

# PROSTHESIS

## COMPLETE DENTURE



Horizontal jaw  
relation

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# Horizontal relation

## Steps of jaw relation

1-orientation relation

2-vertical relation

3-horizontal relation

## 3-horizontal relation

### ● There are several horizontal mandibular positions

1-**teeth position** habitual intercuspal position estimated to 1mm anterior to muscular position (determined by teeth )''centric occlusion'' tooth to tooth contact

2-**muscular position** of condyle determined by reflex of muscles which is 1;2mm posterior to teeth position which is (centric relation)

3-**ligamentous position** it is extreme retruded position obtained by muscle relaxation ,,posterior to centric relation by 1mm

4-**habitual position** in edentulous patient ,by which patient masticate

### Notes

\*Ex; if patient loss his posterior teeth so will masticate on anterior teeth and has habitual protrusive position so avoid to make denture on this position

\*In edentulous patient ,we construct denture on C.R so occlusion of artificial teeth will be on centric relation ,this position is called **centric occluding relation**, muscles will adapted on this new position as muscles are unstrained

\*When patient move from centric relation to maximum opening so in the first 20;25 mm condyle rotate without translate ,and line pass between 2 condyle in this moment called terminal hinge axis

\***Actual hinge axis** detected by mandibular face bow which is at centric relation

\*To avoid muscle spasm in centric relation can decrease cusps and widen fossa to allow free in movement which is called long centric

● **Centric relation(C.R)** the most retruded, superior unstrained position of condyle in glenoid (mandible to maxilla) at established vertical dimension ,from which patient can move to eccentric movement (protrusive ,lateral),bone to bone contact

From anatomic view position of condyle where articulate with thinnest avascular part of articular disc „and complex of condyle and articular disc in the most anterosuperior position to articular eminence

- detected by muscles so called mandibular muscular position
- from which condyle rotate without translation in initial opening (20-25mm)around terminal hinge axis

### Importance/significance of centric relation

- 1- repeatable and reproducible position and can be recorded and
- 2- reference point to jaw relation
- 3- Definite ,learnable ,recordable
- 4- reference to all movements of edentulous patient (lateral,protrusive functional movement)
- 5- it will be position of occlusion
- 6 -it will be position of swallowing ,mastication

7- all muscles ,ligaments will be in center of activity so denture on other position cause problems on these tissues (lateral pterygoid is relaxed – elevator muscle at minimic tonic contraction )

8. bone to bone relation so not depend on teeth so used for complete denture

## Methods of recording centric relation

### 1-static

### 2-functional/physiologic/dynamic

### 1 -static method

((Wax wafer method/direct interocclusal check bite record/physiologic method/tactile sensation ))

### **Advantages**

1. Simple ,convenient as not need any device in mouth
2. Less displacement of record base over mucosa

### **Indication**

1. Abnormal relation of jaw (class II,III)
2. enlarged tongue
3. poor neuromuscular control
4. displaceable tissue

## How to retrude mandible to centric relation

**1-patient instruction** ask patient to close posterior not to bite as if patient bite will be in slight protrusion which is habitual position

**2-tongue retrusion** ask patient to elevate his tongue to touch P.P.S of record base and close

3-**control of mandible** place index finger on buccal surface of record block then ask patient to close posteriorly ,make retrusion

4-**relaxation** patient must be completely relaxed ,comfortable ,record base not cause any pressure on tissues as if patient has pain so it will shift to side which is comfortable to him. can tilt head of patient posterior so mandible will be retruded

5-**swallowing** ask patient to swallow so retruded mandible to centric relation

6-**fatigue** if has muscle spasm ,ask patient to open and close till be relaxed then use any method to record C.R

7-**head position** tilt head of patient posteriorly so mandible is retruded

8-**temporalis muscle** when patient bite on centric relation ,and palpate on temporalis muscle found its fibers are contracted

9- **ask patient to protrude upper jaw** so will retrude lower jaw in centric relation

### Notes

\* Can use combination between these methods (control mandible and tongue retrusion ,,control mandible and swallow)

\* During record centric relation patient must be relaxed and comfortable ,no pain from record block as if there is pain will increase stresses and during recording ,patient will shift to side comfortable to him

\* In C.R can tilt head of patient as mandible will be retruded ,but in V.D.R patient seated upright position

\* C.R must be accurately recorded, equalized pressure so recording media with uniform consistency ,has no distortion ,,this can be checked in try — in stage

