



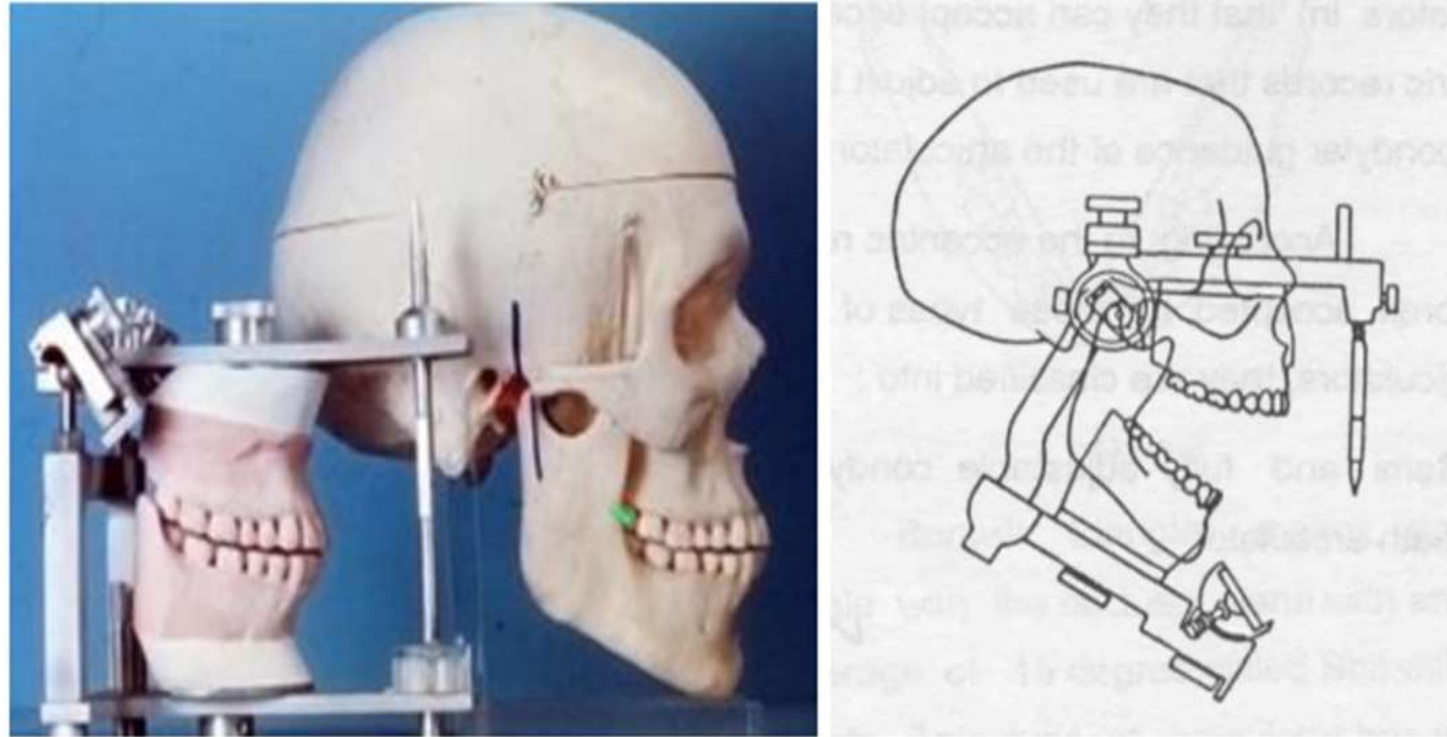
Second Stage

10. lecture

DENTAL ARTICULATOR and FACEBOW

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ARTICULATOR: It is a mechanical instrument that represents the temporomandibular joints and jaw members, to which maxillary and mandibular casts may be attached to simulate some or all mandibular movements.

