Occlusion in complete denture

Occlusion is a concept that is pertinent to all dental patients whether they have their own teeth or not. It is a term used to describe the contact relationship between the upper and lower teeth. When the teeth contact, they exert forces that are either distributed via the periodontal membrane, for those with natural teeth, or through the supporting mucosa for those with removable type prosthesis. So occlusion is bringing the mandibular teeth up into contact with the maxillary teeth. This is a static position when the jaws are centrically or eccentrically related.

Centric occlusion: is the occlusion of opposing teeth when the mandible is in centric relation. This may or may not coincide with the maximal intercuspal position.

Centric jaw relation: is the most posterior relation of the lower to the upper jaw from which lateral movements can be made at a given vertical dimension.

Goals of complete denture occlusion:
1- Minimize trauma to the supporting structures.
2- Preserve remaining structures.
3- Enhance stability of the denture.
4- Facilitate esthetic and speech.
5- Restore masticatory efficiency to a reasonable level.

Differences between natural and complete denture occlusion:

<table>
<thead>
<tr>
<th>Natural dentition</th>
<th>Artificial dentition</th>
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<tbody>
<tr>
<td>1- Retained in PDL</td>
<td>Mobile base on mucosa</td>
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<td>2- Teeth move separated to others</td>
<td>Teeth move as an a unit</td>
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<td>3- Malocclusion effects not immediately</td>
<td>Malocclusion effect entire base immediately</td>
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<td>4- Non -vertical forces affect only teeth Involved and usually well tolerated</td>
<td>Non -vertical forces affect all the teeth and is traumatic</td>
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<td>5- incising does not affect posteriors</td>
<td>incising affects all teeth attached to base</td>
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<td>6- bilateral balance is rare</td>
<td>bilateral balance is often desired for base stability</td>
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<td>7- tactile sensitivity</td>
<td>decrease tactile sense</td>
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**Types of complete denture occlusion:**
1-bilateral balance occlusion.
2-neutro centric occlusion (monoplane occlusion).
3-lingualized occlusion.

Bilateral balance occlusion concept means the simultaneous contacting of the upper and lower teeth on the right and left sides and in the interior and posterior occlusal surfaces. In centric and eccentric positions.
Teeth should be arranged tightly in centric occlusion so that the facial cusps of the mandibular teeth contact the central fossae of the maxillary teeth while the lingual cusps of maxillary teeth fit into the central fossa of the mandibular teeth, this facial overlap prevents checking biting when the dentures are completed.

Neutro centric occlusion (Monoplane occlusion) concept: this concept of occlusion assumes that the interior-posterior plane of occlusion should be parallel to the denture foundation area and not dictated by condylar inclination.
The plane of occlusion in this concept is completely flat and level; there is no curve of Wilson or compensating curve.

Lingualized occlusion concept: the lingual cusp tips should be in contact with the central fossae of the opposing mandibular teeth. The cuspal inclines in of the mandibular teeth are relatively flat resulting in potentially less lateral forces and displacement during function.
Lingualized occlusion indicated in severe mandibular ridge atrophy, displaceable supporting tissues, malocclusion, high aesthetic demands and in patients with previous successful dentures with lingualized occlusion.

**The importance of balance occlusion in complete denture:**
1-It avoids displacement of denture during functional movements.
2-It assists in earlier repositioning of denture which become displaced during mastication.
3-During swallowing of saliva, teeth come in contact and this contact demand equal pressure with satisfactory position of the cusp in the opposing fossae. If there is no balanced occlusion the cusp will hit in the opposing fossa result shifting of the denture base which lead to unstable denture also lead to trauma to the supporting tissue and discomfortable and then resorption.
Balanced occlusion will minimize the period that required for adaptation of patient to the denture. So bilateral balanced denture occlusion lead to stable simultaneous contact of opposing upper and lower teeth in centric relation position with smooth bilateral gilding contact to any eccentric position within the normal range of mandibular function developed to lessen or limit tipping structures.

