

## Complete denture occlusion

**Occlusion** is "the static relationship between the incising or masticatory surfaces of the maxillary or mandibular teeth or tooth analogues" (Occlusion=contact between teeth).

While **Articulation** refers to "static & dynamic contact relationship between maxillary & mandibular teeth as they move against each other during function".

### **Centric relation:**

The most retruded physiological relation of the mandible to the maxillae to and from which the individual can make collateral movements. It is a condition that can exist at various degrees of jaw separation. It occurs around the terminal hinge axis.

**Or:** The maxillo-mandibular relationship in which the condyle articulates with the thinnest avascular portion of their respective disc with the complex in the anterior-superior position against the slopes of the articular eminences. This position is independent of tooth contact. It is restricted to a purely rotary movement around the transverse horizontal axis. (bone-to-bone relation).

### **Maximum intercuspation:**

The complete intercuspation of the opposing teeth, independent of condylar position.

**Centric occlusion:** The occlusion of opposing teeth when the mandible is in centric relation. This may or may not coincide with maximum intercuspation position in natural dentition. (tooth-tooth relation).

**Working side:-** is the side that the mandible moves towards in lateral excursion.

**Non-working side:-** is the side that the mandible moves away from during lateral excursion.

### **Occlusion in the natural dentition are:**

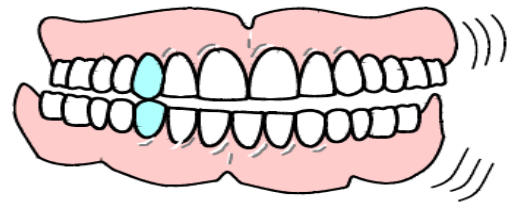
The pathways the teeth take are dependent on the cusps and morphology of the occlusal surfaces of the teeth, as well as on the morphology of the joints. In chewing, the lower teeth move across the uppers, passing through the intercuspation position, usually without stopping.

### **The concepts of natural occlusion are:**

١. **Mutually protect occlusion:** canine protection occlusion : the basic premise of canine protection occlusion is that:

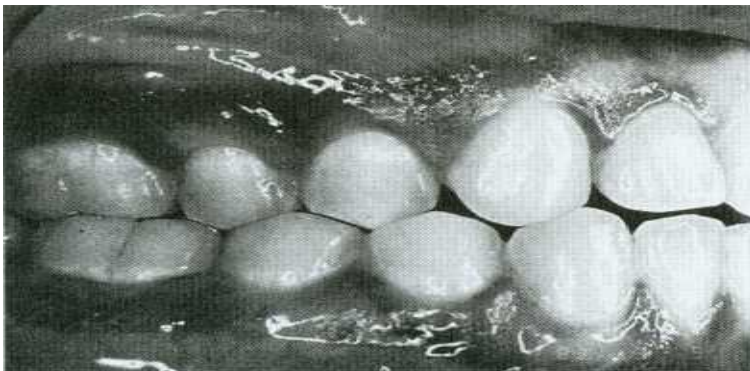
- A. On laterotrusive movements of the mandible, only the canines (possibly first premolars) contact & therefore protect the remaining dentition from adverse occlusal torsion forces on contacts to & from centric occlusion.
- B. Furthermore, it is contended that canine protection occlusion is the ideal type of functional occlusion for the natural dentition & is the functional occlusion type toward which restorative & orthodontic treatments should be directed.
- C. The advocates of canine protection occlusion argued that humans innately possess the long and dominant canine, they further argued that the canine is the strongest human tooth type & has the most sensitive proprioceptive fibers.

**They therefore concluded that the canines are the best teeth to protect the occlusion from eccentric forces that occur on movements to and from centric occlusion.**



٢. **Group function:** exists when there are multiple contact relations between the maxillary & mandibular teeth in lateral movements on the working side where by simultaneous contact of several teeth acts as a group to distribute occlusal forces.

٣. **Balanced occlusion:** this type of occlusion rarely found in natural dentition



& considered as an occlusal interference:

- a. The balancing contacts, for the most part, were contacts & not interferences.
- b. Next, most balancing side contacts were on the distal sides of the posterior molars.

