Lec. 1
4th stage
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Introduction to orthodontics

What is orthodontics?

Orthodontics is the branch of dentistry concerned with facial growth, development of the dentition and occlusion, and the diagnosis, interception, and treatment of occlusal anomalies.

Other definitions:

1. In 1911, Noyes defined orthodontics as "*the study of the relation of the teeth to the development of the face, and the correction of arrested and perverted development*."
2. In 1943, Salzmann defined orthodontics as "*a branch of science and art of dentistry which deals with the developmental and positional anomalies of the teeth and the jaws as they affect oral health and the physical, esthetic and mental wellbeing of the person*"
3. in 1922 the British Society of Orthodontists proposed that "*Orthodontics includes the study of growth and development of the jaws and face particularly, and the body generally, as influencing the position of the teeth; the study of action and reaction of internal and external influences on the development, and the prevention and correction of arrested and perverted development.*"
4. The American Board of Orthodontics (ABO) and the American Association of Orthodontists states: "*Orthodontics is that specific area of the dental profession that has as its responsibility the study and supervision of the growth and development of the dentition and its related anatomical structures from birth to dental maturity, including all preventive and corrective procedures of dental irregularities requiring the repositioning of teeth by functional and mechanical means to establish normal occlusion and pleasing facial contours.*"

Branches of orthodontics:

The art and science of orthodontics can be divided into three categories based on the nature and time of intervention:

1. Preventive orthodontics
2. Interceptive orthodontics
3. Corrective orthodontics.

1. Preventive Orthodontics: that action taken to preserve the integrity of what appears to be the normal occlusion at a specific time.

2. Interceptive Orthodontics: that phase of the science and art of orthodontics, employed to recognize and eliminate potential irregularities and malpositions in the developing dentofacial complex.

Note: Certain procedures under the preventive and interceptive orthodontic fields may overlap. Hence, at times it may not be possible to segregate the two, however, interception always recognizes the existence of a malocclusion or malformation whereas the prevention is aimed at preventing the malocclusion or malformation from occurring.

3. Corrective Orthodontics: Corrective orthodontics, like interceptive orthodontics, recognizes the existence of a malocclusion and the need for employing certain technical procedures to reduce or eliminate the problem and the attendant sequelae. The procedures employed in correction may be mechanical, functional or surgical in nature.

AIMS OF ORTHODONTIC TREATMENT

The treatment provided should not only satisfy the patient's esthetic desires but also satisfy certain functional and physiologic requirements. Jackson had summarized the aims of orthodontic treatment as the "**Jackson's triad":**

1. Functional efficiency
2. Structural balance
3. Esthetic harmony

1. Functional Efficiency

The teeth along with their surrounding structures are required to perform certain important functions. The orthodontic treatment should increase the efficiency of the functions performed by the stomatognathic system.

2. Structural Balance

The structures affected by the orthodontic treatment include, not only the teeth but also the surrounding soft tissue envelop and the associated skeletal structures. The treatment should maintain a balance between these structures, and the correction of one should not be detrimental to the health of another.

3. Esthetic Harmony

The orthodontic treatment should increase the overall esthetic appeal of the individual. This might just require the alignment of certain teeth or the forward movement of the complete jaw including its basal bone. The aim is to get results which gel with the patient's personality and make him/her to look more esthetic.

SCOPE OF ORTHODONTICS:

Orthodontic treatment is aimed at moving teeth, orthopedic change and altering the soft tissue envelop.

1. Moving Teeth

The main reason for the existence of this specialty was its capability of moving teeth. Moving teeth without any deleterious effects into more ideal locations is what everyone always associates this field with. How efficiently this can be undertaken and to what extent, depends upon the nature of the malocclusion and the capability of each individual clinician.