### steps (step by step inter occlusal waxwafer record)

1. Check adaptation .extension .support ,retention ,stability of record base
2. Verify occlusal plane ,lip support, V.D, draw midline ,canine line ,high lip line
3. Centric relation registration ,make V-shaped grooves/notch in upper record block(not parallel, not over deep to avoid distortion after recording ) ((Where contact between wax anterior maintain vertical dimension))
4. remove 2mm of wax then add layers of alu wax and softening to it opposite to grooves (alu wax preserve its softening as reinforced by metals )
5. apply in patient mouth ,record C.R by any previous method so wax will enter grooves make V- shaped projection
6. placed in cold water and separate them so in upper grooves and V-shaped projection in lower

### N.B

#### Bite registration material

1. waxes: simple but uneven softening, difficult in handling, distortion, uneven pressure and cause tissue displacement. (Alu- wax with metal fillers overcome these disadvantages)
2. Plaster of Paris: even consistency, minimal tissue displacement equalize pressure and has little resistance to closing pressure
3. Rubber base interocclusal records O bite silicon material
4. ZNO impression material
5. Bite registration paste

\* When 2 record block attached to each other ,,it is called interocclusal record

**Must must must be even pressure ,,causes of uneven pressure /bear**

- 1-uneven softening of wax
- 2-uneven amount of wax
- 3- patient has pain on one side
- 4-acrylic heels
- 5-presence of wax in fitting surface of record block

### Test and verification

Place 2 record block in patient mouth ,then close in centric relation

\* If projection enter groove without distortion so it is correct ,if distortion occur so it is in correct

### Errors during registration

- 1) Space appear anterior between occlusion rim,may be due to acrylic heels
- 2) Side closed and other side opened
- 3) Forcing /pushing mandible backward
- 4) Displacement of record base especially with resorbed ridge

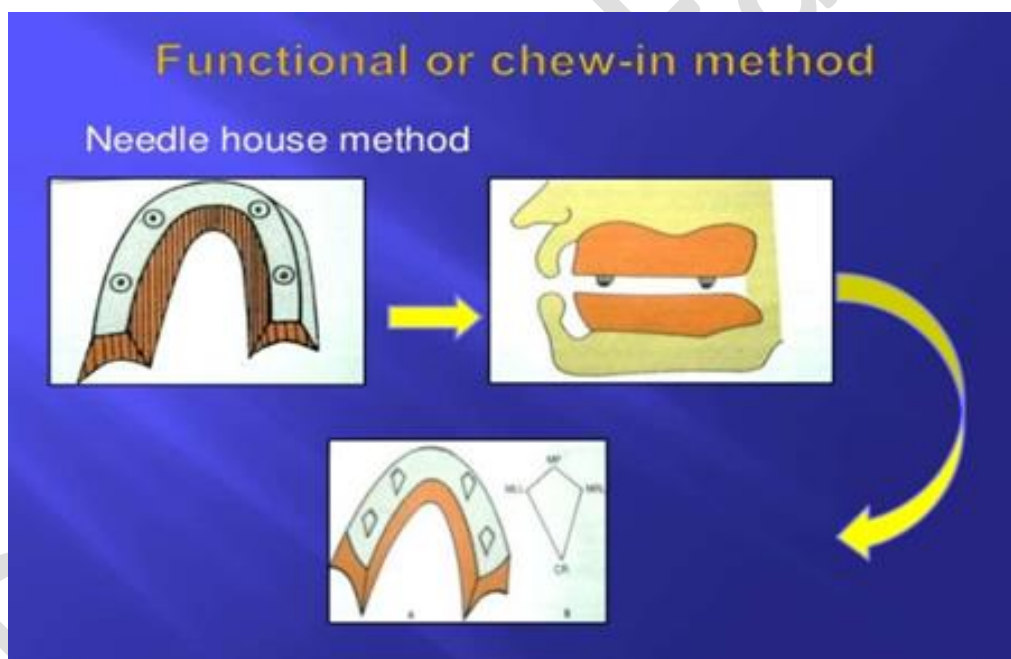
## 2-Functional methods

### Requirement

- 1) Stable base with well-developed ridge
- 2) Good neuromuscular control(old age ,parkinsonism has poor muscle coordination )
- 3) Cooperative patient to follow instruction

## a Needle house technique

1. 2 record block has occlusion rim from compound at correct vertical dimension „apply 5 metal triangle metal studs in upper (height is 2mm , 2at premolar and 2 in molar area)
2. ask patient to move lateral and protrusive so give 4 gothic arch to each studs where apex of tracing is located anteriorly which represent centric relation
3. (if apply studs in lower so give the same shape where centric relation placed posterior in the shape)
4. mounted only in house articulator
5. needle house may consider functional and graphic tracing methods



