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.

In lateral excursion: (working side)

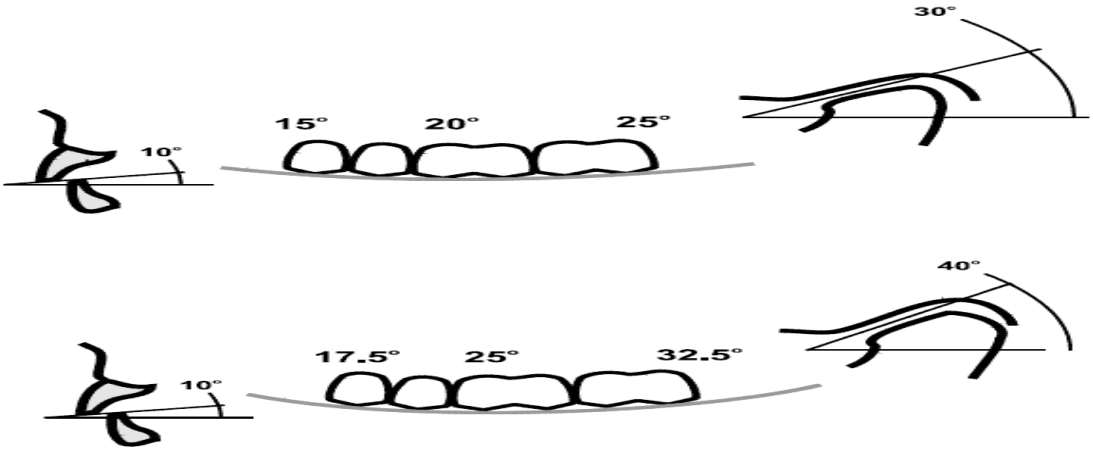
- ***Anterior teeth-*** the maxillary & mandibular anterior teeth contact on working side.
- ***Posterior teeth-*** the buccal & lingual cusps of the maxillary & mandibular posterior teeth are in contact. If lingualized occlusion, the maxillary lingual cusp will be in contact with the mandibular lingual cusp.

In lateral excursion: balancing side

- ***Anterior teeth-*** the maxillary & mandibular anterior teeth may contact on the balancing side.
- ***Posterior teeth-*** the lingual cusps of the maxillary teeth will be in contact with the buccal cusps of the mandibular teeth. With monoplane balanced occlusion, usually only the second molars are in contact or the balancing ramp.

Factors of balanced occlusion(**Laws of Articulation Hanau quint** ***)***

1. **Condylar guidance**: generated by the condyle &articular disc traversing the contour of the glenoid fossae. It is the condylar path in function. This factor recorded from the patient .so it is fixed factor cannot be modified by the dentist.



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.

The incisal guidance angle is formed by the vertical overlap (overbite) between the teeth, so ***Incisal guidance depends on the:***

1.Desired over jet.

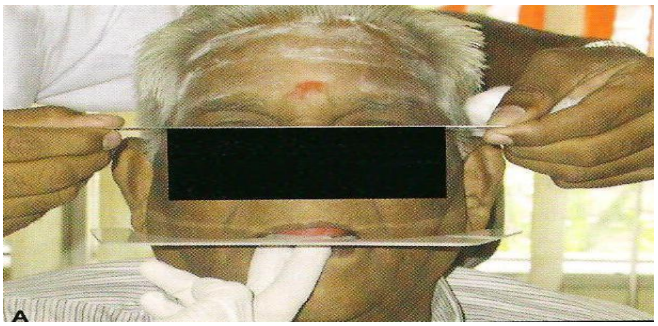
2.Over bite.

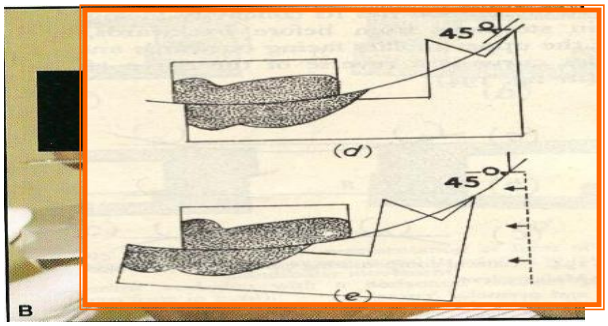
- *This angle varies directly with the vertical overbite and inversely with the horizontal over jet.*

 This angle is set to 10˚ in CD and not exceeding 20˚

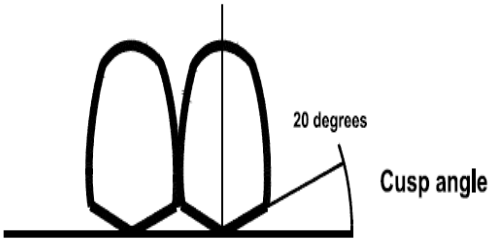
In natural teeth, these dimensions of overbite &over jet are determined by the positions of teeth; in CD ,they are determined by other factors, mainly aesthetic ,phonetic ,&function. This means they can be controlled by the dentist, within the limitations of the other factors that determine over all tooth position.

