Orthodontic

Introduction to Orthodontics

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Definition of orthodontics:

'Ortho' means correction of irregularity and 'dontics' means teeth, so "orthodontics means correcting irregularities of teeth.

More generally, orthodontics is that branch of dental science concerned with genetic variation, development and growth of facial forms and the manner in which these factors affect the occlusion of the teeth and the function of associated organs.

Definition of malocclusion: -

There are three types of occlusion:

1. **Ideal occlusion:** is a hypothetical concept based on the anatomy of the teeth. It is rarely if ever found in nature. However, it provides a standard by which other occlusions can be judged.

2. Normal occlusion: is an occlusion within the accepted deviation of the ideal i.e. with minor variations in the alignment of the teeth which are not of esthetic or functional importance.

3. **Malocclusion:** is an irregularity in the occlusion beyond the accepted range of normal.

However, there is a wide range of variation between individuals and races. The fact that an individual has a malocclusion is not itself a justification for treatment. Only if it is certain that the patient will benefit, esthetically or functionally, and only if he is suitable and willing to undergo treatment should orthodontic intervention be considered.

Normal occlusion six features:

1 Correct relationship of the first permanent molars in the sagittal plane.

2 Correct crown angulation of the incisor teeth in the transverse plane.

3 Correct crown inclination of the incisor teeth in the sagittal plane.

4 An absence of rotation of individual teeth.

5 Correct contacts of individual teeth within each dental arch, with no bspacing or crowding.

6 A flat or only slightly curved occlusal plane.

The aims of orthodontic treatment:

1. The improvement of facial and dental esthetics.

2. The alignment of the teeth to eliminate stagnation areas.

3. The elimination of premature contacts which give rise to mandibular displacements and may cause later muscle or joint pain.

4. The elimination of traumatic irregularities of the teeth.

5. The alignment of prominent teeth which are liable to be damaged.

6. The alignment of irregular teeth prior to bridge-work, crowns or partial dentures.

Overiet:

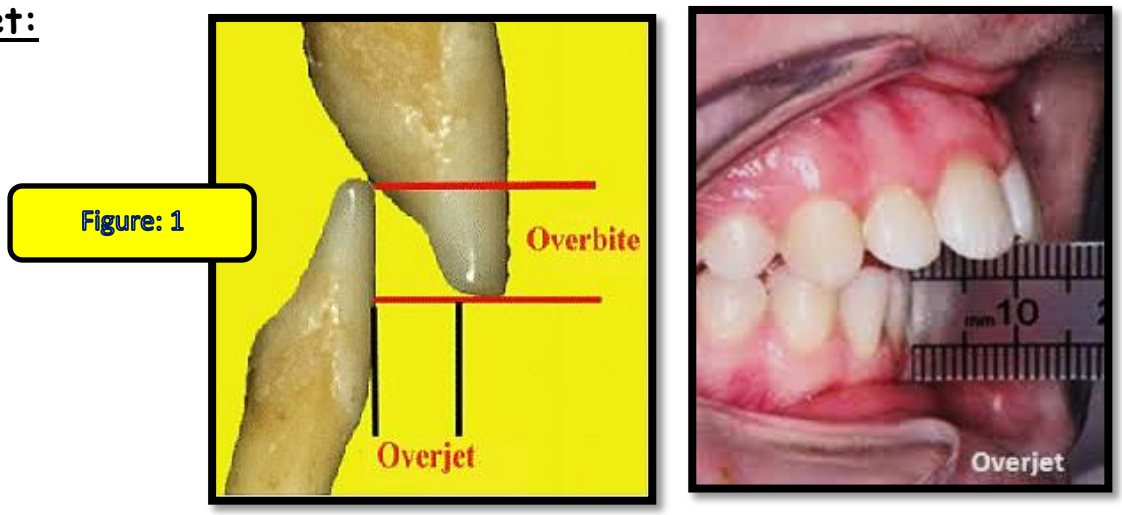


Figure: 1

It is the horizontal distance between the upper and lower incisors in occlusion, measured at the tip of the incisors (1). It is of four types:

1. Excessive overjet: it is increased overjet being more than 4mm.(2)
2. Normal overjet: it is 2-4mm.(A)
3. Edge to edge occlusion: it is occlusion of the upper and lower incisal edges.(B)
4. Reversed overjet: it is decreased overjet being more than less than 0mm. (C)