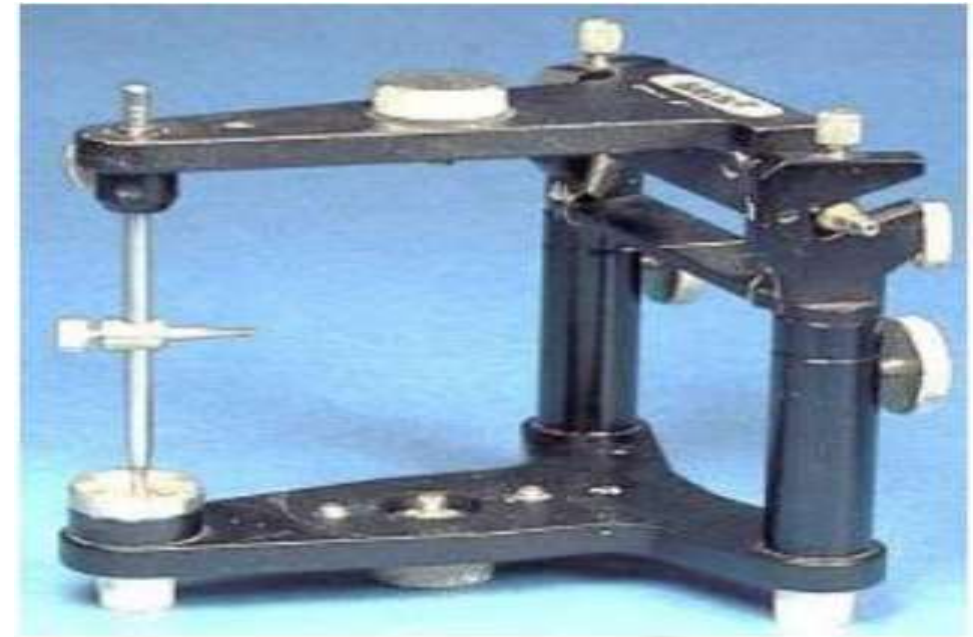


Uses of an Articulator

1. To hold the upper and lower casts in fixed relationship.
2. To simulate the jaw movements like opening and closing.
3. To produce border movements (extreme lateral and protrusive movements) and intra border movements (within the border movement) of the teeth similar to those in the mouth.
4. It allows most of the prosthetic work to be done in the absence of the patient (diagnosis, treatment planning, setting – up of teeth and development of balanced articulation and waxing-up of dentures).
5. To remounting the dentures after processing for correction of occlusal disharmony.

Requirements of an Articulator

1. It should hold casts in the correct **horizontal** relationship.
2. It should hold casts in the correct **vertical** relationship.
3. The casts should be **easily removable** and **re-attachable**.
4. It should provide a positive **anterior vertical stop** (**incisal pin**).
5. It should accept **face-bow** transfer record.
6. It should open and close in a **hinge** movement.
7. It should be made of **non-corrosive** and **rigid materials**.
8. It should not be **bulky** or **heavy**.
9. There should be **adequate space** between the upper and lower members.
10. The moving parts should **move freely** without any friction.



Classification of Articulators based on adjustability

I. Non-adjustable condylar path articulator

- a. Simple hinge articulator (Class I).
- b. Mean value or fixed condylar path articulator (Class II).

II. Adjustable condylar path articulator

- a. Semi-adjustable condylar path articulator (Class III).
- b. Fully-adjustable condylar path articulator (Class IV).

I. Non-adjustable condylar path articulator

a- Simple Hinge Articulators (plane line)

Possible movements:

This type of articulators gives **only opening and closing** movements.

Records required:

a- Vertical dimension of occlusion.

b- Centric relation records.

Disadvantages:

These articulators do **not represent** the temporomandibular joint and the dynamic mandibular movements.



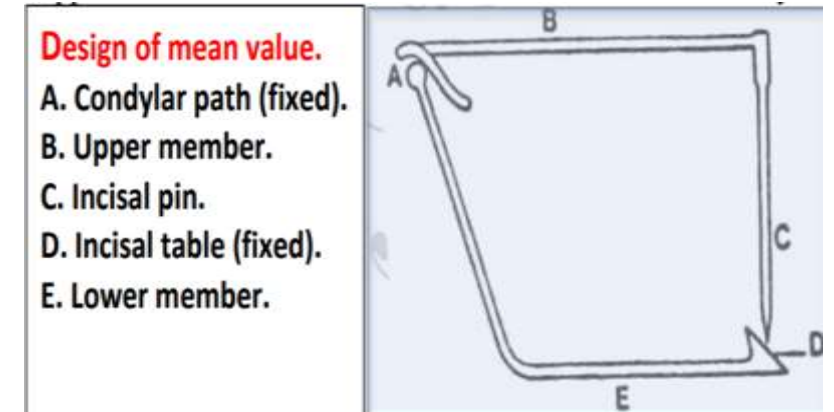
b- Mean Value or Fixed Condylar Path Articulators

Possible movements:

- 1- Opening and closing.
- 2- Protrusive movement at a fixed condylar path angle.