**Occlusion in complete denture:**

To establish proper occlusal relationship between artificial teeth in CD, you have to consider: the absence of direct attachment between the dentures & the patient's musculo-skeletal system requires a different set of guidelines of good occlusal practice, in addition all the teeth are attached to one base so the force on a single tooth may affect all the base. When replacing natural teeth with artificial teeth, it is imperative that the replacement function in harmony with the entire system of jaws, muscles & joints.

### ***Objectives of occlusion in CD:***

- Preservation of remaining tissues.
- Proper masticatory efficiency.
- Enhancement of denture retention.
- Enhancement of phonetics & esthetics.

### ***Requirements of CD occlusion:***

1. Stability of occlusion at centric relation & in areas forward & lateral to it.
2. Balanced occlusal contacts bilaterally.
3. Control of horizontal force by buccolingual cusp reduction according to residual ridge resistance, from the arch & inter-arch distance.
4. Functional lever balance by favorable tooth-to-crest ridge position.
5. Cutting, penetrating, & shearing efficiency of occlusal surfaces.
6. Anterior incisal clearance during all posterior masticatory movement.

### ***Concepts of denture occlusion:***

1. Balanced occlusion.
2. Lingualized occlusion.
3. Monoplane occlusion.

### **Balanced occlusion:-**

Means bilateral simultaneous anterior & posterior occlusal contact of the upper & lower teeth in centric & eccentric positions (protrusive & lateral). OR: is the continuing contacts as many mandibular & maxillary artificial teeth as possible in all excursive movements away from, & into the position of maximum intercuspation.

### ***Factors of balanced occlusion***

1. **Condylar guidance:** generated by the condyle & articular disc traversing the contour of the glenoid fossae. It is the condylar path in function.
2. **Incisal guidance:** the influence of the contacting surfaces of the mandibular & maxillary anterior teeth on mandibular movements. It is usually expressed in degrees of angulations from the horizontal by a line drawn in the sagittal plane between the incisal edges of the upper & lower incisor teeth when closed in centric occlusion.
3. **The plane of occlusion** is established by the height of the lower cuspid & in the posterior by the height of the retromolar pad. It is also related to the ala-tragus line as in the upper arch.
4. **The compensating curve:** the arc introduced in the construction of CD prostheses to compensate for the opening influences produced by the condylar & incisal guidance during lateral & protrusive mandibular excursive movements.

#### 5. **Cusps on teeth or the inclination of cuspless teeth**

when a balanced occlusion is selected you have to use adjustable articulator, record vertical & centric jaw relations first then a protrusive record should be made, in order to set the condylar guidance in the articulator.

#### ***The steps are:***

1. Place a 'V-shaped' notches.
2. The patient should be allowed to protrude a minimum of 2-3mm, but less than 15mm.
3. Elastomeric registration material is placed over the entire mandibular rim & the patient closes in an anterior position.
4. When the material sets, the record bases & registration are removed, placed on the articulator.
5. The condylar elements are released from the hinge position, the instrument protruded, & the records approximated. The condylar elements are rotated until there is maximum interdigitation of the registration & opposing occlusal rims.
- ☒ The incisal guidance angle is formed by the vertical overlap (overbite) between the teeth. It is only dependent on the amount of horizontal overlap (overjet). In natural teeth, these dimensions of overbite & overjet are determined by the positions of teeth; in CD

,they are determined by other factors, mainly aesthetic ,phonetic ,&function. This means they can be controlled by the dentist, within the limitations of the other factors that determine over all tooth position.

- ☒ Occlusal plane cannot be altered substantially since functional requirements dictate position. It usually govern by the ala-tragus line in the upper arch &position in relation to the corner of the mouth &retro molar pad in the lower arch.
- ☒ The degree of cuspal inclination is dependent on multiple factors (residual ridges, neuromuscular control, esthetics, etc.). however in general it is better to reduce cuspal inclination to help reduce horizontal forces of occlusion.
- ☒ The compensating curve is very helpful in obtaining balanced occlusion& depending on the posterior tooth forms it can easily be corrected to facilitate posterior tooth contacts in eccentric positions.

