Horizontal jaw relation

the relationship of the mandible to maxilla in a horizontal plane. (anteroposterior and side to side direction). *HJRs(for shorts) include:*

1-Centric jaw relation
2-Eccentric jaw relation
a-Protruded or forward relation
b-Left or right lateral relation

centric jaw relation:

The most retruded relation of the mandible to the maxillae when the condyles are in the most posterior unstrained position in the glenoid fossae from which lateral movement can be made at any given degree of jaw separation. All other maxillo-mandibular relations are to be considered as Eccentric Relations.

Centric occlusion:

The occlusion of opposing teeth when the mandible is in centric relation. This may or may not coincide with the maximal intercuspal position (**it is tooth-to-tooth relationship dictated by bone to bone relationship**).

Maximal intercuspal position: is a maxillomandibular relationship determined by **tooth-to-tooth relationship** independent on condylar position.

Importance of centric jaw relation:

1-It is learnable, repeatable, and recordable position which remains constant throughout life.

2-It is a reference position from which the mandible can move to any eccentric position and return back involuntarily.

3-It is the start point for developing occlusion.

4-Functional movements like chewing and swallowing are performed in this position, because it is the most unstrained position.

5-It is a reliable jaw relation, because it is bone to bone relation.

Methods of recording centric jaw relation:

1-Functional or chew-in methods

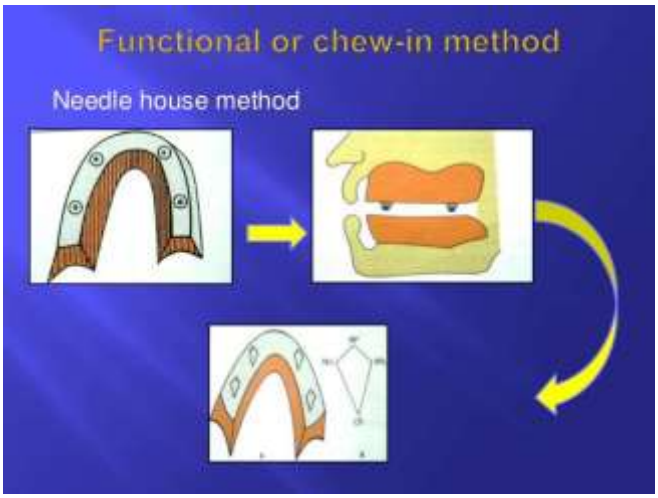
2-Graphic method

3-Tactile or inter occlusal check record method

1-Functional methods

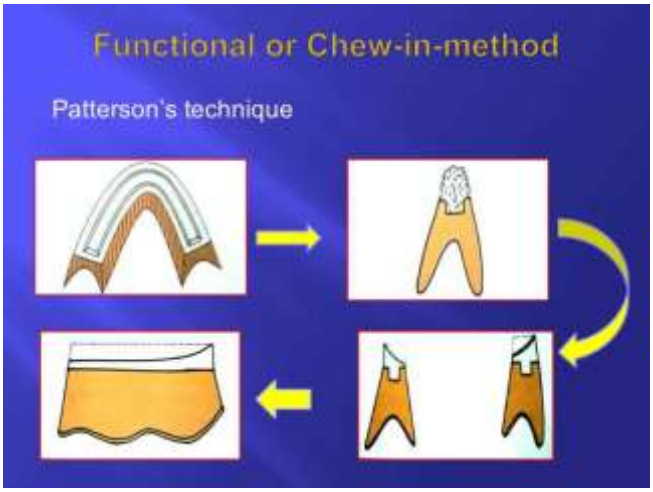
a- *needle-house technique:*

In this method we used impression compound occlusion rims with four metal styli placed in the maxillary rim in premolar and molar regions. When the patient moves his mandible, the styli on the maxillary rim will create a marking on the mandibular rim, after all mandibular movements are made, and a diamond-shaped pattern is formed. The posterior most point of this diamond pattern indicates the centric jaw relation.