Disadvantages:

- a- Most of these articulators **do not accept face-bow** record.
- b- The condylar path moves to a fixed angle and it is successful in patients whose condylar angle approximates that of the articulator.
- c- No lateral movements.



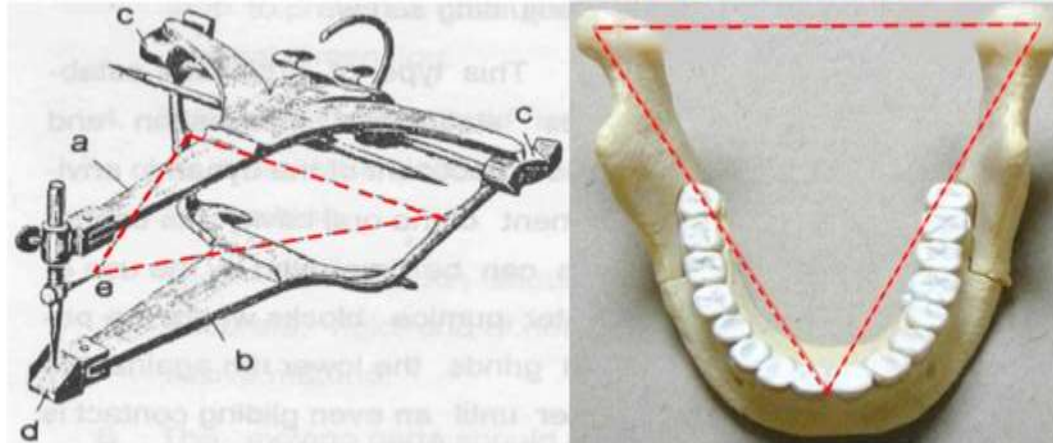
Records required:

a- Vertical dimension of occlusion.

b- Centric relation record.

c- Face-bow record: In some designs of these articulators, the upper cast can be mounted by a face bow transfer.

*When the articulators dose not accepts face-bow record, the mounting is made according to **Bonwill triangle**. (equilateral triangle= 4 inches)*



a- Upper member. b- Lower member. c- Fixed condylar path inclination. d- Fixed incisal guide table. e- Anterior pointer.

II- Adjustable Condylar Path Articulators

a- Semi Adjustable Condylar Path Articulators:

Possible movements

- a- Opening and closing.
- b- Protrusive movement according to the horizontal condylar path angle determined from the patient.
- c- Lateral movement to the angle estimated from the Hanau's formula. $L = H / 8 + 12$
- d- Some types have **Bennett movement**. Lateral translation or (*Bennett movement*) is classified according to the timing of the shift in relation to the forward movement of the non-working condyle

Disadvantages:

- a- The lateral condylar path angle is determined from the formula.
- b- Most of these articulators have no Bennett movement.



Some semi adjustable articulators are **non-arcon**, while others are **arcon**.

*The term **arcon** comes from (mandibular condyle). It is commonly used to indicate an instrument that has its condyles on the lower member and the condylar guides on the upper member.*

Condyle attached to the lower member



Condyle attached to the upper member



b- Fully adjustable articulators:

They differ from the semi - adjustable articulators in that the lateral condylar path inclinations are adjusted according to records taken from the patient.

Possible movements:

1. Opening and closing.
 2. Protrusive movement according to the horizontal condylar path angle determined from the patient.
 3. Lateral movement according to the lateral condylar path inclination determined from the patient.
 4. Bennett movement.
- * The same movements of the semi-adjustable type, in addition they have *Bennett* movement.



Records required:

- a- **A maxillary face bow** record to mount the upper cast.
- b- **Centric occluding** relation record to mount the lower cast.
- c- **Protrusive record** to adjust the horizontal condylar path inclination.
- d- **Right lateral** record to adjust the left lateral condylar path inclination.
- e- **Left lateral** record to adjust the right lateral condylar path inclination.

