.
 - (13) Dry endodontically treated canals using absorbent paper points.
 - (14) Adjust dentures extra-orally.
 - (15) Remove excess cement from surfaces of teeth with a hand instrument.
 - (16) Polish coronal surfaces of the teeth.
 - (17) Place ligature ties and archwires.
 - (18) Remove orthodontic bands.
 - (19) All duties that the board may prescribe by regulation.
- (b) A registered dental assistant may only perform the following additional duties if he or she has completed a board-approved registered dental assistant educational program in those duties, or if he or she has provided evidence, satisfactory to the board, of having completed a board-approved course in those duties.
- (1) Remove excess cement with an ultrasonic scaler from supragingival surfaces of teeth undergoing orthodontic treatment.
 - (2) The allowable duties of an orthodontic assistant permit holder as specified in Section 1750.3. A registered dental assistant shall not be required to complete further instruction in the duties of placing ligature ties and archwires, removing orthodontic bands, and removing excess cement from tooth surfaces with a hand instrument.

Requirement for Dental Assistant with Expanded Functions and allowable duties - see website

Introduction to Dental Infection Control

- an extensive working knowledge of infection control practices and procedures is required. This material serves as an introduction, with the CDA (California Dental Association) course available for required training. Periodic courses are also offered by the CAO (California Association of Orthodontists) that will fulfill the California Dental Board requirements noted above.

- All instruments are sterilized according to CDC recommendations, including orthodontic hand-pieces.
- Team members wear smocks, gloves, masks, and when needed, protective eye wear, to protect them and patients from the possible spread of disease.
- All items used in any procedure are disposable, sterilized, disinfected, or individually packaged.
- Countertops, lights, chairs, headrests and all other surfaces are disinfected and/or covered prior to each patient's appointment.

Patients must be confident that your office meets all the guidelines of the American Dental Association (ADA), the American Association of Orthodontists (AAO), the Occupational Safety and Health Administration (OSHA), and the Center for Disease Control (CDC).

- an informative website is that of the Center For Disease Control - cdc.gov
an example of information found there is their recommendation for proper hand hygiene

- **Introduction**
- Good hand hygiene is one of the most critical control strategies in outbreak management. Hand hygiene is defined as any method that removes or destroys microorganisms on hands. It is well-documented that the most important measure for preventing the spread of pathogens is effective handwashing. Hand hygiene programs should include clear guidance on procedures for the removal of common pathogens from the hands of passengers and crew members. Included in this program should be detailed instructions on when, where, why and the "how tos" of proper hand hygiene, including the use of soap and water, followed by effective hand drying. When supplied to either passengers or crew members, instructions should also be given on the effective use of antiseptic hand washes and hand rubs/sanitizers.
- During outbreaks of acute gastroenteritis, enhanced hand hygiene messages should be inserted into printed materials and announcements should be made throughout the day encouraging proper hand hygiene.
- **Handwashing and Drying**

- Hand washing is defined as the vigorous, brief rubbing together of all surfaces of lathered hands, followed by rinsing under a stream of water. Handwashing suspends microorganisms and mechanically removes them by rinsing with water. The fundamental principle of hand washing is removal, not killing.

- The amount of time spent washing hands is important to reduce the transmission of pathogens to other food, water, other people and inanimate objects (fomites), such as door knobs, hand railings and other frequently touched surfaces. Proper hand hygiene involves the use of soap and warm, running water, rubbing hands vigorously for at least 20 seconds. The use of a nail brush is not necessary or desired, but close attention should be paid to the nail areas, as well as the area between the fingers.

- Wet hands have been known to transfer pathogens much more readily than dry hands or hands not washed at all. The residual moisture determines the level of bacterial and viral transfer following hand washing. Careful hand drying is a critical factor for bacterial transfer to skin, food and environmental surfaces.

