

## Review Article

### Occlusal Scheme in Complete Denture – A Review

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#### ABSTRACT:

The occlusal scheme refers to the configuration and organization of occlusal contacts found in both natural and artificial teeth. The selection of a specific occlusal scheme influences the interaction of occlusal contacts between opposing teeth during centric relation and the functional movements of the mandible. In the context of dentures, the number and strength of these contacts play a crucial role in determining the magnitude and direction of forces transmitted through the denture bases to the residual ridges. Consequently, the occlusal scheme is a critical consideration in the design of complete dentures.

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#### INTRODUCTION

A complete denture is a removable prosthesis used when all of the teeth in a jaw have been lost and must be replaced prosthetically. Among the principles considered essential for complete denture success is occlusion. Occlusion is defined as the "static relationship between the incisive and masticatory surfaces of maxillary and mandibular teeth or analogues of teeth."<sup>1</sup>

A good clinical practice involves wide knowledge about the occlusion-related issues in all dental disciplines. The voyage of occlusion in dental practice and science indeed has attained its current role as 'the medium of dentistry.'<sup>2</sup> Different concepts, techniques, and philosophies have been followed for removable complete-denture, occlusion are broadly divided into centric and eccentric occlusal relationships. While the centric relation position has been widely accepted, a diverse range of eccentric relationships have been proposed, starting from pioneering prosthodontists to contemporary digital systems<sup>3</sup>.

The occlusion developed with RPDs should be physiologically harmonious, allowing the supporting structures to remain in a good state of health with functional stress distributed among all the occluding teeth. Multiple authors indicate the occlusion in maximum intercuspation/centric occlusion should incorporate bilateral posterior contacts with no deflective occlusal contacts. When most occlusal contacts on natural teeth are missing, it has been proposed that extension base RPDs have their occlusal contacts developed in centric occlusion<sup>4</sup>.

**COMPONENTS OF OCCLUSION:-**The components of occlusion as interpreted by Prosthodontics are: (1) the temporomandibular joint, (2) the musculature, (3) the tissue support for the denture bases, and (4) the teeth.

Occlusion may be discussed from two viewpoints. It may be discussed in its static relations or in its dynamic relations. The static relations in occlusion are those which occur in the many possible contacts of teeth without the interposition of food. The dynamic or functional relations are those which occur in the mastication of food.

**Static concept: -** Static relations in occlusion include:

- Centric occlusion,
- Protrusive occlusion,
- Right and left lateral occlusion,
- Intermediate occlusion.

These static relations have to be balanced with the simultaneous contacts of all the teeth on both sides of the arch at their very first contact. There should be proper cuspal inclines so that the teeth can glide from a more centric occlusion to eccentric position without interference and without the introduction of rotating or tipping forces<sup>5</sup>.

**Dynamic concept:-**Opening and closing movements involved in mastication gliding movement of teeth one jaw over the teeth of opposing jaw. Movements of the mandible which occur when the teeth are not in contact are termed as free movements<sup>2&5</sup>.

### **OCCLUSAL SCHEMES CLASSIFICATION:**

- Neurocentric occlusion
- Lingualized occlusion
- Non anatomic occlusion (Monoplane occlusion with balance)
- Linear occlusion
- Balanced occlusion<sup>2&6</sup>.

**NEUTROCENRIC OCCLUSION:** Neurocentric occlusion is at the far right of the occlusal spectrum and the exact opposite of the anatomic occlusion, was developed by De van. De Van coined the term neurocentric to embody the two key objectives of his occlusal scheme, 1. The neutralization of inclines. 2. The centralization of forces which act on the basal seat when the mandible is in centric relation to the maxillae.

There are five elements in this occlusal scheme:

1-Position:

- Positioned the posterior teeth over the posterior residual ridge as far lingually as the tongue would allow, so that forces would be perpendicular to the support areas.

2- Proportion:

- Reduction of tooth width up to 40%.
- Reduced vertical stress on the ridge by narrowing the occlusal table.
- Forces were centralized without encroachment on the tongue space.

3- Pitch:

- Pitch or inclination or tilt
- There was no compensating curve and no incisal guidance.
- This positioning directed forces perpendicular to the mean osseous foundation plane.

4- Form:

- Flat teeth with no deflecting inclines reduced destructive lateral forces and helped to keep masticatory forces perpendicular to the support.