b- *Patterson's technique*

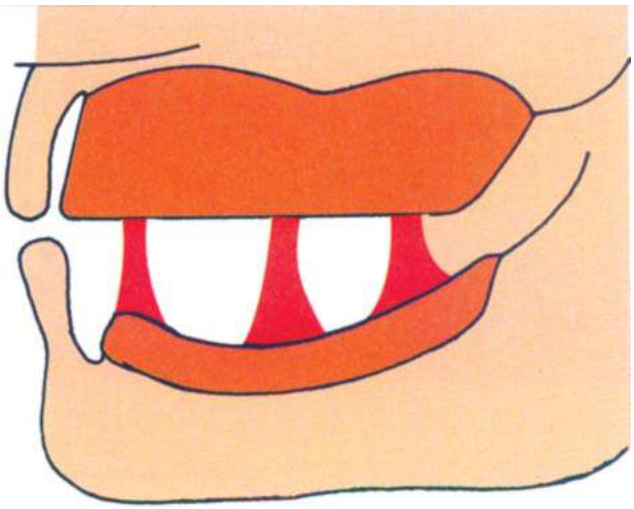
In this method wax occlusion rims are used. A trench is made along the length of mandibular rim. A 1:1 mixture of pumice and dental plaster is loaded into the trench. When the patient moves his mandible, compensating curves on the mixture will produced, and the height of the mixture is also reduced. The patient is asked to continue these movements till a predetermined vertical dimension is obtained. Finally, the patient is asked to retruded his jaw and the occlusal rims are fixed in this position with metal staples.



The disadvantages of these functional methods involve lateral and anteroposterior displacement of the recording bases in relation to the supporting bone while the record is being made.

c- *Swallowing technique*:

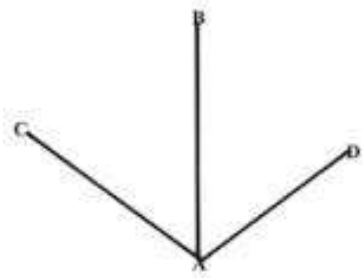
In this method, soft cones of wax are placed on the lower record base. The wax cones contact the upper occlusion rim when the patient swallows. This procedure is supposed to establish both proper vertical and horizontal relation of the mandible to maxilla.

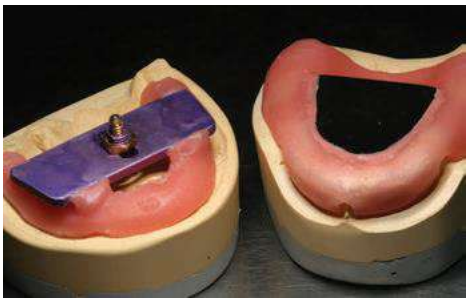


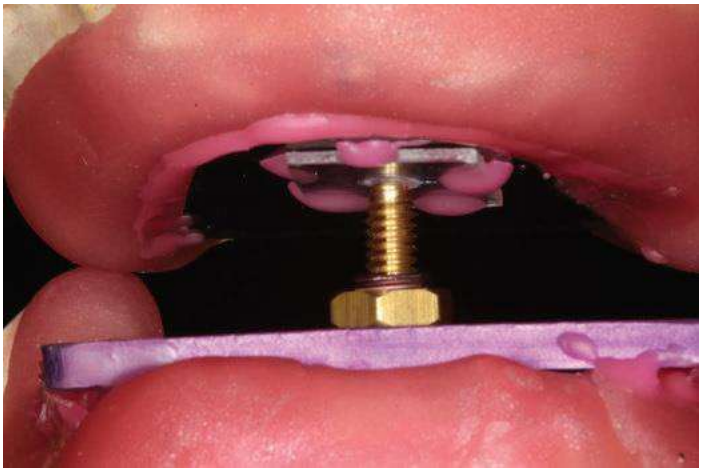
2-Graphic methods

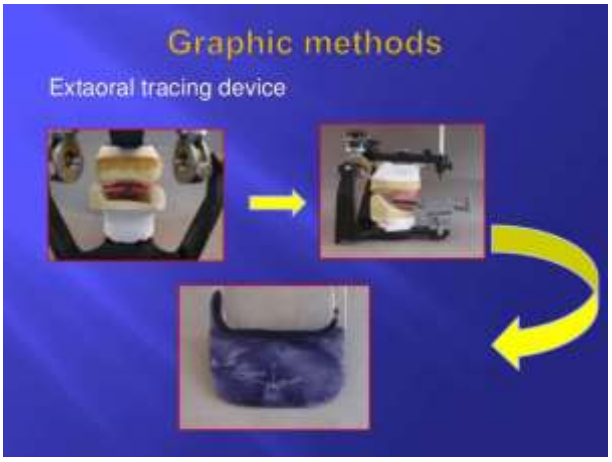
These methods are called so because they use graphs or tracing to record the centric relation. The general concept of this technique is that a pen-like pointer is attached to one occlusal rim and a recording plate is placed on the other rim, the plate coated with carbon or wax on which the needle point can make the tracing, when the mandible moves in horizontal plane, the pointer draws characteristic patterns on the recording plate.