- The drying times required to reduce the transfer of these pathogens varies with drying methods. Repeated drying of hands with reusable cloth towels is not recommended and should be avoided. Recommended hand drying methods and drying times are outlined below:

- Drying method
- Protocol
- Total drying time
- Comments
- Single-use paper towels
- Rub hands on two paper towels drying hands for 10 seconds on each
- 20 seconds
- The first towel removes the bulk of the water; the second achieves

complete drying

- Air dryer
- Rub hands together for while rotating them under warm air
- 30 - 45 seconds
- A prolonged drying period is required to achieve complete drying
- Single-use cloth towel
- Rub hands on two sections of the towel, drying hands for 10 seconds on

each section

- 20 seconds
- The first section of the towel removes the bulk of the water; the second achieves complete drying

The following material comes from an article, "Infection Control Patrol" printed in the April/May 2007 publication, Orthodontic Products, and is authored by Leslie Canham, CDA, RDA. Leslie currently offers courses in Infection Control to satisfy the requirements mandated by the Dental Board of California and the Dental Practice Act

Infection-Control Patrol
by Leslie Canham, CDA, RDA

Six common areas of cross-contamination in an orthodontic practice

As new patients join your practice, the welcoming process should include a statement about your concern for patient safety through proper sterilization and infection-control techniques as well as strict adherence to OSHA regulations. But today's orthodontic practices are often busy, and staff members need to work at top speed to perform efficiently and stay on schedule. Sometimes, in the rush to stay on time, they can forget to perform some basic infection-control protocols. Other times, the protocols are followed but sabotaged by recontamination. Let's look at some of the common areas of cross-contamination and how to eliminate them.

Infection Control In the Orthodontic Office

Hand Hygiene

Hand hygiene is defined as any method that removes or destroys microorganisms on hands. It is well-documented that the most important measure for preventing the spread of pathogens is effective handwashing.¹ Effective handwashing includes vigorously rubbing together all surfaces of lathered hands for at least 20 seconds, followed by rinsing under a stream of water. Handwashing suspends microorganisms and mechanically removes them by rinsing the hands with water. The fundamental principle of handwashing is removal, not killing. The amount of time spent washing hands is important to reduce the transmission of pathogens to your patients, inanimate objects, and other frequently touched surfaces.

Drying hands is important, too, because wet hands can transfer pathogens much more readily than dry hands or unwashed hands. The residual moisture determines the level of bacterial and viral transfer following handwashing. Careful hand drying is critical to preventing bacterial transfer to skin, food, and environmental surfaces. Also, be certain that hands are dry before donning gloves to reduce the chances of developing skin irritation.

If the hands are not visibly soiled, an alcohol-based hand rub is adequate. Alcohol hand rubs are rapidly germicidal when applied to the skin and should include such antiseptics as chlorhexidine, quaternary ammonium compounds, octenidine, or triclosan to achieve persistent activity. Some products marketed to the public as antimicrobial hand sanitizers are not effective in reducing bacterial counts on hands. For alcohol-based hand sanitizers used in the health care professions, the FDA recommends a concentration of 60% to 95% ethanol or isopropanol—the concentration range of greatest germicidal efficacy.

Gloves

Gloves are considered single-use, disposable items, which means they should be used on one patient and then discarded. Hand hygiene should be performed after removing and discarding gloves. Occasionally, in the middle of treatment, the orthodontist or assistant needs to leave the patient to get an instrument or device. If the gloves are not removed, cross contamination could occur when you touch a surface with your gloved hand.

Removing only one glove to open a drawer or cabinet creates another concern because handwashing would not take place. After retrieving the desired instrument, if the same previously worn glove is reworn, cross contamination occurs again.

Touching a keyboard or mouse with a gloved hand is a common cause of cross-contamination. Here, a black light shows the spreading of simulated spray contamination. One possible solution is to wear overgloves.

The three cross-contamination issues here are the following:

- The gloved hand may contaminate the surface touched.
- If only one glove is removed, the ungloved hand cannot be effectively washed, thus further spreading contamination.
- The provider may have contaminated his or her hand by rewearing the dirty glove.

One solution is to have food handlers' gloves or overgloves available. Another method would be to use a cotton pliers or a drawer tweezers to open the drawer and grasp the needed item. Salad tongs or forceps can be used as well. As always, be sure to disinfect between patients.

These solutions help to avoid the time-consuming process of removing both gloves, performing hand hygiene, and regloving. If you do need to unglove and leave the patient, remember that you must discard the gloves and perform hand hygiene.