### **Lingualized occlusion:**

The lingual cusp tips should be in contact with the central fossae of the opposing mandibular teeth. The cuspal inclines of the mandibular teeth are relatively flat, resulting in potentially less lateral forces &displacement during function. Theoretically, there should be less lateral displacement of the denture &less lateral forces during function when using lingualized posterior denture teeth. In lingualized occlusion you may use flat lower teeth.

### **Advantages:**

١. Good esthetics
٢. Potential for bilateral balance.
٣. Centralizes vertical force
٤. Minimizes tipping force.
٥. Facilitates bolus penetration (mortar &pestle effect).
٦. Easier to adjust occlusion.
٧. Simpler technique, less precise CR records.
٨. May be used in class II, class III and cross bite.

### **Indication of use :**

١. For patients with severe alveolar bone resorption resulting in little or no ridge.

- ٧. Patient have a discrepancy between the size of the narrowing upper ridge compared with the widening lower jaw.
- ٧. This setup technique is also indicated for patients with implant-supported over dentures to eliminate lateral forces that can rock abutments, loose over time
- ٤. Additionally, lingualized occlusion is appropriate for intra-coronal attachments to avoid breakage.
- ٥. High esthetic demands.
- ٦. Displaceable supporting tissues.
- ٧. Weak muscles of mastication.
- ٨. Previous successful denture with lingualized occlusion.

### **Monoplane occlusion:**

#### **Indications of monoplane occlusion:**

- Jaw size discrepancies, malocclusions.
- Cross bite, cl II, cl III.
- Minimal ridge.
- Reduces horizontal forces—implants may help.
- Uncoordinated jaw movements.

#### **Types of occlusal schem:-**

- ١) **An anatomic tooth** is one that is designed to simulate the natural tooth form. The standard anatomic tooth has inclines of approximately ٣٣ degree or more.

#### **Advantages of anatomic occlusion:**

- ١. Esthetics.
- ٢. Better penetration of food bolus.
- ٣. Decrease of vertical stresses.
- ٤. Harmony with muscles of mastication & TMJ during functional & non- functional movements.

#### **Disadvantages of anatomic occlusion:**

- ١. Precise technique required.
- ٢. Greater lateral forces.

- ٢. More time, not long-lasting, required occlusal adjustment.
- ٤. Difficult to tooth position in class II,III.

### ٢) **Semi-anatomical teeth:-**

When the cusp incline is less steep than the conventional anatomic tooth of ٣٣ degree it can be classified as a modified or semi-anatomic tooth. It can be considered basically anatomic & will articulate in three dimensions.

#### ***Advantages of semi-anatomic cusp teeth:***

- ١. Esthetic.
- ٢. Good chewing efficiency.
- ٣. Balanced occlusion.
- ٤. Less lateral forces.
- ٥. Functional occlusal balance.

#### ***Disadvantages of semi-anatomic cusp teeth:***

- ١. Same as for anatomic teeth.
- ٢. More difficult to achieve cross arch, cross tooth balance.
- ٣. Esthetics reduced somewhat by decreasing the incisal guidance of anterior teeth.

### ٣) **A non- anatomic tooth:-**

Is essentially flat & has no cusp heights to interdigitate with an opposing tooth & has sulci to enhance its comminuting effect on food. They articulate in only two dimension.

#### ***Advantages of non- anatomic tooth:-***

- ١. Slightly more esthetic than neutrocentric occlusion.
- ٢. Indicated for patients with poor neuromuscular coordination, difficult to obtain precise or repeatable jaw relations record.
- ٣. Less time involved in set up & articulation.
- ٤. Patients with cross bite or cl.III relationships & particularly for patients with cl.II relationships who move the mandible far forward in functional relationships.

#### ***Disadvantages of non- anatomic tooth:-***

- ١. Use of a compensating curve may cause the same damaging effects as cuspal inclines.
- ٢. Occlusal adjustments are more difficult to accomplish.

#### **Balanced occlusion for non-anatomic teeth may be accomplished by:**

- ✓ Compensating curve.
- ✓ Tilting the second molar.
- ✓ Placing the balancing ramp.