Disadvantages:

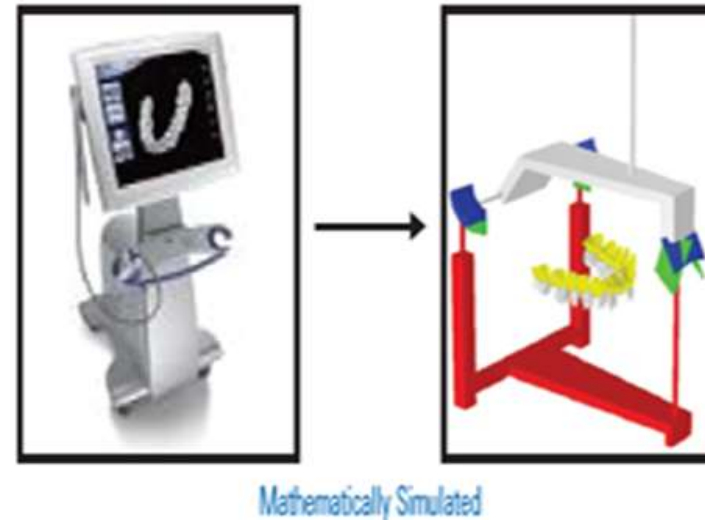
Multiple **records** are required with the possibility of errors.

The semi adjustable articulators are usually enough for complete denture construction.



Virtual articulator

In prosthodontics, the virtual articulator should be considered as an *additional diagnostic and treatment planning tool to the mechanical articulator*, especially in **complex** cases involving *alterations* to the vertical dimension of occlusion.

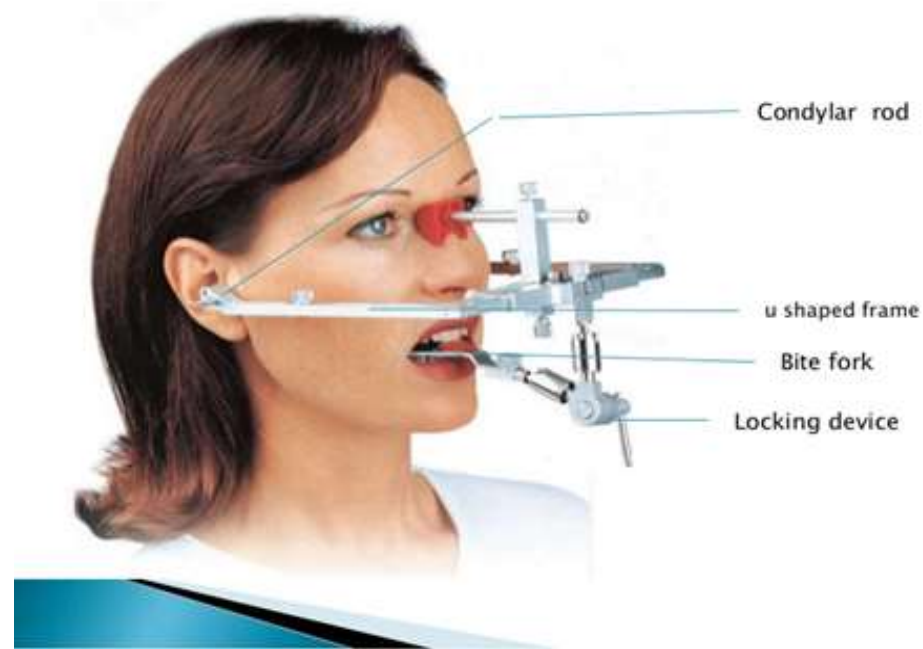


FACEBOW

The facebow is a calliper like device that is used to record the relationship of the **maxilla** to the **temporomandibular joints** or the **opening axis of the jaws** and to **orient the casts** in this same relationship to the opening axis of the articulators.