The characteristic patterns created on the recording plate is called ***arrow point tracing***, also known as ***Gothic arch tracing***. The apex of the arrow point tracing gives the centric relation, with the two sides of the tracing originating at that point being the limits of the lateral movements. The apex of the arrow head should be sharp else the tracing is incorrect.









The graphic methods are either ***intraoral*** or ***extraoral*** depending upon the placement of the recording device. The extraoral is preferable to the intraoral tracing, because the extraoral is more accurate, more visible, and larger in comparing with the intraoral tracing.

3-Tactile or inter occlusal check record method

In this method the centric relation is recorded by placing a record medium between the record bases when the jaws positioned at centric relation. The patient closes into the recording medium with the lower jaw in its most retruded unstrained position and stops the closure at predetermined vertical dimension. This method is simple, because mechanical devices are not used in the patient mouth and are not attached to the occlusion rims. It has advantage of causing minimal displacement of the recording bases in relation to the supporting bone. it is essential in making an accurate record, the visual acuity and the sense of touch of the dentist also inter in making of centric relation record, this phase is developed with experience and it is difficult to teach to another individual.

Indications of the Interocclusal check record:

1-Abnormally related jaws.

2-Displaceable, flabby tissues.

3-Large tongue.

4-Uncontrollable mandibular movements.

5-It can also be done for patient already using a complete denture.

Methods for assisting the patient to retrude the mandible to centric jaw relation

1-The patient is instructed to let his jaw relax (palpate the temporalis and masseter muscles to relax them), pull it back and close slowly on the back teeth.

2-instruct the patient to contact with his tongue a piece of wax placed on the posterior palatal seal area and slowly close.

3-The patient is instructed to get the feeling of pushing his upper jaw out and then close the mouth with back teeth in contact.

4-Assist the patient to protrude and retrude the mandible repeatedly with the operator holding a finger lightly against the chin.

5-Boo's series of stretch exercise:

a- Open the mouth wide and relax.

b- Move the jaw to the left and relax.

c- Move the jaw to the right and relax.

d- Move the jaw forward and relax, in series of movements.

The results to be expected are for the patient to be able to follow the dentist's directions in moving the jaw to centric relation and the desired eccentric positions.

6-The patient is told to swallow and conclude the act with the occlusal rims in contact. However, the person can swallow when the mandible is not completely retruded. This method must be verified by other technique.

7-The patient can be instructed to turn the tongue towards the posterior border of the upper record base and close the rims together until they meet. The disadvantage with this method is the likelihood of displacing the mandibular record base by the action of the elevated tongue.

8-Tilt the patient head back, the tension of muscles under chin make protrusion more difficult.

9-Exert pressure in molars in both sides and ask the patient to close (molar reflex method).

Factors that complicates centric relation record

1-resiliency of the tissue supporting the denture base
2-stability and retention of the record bases
3-the TMJ and its neuromuscular mechanism
4-amount of the pressure applied in making the record
5-technique employed in making the record
6-the ability of the dentist

Eccentric jaw relation

It is defined as any relation-ship of the mandible to the maxilla other than the centric relation. It includes protrusive and lateral relations. The main reason in making an eccentric jaw relation record is to adjust the horizontal and lateral condylar inclination in the adjustable articulator, and to establish the balanced occlusion.
The protrusive and left and right lateral movements records are made in the same manner as for centric relation record and these include:
1-Functional or chew in methods.
2-Graphic methods.
3-Physiological methods (tactile or inter-occlusal check record method).
The Interocclusal eccentric records may be made either on the occlusion rim before the teeth are set up or on the posterior teeth at the try-in appointment.
When the protrusive eccentric record is made on Hanau articulator, the following formula is used to obtain an acceptable lateral inclination.

$$L = \frac{H}{8} + 12$$

H: Is the horizontal condylar inclination in degrees as established by the protrusive relation record.

L: lateral inclination in degrees as obtained from the formula.