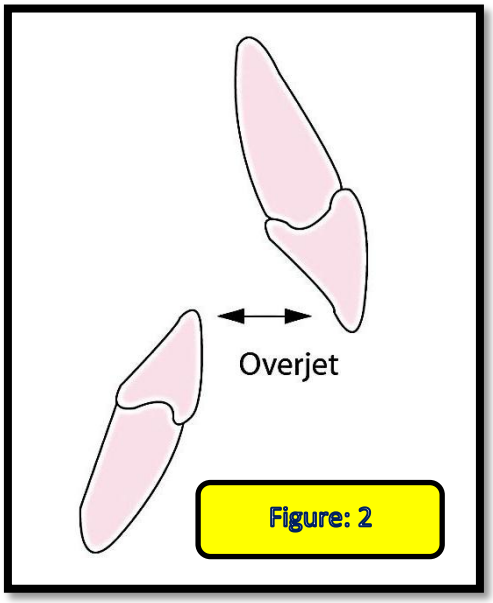


Figure: 2

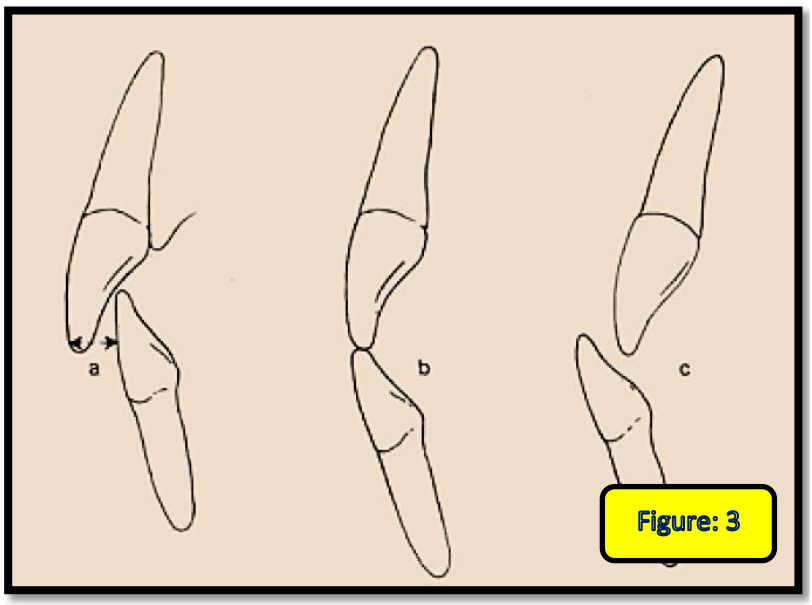


Figure: 3

Overbite:

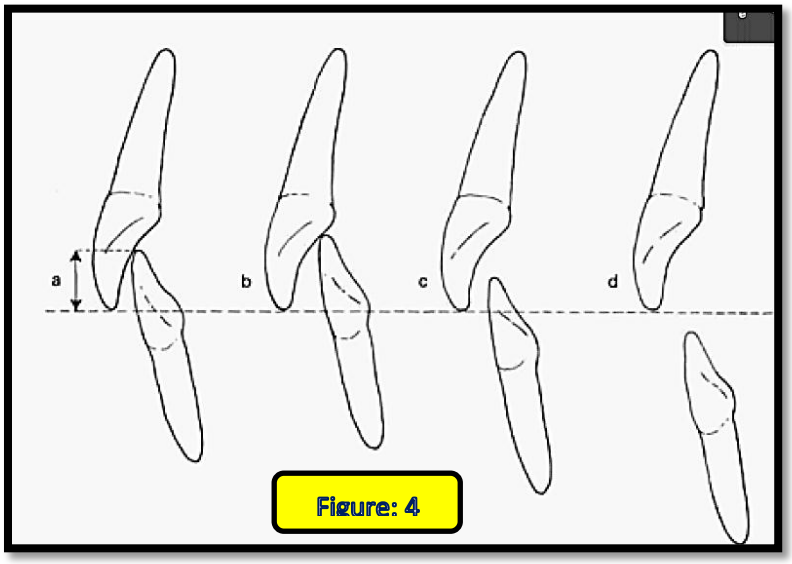


Figure: 4

It is the vertical distance between the tips of the upper and lower incisors in occlusion (1). It is of four general types:

1. Anterior open bite: it is decreased overbite with absence of overlap between opposing incisors being more than less than 0mm (4-d).

2. Edge to edge occlusion: it is occlusion of the upper and lower incisal edges with 0mm overjet (3-b).
3. Normal overbite: it is 1-3mm (4-a).
4. Deep overbite: it is increased overbite being more than 3mm. It may be
   A. Incomplete: when the lower incisal edge does not touch any opposing tissue (4-C).
   B. Complete: it's more than 3mm(4-b) , but when the lower incisal edge occludes with the palatal soft tissue or the palatal aspects of the opposing upper incisors it's called either:
   1. Traumatic: when the upper incisors are proclined and the lower incisors cause trauma of the palatal soft tissue (especially the spheno-palatine foramen area)
   2. Bitraumatic: when the upper incisors are retroclined and the lower incisors cause trauma of the palatal soft tissue and the upper incisors cause trauma of the lower labial soft tissue.