The facebow consist of:

- 1 Condylar rods.
- 2- U- shaped frame.
- 3- Bite fork.
4. Locking device

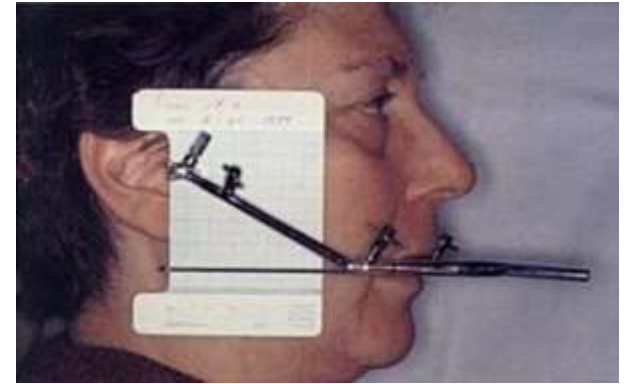


Types of facebow:

There are two basic types of facebow; the **kinematic**, and the **maxillary**.

The kinematic (mandibular, hinge axis locator) facebow:

The transverse hinge axis is an imaginary line. Which the mandible rotates during opening and closing for about 20mm.



The maxilla facebow: It is used to record the position of the upper jaw in relation to the hinge axis and transferring the relation to an articulator.



Important of the facebow:

- 1- An arbitrary mounting of the maxillary cast **without face - bow** transfer can produce **errors** in the occlusion of the finished denture.
- 2- A facebow transfer allows **minor changes in the occlusal vertical dimension** on the articulator without having to make new maxillomandibular records.
- 3- It is helpful in **supporting maxillary cast** while it is being mounted on the articulator.



B- Fully adjustable articulators:

Possible movements:

The same movements of the semi-adjustable articulators. In addition they have Bennett movement.

Disadvantages:

Multiple records are required with the possibility of errors. The semi adjustable articulators are usually enough for complete denture construction.

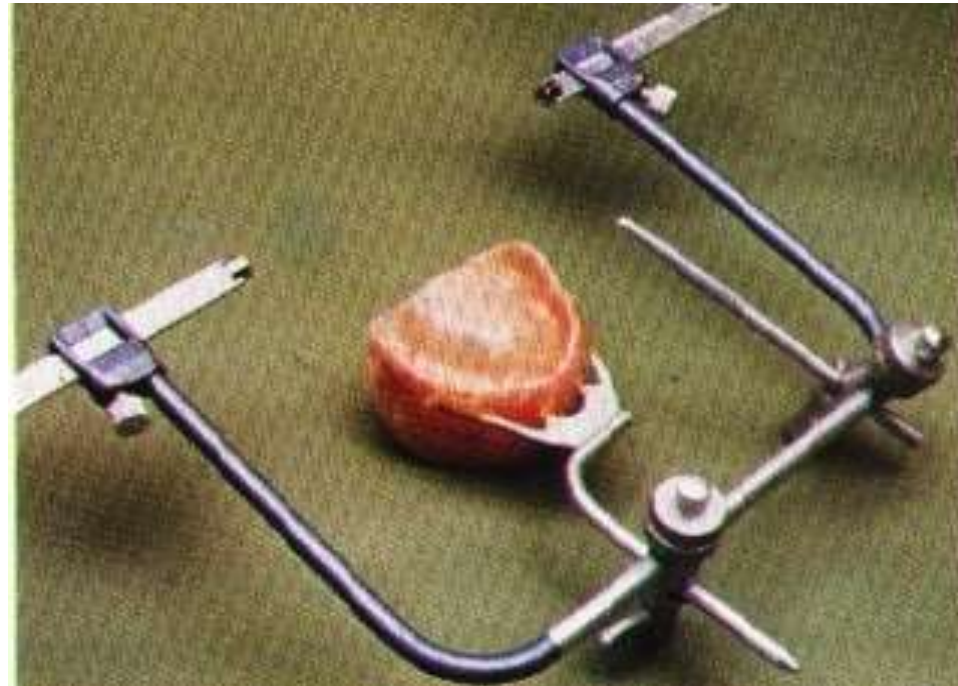


FACEBOW

The facebow is a calliper like device that is used to record the relationship of the maxilla to the temporomandibular joints or the opening axis of the jaws and to orient the casts in this same relationship to the opening axis of the articulators.

The facebow consist of:

- 1- U- shaped frame or assembly.
- 2- The condyle rods.
- 3- The fork.