## b. Essing and Patterson (Chew in method, functional generating path)

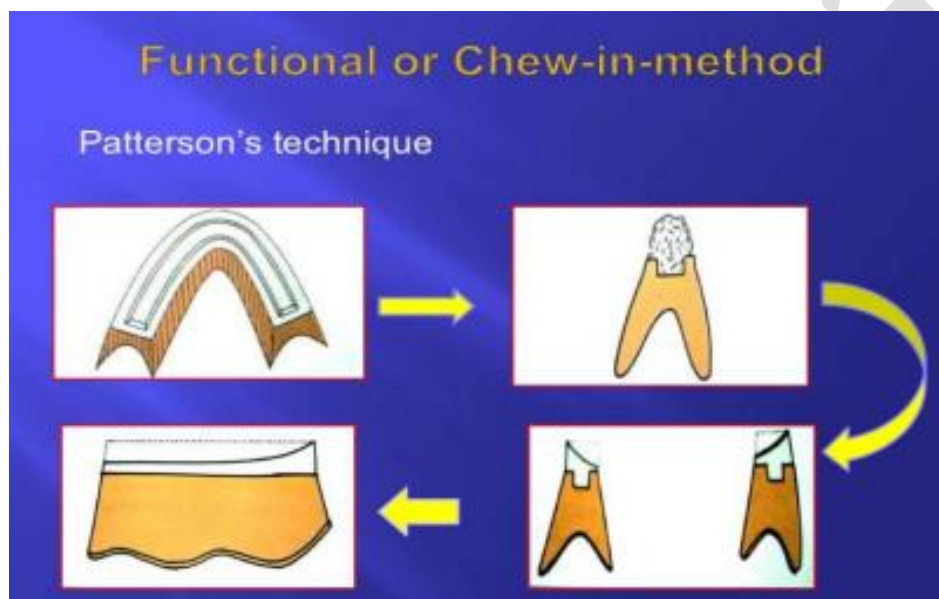
- ✓ compound occlusion rim ,remove it at center with undercut ( make furrow funneling with dove tail cross section) and filled with plaster and pumice, height is 1:2 mm excess in each arch (upper and



lower),ask patient to move protrusive and lateral till correct vertical dimension

✓ give functional generating path which is (occlusal plane and compensatory curves "anteroposterior ,medio lateral curve) simulate curve of spee and Wilson mounting it at simple hinge articulator and set teeth according to compensatory curves give balanced occlusion/articulation

✓ how to set teeth \*\*\*



### c. graphic tracing method

These method record centric and eccentric movement

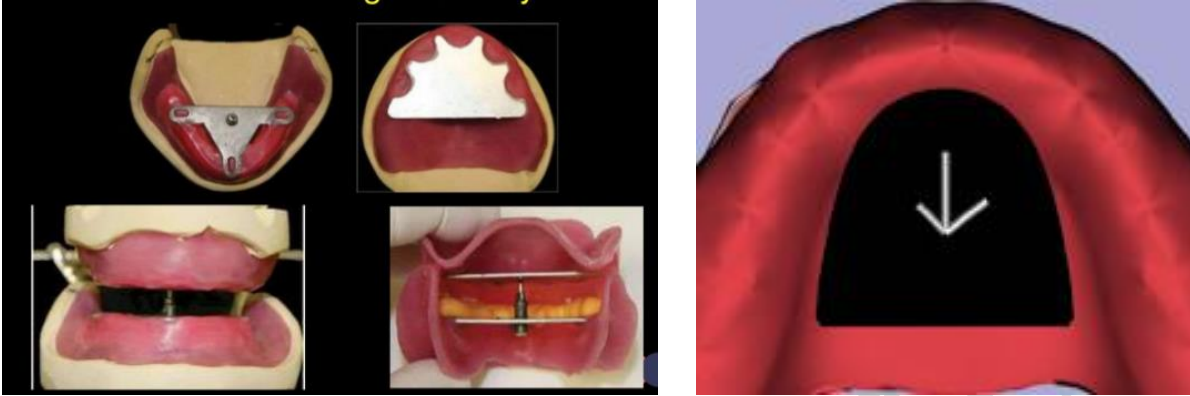
**Gothic arch trace = central bearing = device arrow point tracing**