5- Number:

- The posterior teeth were reduced in number from eight to six.
- This decreased the magnitude of the occlusal force and centralized it to the second premolar and first molar area.

**Indication:**

- Ideal for a patient who have resorbed friable ridges.
- Because the neurocentric technique provides an area of closure and does not lock the mandible into a single position. Ideal for Geriatric patient with limited oral dexterity.
- It is especially good for Class II (retrognathic), Class III (prognathic) and crossbite cases<sup>6</sup>.

### **LINGUALIZED OCCLUSION:**

Lingualized occlusion Concept was introduced by Alfred Gysi in 1927 S.H. Payne (1941): 'cusp-to-fossa occlusion' Pound: 'Lingualized occlusion'

Lingualized occlusion can be defined as, the form of denture occlusion that where the maxillary lingual cusps articulate with the mandibular occlusal surfaces in centric working and non-working mandibular positions. Lingualized occlusion should not be confused with placement of the mandibular teeth lingual to the ridge crest.

This type of occlusion involves:

1. The use of a large upper palatal cusp against wide lower central fossa,
2. The buccal cusp of the upper and lower teeth do not contact each other.

**Indications:**

- When patient places high priority on aesthetics but oral conditions indicate a non-anatomic occlusal scheme such as:
- Severe alveolar resorption
- Class II jaw relationship
- Displaceable supporting tissues
- When a complete denture opposes a removable partial denture

- When a more favourable stress distribution is desired in patients with parafunctional habits<sup>2&6</sup>.

However the disadvantage in association with the lingualised occlusion are :  
Due to constant wearing of maxillary lingual cusp or mandibular fossa rapidly results in buccal and lingual contact of equal intensity results in depletion of centralization of forces on the mandibular posterior teeth and increase the potential lateral displacement<sup>2</sup>

### **MONOPLANE OCCLUSION:**

Sear introduced monoplane occlusion with balancing ramps or tooth at the distal part of the mandibular arch which comes in contact only in eccentric excursions. De Van has used the same principle without the balancing ramp. According to this concept teeth which are flat mesiodistally and buccolingually are used, oriented as close as possible parallel to the maxillary and mandibular mean foundation plane.

#### **Indication:**

- Abnormal closure imbalance, pathosis, trauma, neuromuscular disturbances.
- Posterior displaceable mucosa.
- Mutilated, tortuous ridges with an excessive denture space.
- Ridges are flat or knife edge, rendering dentures more susceptible to horizontal force.
- When chewing pattern is milling type with broad excursions.
- Maximum of vertical force and a minimum of horizontal stress is desired.
- The amount of horizontal overlap is determined by jaw relation, ranges from 0mm (edge to edge) Class III relation to as much as 12mm for severe class II relation. Usually the mandibular second molar will be placed on the molar slope area, called 'skid row'. In this the occlusal surface of the maxillary second molar set parallel to the occlusal surface of the mandibular second molar but 2 mm above the occlusal plane, well out of occlusion.

Monoplane occlusion can be balanced by following methods:

Incline the mandibular second molar to provide contact with the maxillary denture in all excursions, the maxillary second molars are similarly inclined but left out of centric contact. The use of customized balancing ramp placed distal to the mandibular second molar. Ramp provides tripod effect of contacts of denture bases. In eccentric relation, there is smooth contact anteriorly on teeth and posteriorly on the balancing ramp. Balancing ramp improves horizontal stability of the denture<sup>6&7</sup>.

### **LINEAR OCCLUSION:**

The glossary of prosthodontics terms defines linear occlusion as “the occlusal arrangement of artificial teeth, as viewed in the horizontal plane, wherein the masticatory surfaces of the mandibular posterior artificial teeth have a straight, long, narrow occlusal form resembling that of a line, usually articulating with opposing monoplane teeth.”

Linear occlusion consists of following basic parameters:

- Zero degree (flat plane) teeth are opposed by bladed (line contact) teeth in which the blade is in a precisely straight line over the crest of the ridge.
- One arch is set to a flat (monoplane occlusal plane).
- There is no anterior interference to protrusive and lateral movements<sup>7</sup>.