Street Clothes Versus Clinical Jackets

Clothing worn by the orthodontic team is an important area of cross contamination. A clinical jacket protects the orthodontist's or assistant's street clothing and skin from the patient's oral materials generated during patient treatment. A visible spray is created during the use of dental instruments such as handpieces, ultrasonic scalers, and air-water syringes. This spray travels only a short distance and settles quickly, landing on either the floor, the nearby operatory surfaces, the dental health care personnel providing care, or the patient. OSHA mandates that protective clothing such as gowns, clinic jackets, or similar outer garments shall be worn in occupational exposure situations. General work clothes such as uniforms, scrubs, pants, and shirts are not intended to protect against a hazard, nor are they considered personal protective equipment.

Masks, Face Shields, and Protective Eyewear

OSHA requires dental health care providers (DHCPs) to wear masks and face shields or protective eyewear to protect the skin and the mucous membranes of the eyes, nose, and mouth from exposure to spray generated during a dental procedure. This spray may land on and contaminate masks and protective eyewear but not be visible. To prevent cross-contamination, you must disinfect the contaminated eyewear after each patient and be careful to avoid touching the contaminated eyewear with your bare hand. A surgical mask protects the patient against microorganisms generated by the wearer with greater than 95% bacterial filtration efficiency, and also protects the DHCP from large-particle droplet spatter that might contain blood-borne pathogens or other infectious microorganisms. The mask's outer surface can become contaminated with infectious droplets from spray of oral fluids or from touching the mask with contaminated fingers. Also, when a mask becomes wet from exhaled moist air, the resistance to

airflow through the mask increases, causing more airflow to pass around the edges of the mask. If the mask becomes wet, it should be changed between patients or even during patient treatment, when possible.²

As shown by a black light, a surgical mask's outer surface can become contaminated with infectious droplets from spray of oral fluids or from touching the mask with contaminated fingers. Wet masks should be changed.

Environmental Surfaces

Environmental surfaces include surfaces or equipment that do not contact patients directly but can become contaminated during patient treatment. This occurs as a result of spray generated during treatment, contact with contaminated instruments or devices, or when a member of the orthodontic team touches the surfaces with contaminated gloves. These surfaces can serve as reservoirs of microbial contamination. Transfer of microorganisms from contaminated environmental surfaces to patients occurs primarily through DHCP hand contact. When you touch these surfaces, microbial agents can be transferred to instruments; other environmental surfaces; or to the nose, mouth, or eyes of workers or patients.

Environmental surfaces are divided into clinical contact surfaces and housekeeping surfaces. Clinical contact surfaces are surfaces that come in contact with sprays, spatters, contaminated instruments, and your gloved hand. These include:

- dental light handles;
- chair switches;
- dental radiograph equipment;
- chairside computer keyboards;
- reusable containers of dental materials;
- drawer handles;
- faucet handles;
- countertops;
- pens;
- telephones;
- doorknobs; and
- contaminated instruments or devices.

An effective way to protect some surfaces is to use barriers. Barriers can be clear plastic wrap, bags, sheets, tubing, and plastic-backed paper or other materials impervious to moisture. Because barriers can become contaminated, they should be removed and discarded after each patient while you are still gloved. After you remove the barrier, if the surface becomes soiled, then it must be cleaned and disinfected. Otherwise, after removing gloves and performing hand hygiene, you should place clean barriers on these surfaces before the next patient.

Clinical contact surfaces that are not barrier-protected must be disinfected between patients. There are a number of surface disinfectants to choose from. The CDC Guidelines state that an EPA-registered disinfectant with a minimum kill claim of HBV and HIV should be used on clinical contact surfaces. When the surface is visibly contaminated with blood or other potentially infectious material, an intermediate-level disinfectant (with a tuberculocidal kill claim) should be used.

There are two steps to proper surface disinfection: First, you must clean the surface; and second, you must disinfect the surface. Always follow the manufacturer's directions for correct use of the product. When using spray disinfectants, the system of "spray-wipe-spray" means spray the surface to moisten, then wipe up to remove any debris. Once the surface is clean, spray the surface again and allow the product to remain on the surface for the recommended contact time. When using premoistened wipes, the manufacturer's directions indicate a system of "wipe-discard-wipe," which means wipe the surface to remove any debris, discard the contaminated wipe, and then use a fresh wipe to disinfect the surface for the recommended contact time. While it may seem that you use twice as many wipes when you follow the manufacturer's directions, you may not achieve disinfection by using only one wipe. Another issue to address is placing disinfectant solutions in a container with 4x4 gauze for use on dental equipment. This is not listed on the manufacturer's label as proper use of the product, primarily because the cotton fibers contained in the gauze may shorten the effectiveness of some disinfecting agents when they are stored together in containers. If gauze is used to apply disinfectant to surfaces, it should be saturated with the disinfecting agent at the time of use.