Types of facebow:

There are two basic types of facebow; the kinematic, and the maxillary.

1- The kinematic (mandibular, hinge axis locator) facebow:

It is used to locate the kinematic (true or terminal) transverse hinge axis. The transverse hinge axis is an imaginary line. Which the mandible rotates during opening and closing for about 20 mm.

2- The maxilla facebow:

It is used to record the position of the upper jaw in relation to the hinge axis and transferring the relation to an articulator.



Important of the facebow:

- 1- An arbitrary mounting of the maxillary cast without face - bow transfer can produce errors in the occlusion of the finished denture.
- 2- A facebow transfer allows minor changes in the occlusal vertical dimension on the articulator without having to make new maxillomandibular records.
- 3- It is helpful in supporting maxillary cast while it is being mounted on the articulator.



Mounting: The laboratory procedure of attaching a cast to an articulator or cast relater.

Preparation of the casts and mounting the upper cast

Determine the midline of the cast according to midline of incisive papillae.

2- With laboratory knife, from 3 or 4 (V) shape cuts on the base of upper and lower casts.

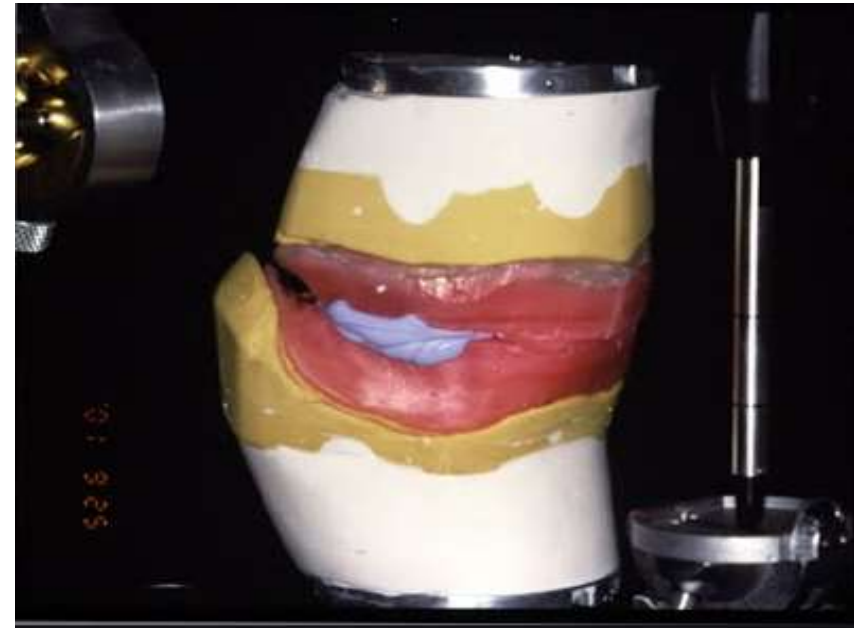
3- The base plate with occlusion rims should be sealed to the cast by wax.

4- Alignment of the midline of the occlusion rim (upper) to the center of the cross midline which found on the mounting table anteriorly and posteriorly.

5- Enough space should be present between the base of the cast and the upper member of the articulator.

6- Plaster is mixed according to the correct w/p ratio and mixed according to the manufacturer instruction.

7- Smoothing and polishing of the plaster is done.



After setting of plaster, the mounting should be checked for:-

- 1- The midline of upper cast should coincide with the midline of lower cast and midline of articulator.
- 2- Centralization of upper cast with upper member of articulator then the centralization of lower cast that depend on accuracy of the upper cast.
- 3- Incisal pin checked if it does not touch the incisal table.
- 4- Healer's area checked if there is any contact.



Errors occurred during mounting:-

- 1- The record base is not properly secured to the cast.
- 2- Interference of the casts posteriorly.
- 3- The incisal pin is not properly screwed.
- 4- The incisal pin not touching the incisal table.
- 5- Wrong transference of the midline of the articulator with that of the casts (shifting of the midline).
- 6- Movement of the casts during mounting.
- 7- Upper and lower occlusal rims are not properly fixed for orientation.
- 8- Dimensional changes in the plaster.
- 9- Facebow record defected.