3. **The plane of occlusion:** lt is imaginary surface related anatomically to the cranium and theoretically touches the incisal edge of incisors and the tip of occluding surface of posterior teeth, it 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. 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.





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. 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.



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 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.

Interaction of the five factor:

Of the four that he can control two of them (the incisal guidance and the plane of occlusion) can be altered only a slight amount because of esthetic and physiologic factors. The important working factors for the dentist to manipulate are the compensating curve and the inclinations or cusp on the occlusal surfaces of the teeth.

For the balanced occlusion, it is important to use adjustable articulator

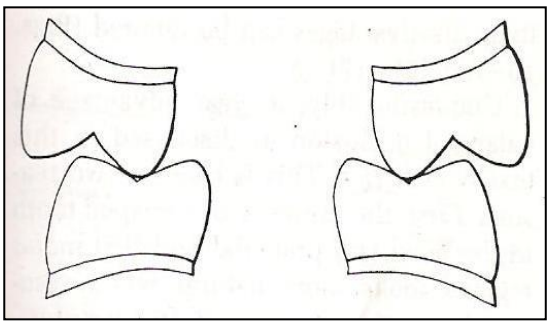
How to record the condylar guidance?

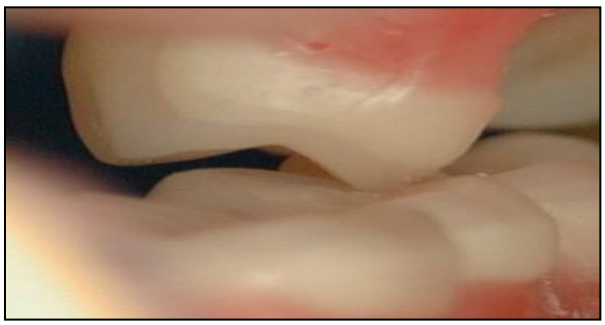
After recording of jaw relation (orientation relation, vertical ,centric jaw relation)then a protrusive record should be made, in order to set the condylar guidance on articulator according to **the following steps**:-

1. Place a 'V-shaped' notches.
2. The patient should be allowed to protrude a minimum of 5-6mm, but less than 12mm.
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.

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:

1. Good esthetics
2. Potential for bilateral balance.
3. Centralizes vertical force
4. Minimizes tipping force.
5. Facilitates bolus penetration (mortar &pestle effect).
6. Easier to adjust occlusion.
7. Simpler technique, less precise CR records.
8. May be used in class II, class III and cross bite.

Indication of use :

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

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

Monoplane occlusion:

- ❖ It is also named (neutrocentric), this concept of occlusion assumes that the anterio-posterior plane of occlusion should be parallel to the denture foundation area & not dictated by condylar inclination.
- ❖ The plane of occlusion is completely flat &level.
- ❖ There is no curve of Wilson or Curve of Spee (compensating curve) incorporated into the set up.
- ❖ There is no vertical overlap of the anterior teeth.
- ❖ When using this concept of occlusion the patient is instructed not to incise the bolus.

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 occlusalschem:-

1) **An anatomic tooth** is one that is designed to simulate the natural tooth form. The standard anatomic tooth has inclines of approximately 33 degree or more.

Advantages of anatomic occlusion:

1. Esthetics.
2. Better penetration of food bolus.
3. Decrease of vertical stresses.
4. Harmony with muscles of mastication &TMJ during functional &non-functional movements.

Disadvantages of anatomic occlusion:

1. Precise technique required.
2. Greater lateral forces.
3. More time, not long-lasting, required occlusal adjustment.
4. Difficult to tooth position in class II,III.

2) Semi-anatomical teeth:-

When the cusp incline is less steep than the conventional anatomic tooth of 33 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:

1. Esthetic.
2. Good chewing efficiency.
3. Balanced occlusion.
4. Less lateral forces.
5. Functional occlusal balance.

Disadvantages of semi-anatomic cusp teeth:

1. Same as for anatomic teeth.
2. More difficult to achieve cross arch, cross tooth balance.
3. Esthetics reduced somewhat by decreasing the incisal guidance of anterior teeth.

3) A non- anatomic tooth:-

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

Advantages of non- anatomic tooth:-

1. Slightly more esthetic than neutrocentric occlusion.
2. Indicated for patients with poor neuromuscular coordination, difficult to obtain precise or repeatable jaw relations record.
3. Less time involved in set up &articulation.
4. 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:-

1. Use of a compensating curve may cause the same damaging effects as cuspal inclines.
2. 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.

Factors influencing the selection of selection of occlusal scheme:

1. Characteristics of occlusal scheme:

- Tooth form and arrangement
- Balanced or not

2. Characteristics of the patient:

- Height and width of the residual ridge
- Aesthetic demands of the patient
- Skeletal relations
- Neuromuscular control
- Tendency for parafunctional activity