**Factors of occlusion:**

There are five factors of occlusion which influence the arrangement of teeth, particularly anatomical teeth to achieve bilateral balance occlusion:

1. Horizontal Condylar guidance (HCG)
2. Incisal guidance (IG)
3. Orientation of occlusion plane (OOP)
4. Cuspal inclination (CI)
5. Prominance of compensating curve (CC)

These factors were described by Hanau and a formula was put for balance occlusion:

\[
\text{Condylar inclination} \times \text{Incisal guidance} = \frac{\text{K (constant)}}{\text{Orientation of occlusal plane cuspal inclination Compensating curve}}
\]

K (constant) = Balance occlusion

All these factors are interrelated; variation of each one will affects the others

1. Condylar inclination is the only one factor that the dentist has no control over since it is the property of the patient, this factor is obtained by making (protrusive& / or lateral jaw registrations) from the patient.

Protrusive relation: is the relation acquired by the mandible when moves in a protrusive direction. The protrusive direction is downward and forward. Then the condyles travels in this direction it brings the interior teeth into a position favorable for incision, this movement transferred to the articulator which reserved by protrusive condylar guidance which is intended to produce similar guidance in articulator movements as are produced by paths of condyles on the T.M.J.

The inclination of the condylar guidance is formed.
Between the protrusive path of condyle in the glenoid fossa and the horizontal plane. This angle should not be changed by the operator when ever it is recorded. And it related to each individual and the dentist has no control in it and it is affected by many factors:

- shape of bony contour of T M J.
- the action of the muscles attached to the mandible.
- action of movements affected by the attached ligaments.
- the method used for registration

2-incisal guidance: is the influence of the contacting surfaces of the mandibular and maxillary anterior teeth on mandibular movements. The inclination of the incisal guidance is affected by many factors, ridge relationship, arch shape, ridge fullness, interridge distance, esthetics and phonetics.

The incisal guidance adjusted after arrangement of anterior teeth in such manner will give the requirement of phonetics and esthetics and it is under control of the dentist and it changed according to the other factors that mentioned above.

3-orientation of occlusal plane: occlusal plane can not be altered substantially since functional requirements dictate position. By positioning the anterior teeth correctly for esthetic appearance and locating the posterior end of the occlusal plane approximately level with the anterior two-thirds of retromolarpad. The dentist fixes the orientation of the occlusal plane.

4-cuspal inclination: the degree of cuspal inclination is dependent on multiple factors (residual ridges, neuromuscular control, esthetic and others) in general it is best to reduce cuspul inclination to help reduce horizontal forces of occlusion. Cusp height is the perpendicular distance between the tip of cusp and its base lane:

5-compensating curve: is very helpful in obtaining balanced occlusion and depending on the posterior teeth from, it can easily be corrected to facilitate posterior teeth contacts in eccentric positions.
Fig 1: In centric occlusion, the facial cusps of the mandibular teeth contact the central fossa in the maxillary teeth, while the lingual cusps of maxillary teeth fit into the central fossa of the mandibular teeth.

Fig 2: In protrusive balance occlusion the distal inclines of the maxillary teeth of the facial cusps contact the mesial inclines of the mandibular facial cusps. Contacts may also occur on the lingual cusps.

Fig 3: Working or functional occlusion occurs when the facial cusps of the maxillary teeth meet the facial cusps of the mandibular teeth, the lingual cusps of maxillary teeth meet also the lingual cusps of mandibular teeth. Non-working(balanced occlusion) occurs simultaneous in the opposite side from working occlusion. In balanced occlusion the lingual cusps of maxillary teeth contact the facial cusps of the mandibular teeth.

Fig 4: Centric occlusion, working and balancing in mono plane occlusion.
Fig 5: Centric occlusion, working and balancing in lingualized occlusion.

Fig 6: Effect of CG & IG to OP, CC, & CH.