Examples of housekeeping surfaces include floors, walls, and sinks. Housekeeping surfaces pose little risk for disease transmission in dental health care settings. The majority of housekeeping surfaces need to be cleaned only with a detergent and water or an EPA-registered hospital disinfectant/detergent, depending on the nature of the surface and the type and degree of contamination.

Instruments and Other Patient Care Items

To determine if you are processing instruments properly, ask yourself three questions:

- Would I feel comfortable putting this instrument in my mouth?
- Have I sterilized this item according to the CDC guidelines?
- Is there any event that might have caused this item to become

contaminated after it was sterilized?

Here are four common pitfalls to be aware of in instrument reprocessing:

• Cleaning

Ultrasonic cleaners are an efficient way to remove debris from instruments. Use ultrasonic solutions that are specifically designed for ultrasonic cleaner use. Other products such as disinfectants can "fix" blood and debris onto the instrument. Be sure to use the appropriate baskets or cassettes to suspend the instruments in the ultrasonic solution. While bundling instruments together with a hair tie will keep sets of instruments organized, it defeats the cleaning process by preventing the instruments from being exposed on all sides to the action of the bubbles and solution. Be sure to close the lid of the ultrasonic tank when in use to prevent contaminated solution from being aerosolized.

• Packaging

Make sure instruments are rinsed and dried thoroughly prior to packaging. The packaging or wrap should be designed for the type of sterilization process being used. In orthodontic practices, most of the instruments fall into the category of "semicritical instruments," those that touch mucous membranes but will not touch bone or penetrate soft tissue. Semicritical instruments that are sterilized unwrapped on a tray or in a container system should be used immediately or within a short time. When sterile items

are open to the air, they will eventually become contaminated. Even temporary storage of unwrapped semicritical instruments should be discouraged because it permits exposure to dust, airborne organisms, and other unnecessary contamination before use on a patient.

• **Sterilizing**

Load the sterilizer according to the manufacturer's instructions. Do not overload it, since too many instruments in the chamber can cause the cycle to fail. Use the full recommended cycle times for wrapped instruments. Allow packages to cool down and dry before removing them from the sterilizer.

Cross-contamination can occur to instruments when autoclave bags are handled when they are still wet. Wet bags may wick (draw in) bacteria from hands, dust, and contaminants from surfaces. Wet bags can also puncture more easily, which compromises the sterility of the instruments.

Use chemical indicators to distinguish processed and unprocessed instruments. Test each sterilizer weekly, and maintain results as required by state and federal regulations. Biological indicators commonly known as spore tests are the most accepted method for monitoring the sterilization process.

• **Storing**

Store instruments in a clean, dry environment to maintain the integrity of the package. Clean supplies and instruments should be stored in closed cabinets. Dental supplies and instruments should not be stored under sinks or in other locations where they might become wet or torn. If the packaging is compromised, instruments must be recleaned, repackaged, and sterilized again.

In today's busy orthodontic practices, patients expect your infection-control practices to protect them from diseases. You must meet their concern for safety with proper sterilization and infection-control techniques as well as strict adherence to OSHA regulations. With a little extra attention to the daily routine of infection control, everyone can eliminate cross-contamination.

A couple of additional articles that are highly recommended, but couldn't be reproduced here due to copyright costs, are:

[Risky short-cuts in sterilization](#) - which comes from the August 2009 edition of Dental Products Report.

And

[Getting The Most From Infection Control](#) - which comes from the December 2008 edition of Dental Products Report.

Both are authored by Chris Miller, PhD who is Professor Emeritus of Oral Microbiology and Executive Associate Dean Emeritus at the Indiana University School of Dentistry. The articles should still be accessible online by entering the

title of the articles into a search engine (i.e. Google search). Dr. Miller is also the Editor-in-Chief of *Infection Control in Practice*. A bi-monthly publication of the Organization for Safety and Asepsis Procedures.