2. Orthopedic Change

Using functional appliances and the latest orthognathic techniques, it is possible to move entire jaws into more favorable positions. It is very much

within the capabilities of an orthodontist to use appliances at times in conjunction with other specialists to move the entire jaws along with its basal bone and the soft tissue envelop to achieve the objectives of treatment.

3. Altering The Soft Tissue Envelop

The functions performed by the soft tissue envelop of the teeth and the oral cavity have a definite impact on the growth and development of the oral and facial structures. The orthodontist can help retain or restrain the soft tissues and or bring about a change in them by altering the position of the teeth or the jaws. The various functional appliances and at times habit breaking appliances may be used along with other treatment procedures.

3 Definitions of occlusion related to orthodontics:

Occlusion: Any position or relationship in which the upper and the lower teeth come together.

Ideal Occlusion: A theoretical concept of an ideal arrangement of the teeth within the dental arches, combined with an ideal inter-arch relationship, which concentrates optimal esthetic, function, and stability of the dentition and supporting structures. But it is almost never found in nature.

Normal occlusion: That occlusion which satisfies the requirements of function and esthetic but in which there are minor irregularities of individual teeth.

Malocclusion: Any deviation from the normal or ideal occlusion.

ANDREWS SIX KEYS TO NORMAL OCCLUSION

Lawrence F Andrews studied 120 casts of nonorthodontic patients with normal occlusion for four years (1960-1964). He identified 6 key characteristics.

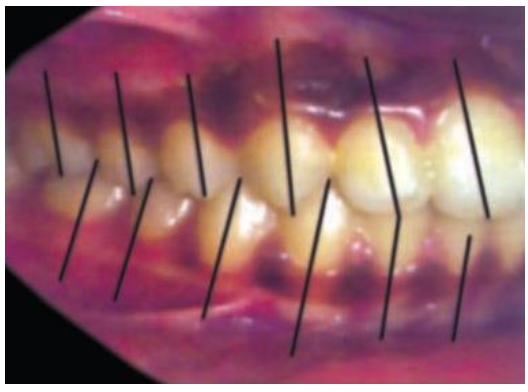
KEY I

Molar relationship: The molar relationship should be such that the distal surface of the distal marginal ridge of the upper first permanent molar contacts and occludes with the mesial surface of the mesial marginal ridge of the lower second molar.

Secondly, the mesiobuccal cusp of the upper first permanent molar falls within the groove between the mesial and middle cusps of the lower first permanent molar. Also, the mesiolingual cusp of the upper first molar seats in the central fossa of the lower first molar.

KEY II

Crown angulation: the mesiodistal "tip". In normally occluded teeth, the gingival portion of the long axis (the line bisecting the clinical crown mesiodistally or the line passing through the most prominent part of the labial or buccal surface of a tooth) of each crown is distal to the occlusal portion of that axis. The degree of tip varies with each tooth type.



KEY III

Crown inclination: the labiolingual or buccolingual, “torque”. Crown inclination is the angle between a line 90 degrees to the occlusal plane, and a line tangent to the middle of the labial or buccal surface of the clinical crown.

The crowns of the maxillary incisors are so placed that the incisal portion of the labial surface is labial to the gingival portion of the clinical crown. In all other crowns, the occlusal portion of the labial or buccal surface is lingual to the gingival portion. In the maxillary molars the lingual crown inclination is slightly more pronounced as compared to the cuspids and bicuspids. In the mandibular posterior teeth, the lingual inclination progressively increases.

KEY IV

Absence of Rotations: Teeth should be free of undesirable rotations. If rotated, a molar or bicuspid occupies more space than it would normally. A rotated incisor can occupy less space than normal.

KEY V

Tight contacts: In the absence of such abnormalities as genuine tooth-size discrepancies, contact points should be tight.

KEY VI

Flat curve of Spee: A flat occlusal plane is a must for stability of occlusion. It is measured from the most prominent cusp of the lower second molar to the lower central incisor, no curve deeper than 1.5 mm is acceptable from a stand point of stability.

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