Record block has compound occlusion rim with correct V.D „apply metal tracing plate "covered by carbon or blue inlay wax" to one of the record block and stylus (pointer) in other record block, then ask patient to swallow and move protrusion and lateral so give gothic arch with arrow head with sharply pointed apex which is centric relation so make hole in this point and apply them in patient mouth ,ask patient to swallow till stylus enter hole

**Types:**

## 1. Intraoral tracing

Apply tracing plate and stylus in patient mouth (if use stylus in upper, must be placed in center of record block to centralize force called central bearing device)



- ❖ **Advantages:** increase stability and direct forces centralized to record block
- ❖ **Disadvantage:** decrease visibility

## 2. Extraoral tracer

Apply tracing plate, stylus extra orally by metal rods attached to record blocks

- ❖ **Advantages:** improve visibility can be magnified, can guide movement
- ❖ **Disadvantages:** decrease stability as lever of record block due to increase weight



## Indication





1. well-developed ridge as need record base to be stable and retentive
2. good neuromuscular control
3. Cooperative patient
4. normal arch relationship
5. Adequate interarch space to apply device in between

## Contraindication

1. severe ridge resorption (flat ridge)
2. flabby ridge

3. TMJ disorders
4. Abnormal jaw relation (class II, class III)
5. poor neuromuscular control

#### Note

- ✓ can make notch in tracing plate after recording so stylus will be placed in it so inject any recording media between 2 occlusion rim
- ✓ If stylus in upper and tracing plate in lower ,give gothic arch as 
- if stylus in lower and tracing plate in lower so give gothic arch as 
- ✓ If tracing as  or  so it is in correct

#### d-terminal hinge axis by mandibular /kinematic face bow

##### Aim

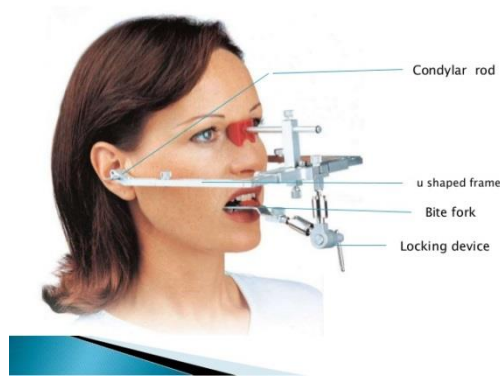
Detect position of condyle in centric relation kinematically or used to detect actual terminal hinge axis and centric relation by tracing

##### Steps

1. bite fork is heated and attach to lower occlusion rim
2. place 2 condylar rods on position of condyle
3. ask patient to open and close within 20:25 mm and decrease opening so condylar rods draw curves till be point (still steady point ) which is position of condyle at centric relation (line pass between z points is terminal hinge axis)

**Disadvantage** :resiliency of mucosa covered by lower record block (slight movement to record base) so not used with complete denture

- ✓ with this method mount lower cast first by mandibular face bow then mount upper by maxillary face bow
- ✓ can be considered tracing methods



### e. Swallowing method

Decrease height of lower occlusion rim, then add cones of wax 3:4 mm (one anterior and two posterior) then ask patient to swallow so decrease height of cones till proper V.D.O and centric relation, then inject any media (ZnO or impression rubber base) between occlusion rims

## Eccentric records

- for achieve balanced occlusion

### 1. Static record

by record eccentric relation between maxilla and mandible by eccentric record (protrusive, lateral record) and mount on adjustable articulator

#### How to obtain eccentric record??

Set anterior teeth according to esthetic and phonetics, ask patient to move protrusion so space present between 2 record block (Christensen's phenomena, apply wax in this space to be protrusive record

#### Protrusive record

represent horizontal /sagittal condylar path angle and adjust horizontal condylar guidance


→ Ask patient to move lateral so there will be space in balanced so apply wax in it to be lateral record

### Latral record

represent lateral condylar path/angle and used to adjust lateral condylar guidance in semi adjustable use **Hanaue equation /formula  $L = H/8 + 12$**

$$L = H/8 + 12$$

( H – Horizontal condylar inclination  
L – Lateral condylar inclination)



- And during setting of teeth on adjustable articulator must achieve

**hanaue quant**

**Condylar guidance \* incisal guidance = occlusal plane \***

**Compensatory curves \* cusp height**

- ✓ In fully adjustable articulator adjust condylar guidance by protrusive record and latral record
- ✓ In semi adjustable articulator not accept lateral record but can move laterally so lateral condylar guidance calculated from **hanaue equation  $L=H /8+12$**

( L → lateral condylar guidance ,H → horizontal condylar guidance )

## 2. Functional methods

ex: needle house and essing and pattreson,gothic arch