#### **Plane of occlusion:**

- The plane is set steeper.
- Esthetics and phonetics determine the maxillary anterior tooth position

#### **Stabilization of mandibular denture Mandibular dentures:**

- Mandibular dentures are almost always less stable than maxillary dentures, the linear ridge is usually placed on the lower ridge.

#### **Esthetics:**

- For esthetic purpose anatomic teeth are used in maxillary posterior region, which occlude with non anatomic mandibular teeth<sup>6&7</sup>.

**Indication:** there are no such definitive indication for linear occlusion but advantages are following:

- A non anatomic (flat plane) occlusion eliminates most lateral components of force.
- Potential of creating the smallest lateral component of force against the denture bases.
- There is no change in the location of the contact during lateral movements.
- Therefore, the direction of force in that dental arch remains fairly constant<sup>8&9</sup>.

**BALANCE OCCLUSION:** The glossary of prosthodontics terms defines “balanced articulation is the bilateral, simultaneous occlusal contact of the anterior and posterior teeth in excursive movements”.

**Characteristic requirements of balanced occlusion:**

- All the teeth of the working side (central incisor to second molar) should glide evenly against the opposing teeth.
- No single tooth should produce any interference or disocclusion of the other teeth.
- There should be contacts in the balancing side, but they should not interfere with the smooth gliding movements of the working side.
- There should be simultaneous contact during protrusion.

**Types of Balanced occlusion:** Occlusal balance or balanced occlusion can be classified as follows:

- Unilateral balanced occlusion
- Bilateral balanced occlusion
- Protrusive balanced occlusion
- Lateral balanced occlusion

**Unilateral balanced occlusion:** This is a type of occlusion seen on occlusal surfaces of teeth on one side when they occlude simultaneously with a smooth, uninterrupted glide. This is not followed during complete denture construction. It is more pertained to fixed partial dentures.

**Bilateral balanced occlusion:** This is a type of occlusion that is seen when simultaneous contact occurs on both sides in centric and eccentric positions. Bilateral balanced occlusion helps to distribute the occlusal load evenly across the arch and therefore there should be simultaneous contact during helps to improve stability of the denture during centric, eccentric or parafunctional movements. For minimal occlusal balance, there should be at least three points of contact on the occlusal plane. More the number of contacts, better the balance.

Bilateral balanced occlusion can be protrusive or lateral balance.

**Protrusive balanced occlusion:** This type of balanced occlusion is present when mandible moves in a forward direction and the occlusal contacts are smooth and simultaneous anteriorly and posteriorly. There should be at least three points of contact in the occlusal plane. Two of these should be located posteriorly and one should be located in the anterior region. This is absent in natural dentition.

**Lateral balanced occlusion:** In lateral balanced there will be a minimal simultaneous three point contact (one anterior, two posterior) present during lateral moment of the mandible. Lateral balanced occlusion is absent in normal dentition.

**Advantages of Bilateral Occlusal Balance:**

- Bilateral simultaneous contact help to seat the denture in a stable position during mastication, swallowing and maintain retention and stability of the denture and the health of the oral tissues.
- Due to cross-arch balance, as the bolus is chewed on one side, the balancing cusps will come close or will contact on the other.
- Denture bases are stable even during bruxing activity.

**Disadvantages of Balanced Occlusion:**

- It is difficult to achieve in mouths where an increased vertical incisor overlap is present.
- It may tend to encourage lateral and protrusive grinding habits.
- A semi adjustable or fully adjustable articulator is required<sup>5&10</sup>.

**CONCLUSION:**

The complete dentures with higher cusps re-established the patient’s vertical dimension and masticatory function and prevented the protruding involuntary movement. Differing ideas about occlusion relative to centrics, gnathology and occlusal adjustment have led to controversial in the literature. In resorbed ridges, the chances for arch relationship discrepancies are increased due to greater horizontal overlap and lack of specific interdigitation make neutrocentric occlusal scheme idea. With Lingualized occlusal scheme, additional stability is imparted to the denture during parafunctional movements when balanced occlusion is used. Monoplane occlusal scheme are more adaptable to the unusual jaw relation such as class II and class III malocclusions and cross bite cases. Linear occlusal scheme stabilizes the denture bases by minimizing lateral occlusal forces. We need to consider all the factors such as biologic, physiologic, and mechanical that favour the stability of the denture base to avoid deflective or excessive forces transmitted to the underlying structures<sup>6, 10&11</sup>.

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