Space discrepancy:

It is the difference between the space needed in dental arch and the available space in that arch and is either crowding or spacing caused by an altered tooth / tissue ratio.

Space discrepancy (crowding or spacing) may be mild, moderate or severe. It may be localized to the anterior or posterior region or may affect the entire arch.

Crowding: is the lack of space in the dental arch associated with rotation or displacement of teeth.

Spacing: is the presence of extra space in the dental arch associated with spaces between the teeth, and if present in the midline called 'a median Diastema.

Midline shift:

It is the lack of coincidence between the lower and upper dental midline. A midline shift of 0.5mm may be considered as normal.

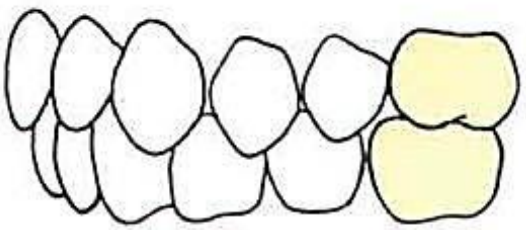
It may involve lack of coincidence between the facial midline with the lower and/or upper dental midline.

Molar Classification:

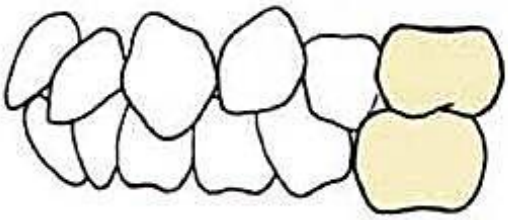
1. Class I relation: the mesiobucal cusp of the maxillary first permanent molar occludes with the mesiobuccal developmental groove of the mandibular first permanent molar.

2. Class II relation: the tip of the mesiobucal cusp of the maxillary first permanent molar lie at least half a cusp anterior to the mesiobuccal developmental groove of the mandibular first permanent molar.

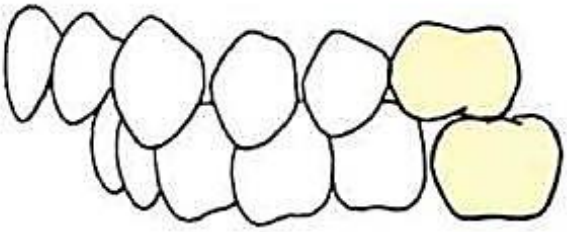
3. Class III relation: the tip of the mesiobucal cusp of the maxillary first permanent molar lie at least half a cusp posterior to the mesiobuccal developmental groove of the mandibular first permanent molar.



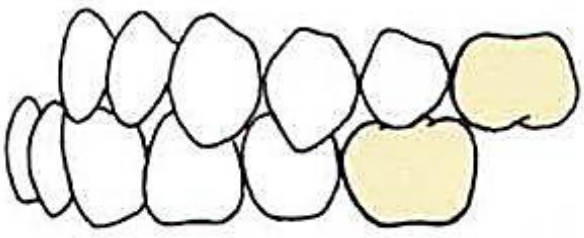
Normal occlusion



Class I malocclusion



Class II malocclusion



Class III malocclusion

Classification of malocclusion (Angle's classification):

Class I occlusion: Normal anteroposterior relationship of the maxillary and mandibular dental arches.

Class II occlusion:

The mandibular arch being retruded in relation to the maxillary dental arch. This was either:

Division 1: with proclined maxillary central incisors and increased overjet, or

Division 2: with retroclined maxillary central incisors and normal overjet.

Class III occlusion:

The mandibular arch being protruded in relation to the maxillary dental arch. This was either:

Postural: associated with forward mandibular displacement, or True: not associated with forward mandibular displacement.

Types of tooth movement:

Orthodontic tooth movement is movement of a tooth under the influence of a mechanical force. It is of several types:

1. Tipping movement: This is the simplest type of tooth movement, but is often undesirable. It involves movement of the crown and the apex of the tooth in opposite directions around a fulcrum in the root caused by a single horizontal force applied to the crown of the tooth. The Centre of rotation of this movement is usually between the apical and middle thirds of the root.
2. Bodily movement (translation): The type of tooth movement during which all points on a tooth move in the same direction by the same amount. A simple force passing through the Centre of resistance can produce bodily tooth movement. Alternatively a force and a counter-moment have to be applied on the bracket of the tooth.
3. Root movement: the type of tooth movement in which the Centre of rotation is at the incisal edge of a tooth. This is the intended type of tooth movement when torqueing incisors, uprightening canines after extraction space closure and uprightening mesially tipped molars.
4. Rotation movement: Rotation of a tooth around its axis, most evident when viewing the tooth from on occlusal view. The application of a force couple is required.

5. Extrusion movement: It is a type of bodily tooth movement parallel to the long axis of the tooth in an occlusal direction.
6. Intrusion movement: It is a type of bodily tooth movement parallel to the long axis of the tooth in an apical direction.