Dental articulator

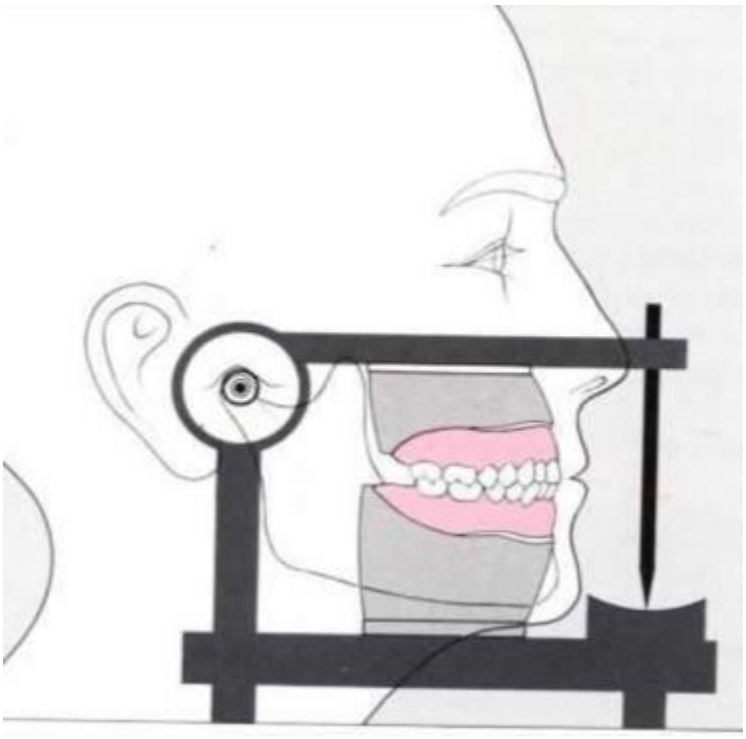
Definition:

Dental articulator

It is a mechanical instrument that represents the TMJ and jaw members to which the maxillary and mandibular casts are attached to simulate some or all mandibular movements.

►It can be used to hold the upper and lower casts according to their relationships to facilitate the purposes of diagnosis and arrangement of artificial teeth outside the patient mouth.

►It is an instrument that acts as the patients in their absence and provide media of working without the interference of cheek, lips, saliva and tongue.



Functions:

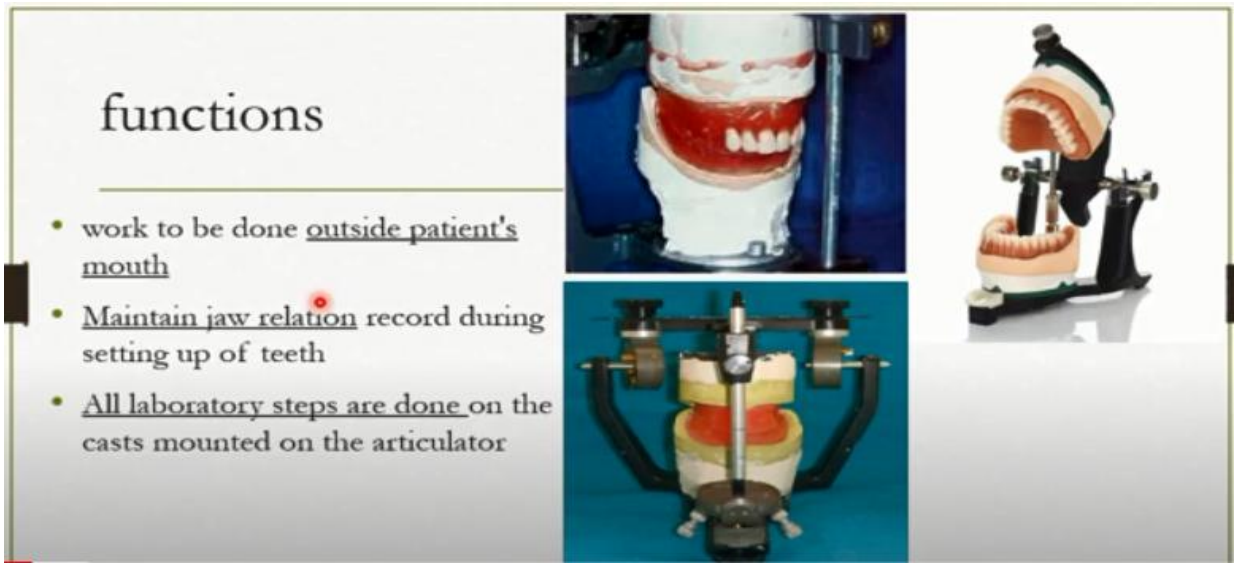
1- Allow most of the prosthetic work to be done in the absence of the patient (act as a patient in the absence of the patient).

2- Maintain jaw relation record during setting up of teeth.

3-Articulators can simulate all the possible mandibular movements.

4- Arrangement of artificial teeth for complete and partial denture.

5-Mounting dental casts for diagnosis and treatment planning.



Types of articulators:

1- Non-Adjustable condylar path articulator

a. Simple hinge articulators ***(Class I)***.

b. Mean value or fixed condylar path articulators (***Class II***).

2. Adjustable condylar path articulators.

a. Semi-adjustable condylar path articulators (***Class III***).

b. Fully-adjustable condylar path articulators (***Class IV***).

1. Simple hinge articulators (class I)

It consists of upper and lower members held apart at a certain distance by a screw which acts at the back. The screw can increased or decrease the distance between the two members, and permits only a hinge like movement.

- Single hinge movement only(**opening & closing**)
- No lateral movement
- Smaller than patient jaws

- Very limited value in restorative dentistry and prosthodontics.(used in construction of crowns &bridges).





2. Mean Value or Fixed Condylar Path Articulators

The two members of these articulators are joined together by two joints which represents the TMJ.

1- **Allows for opening and closing(vertical) plus Protrusive(horizontal) movements .**

2- Dose not accepts the Face – bow transfer.

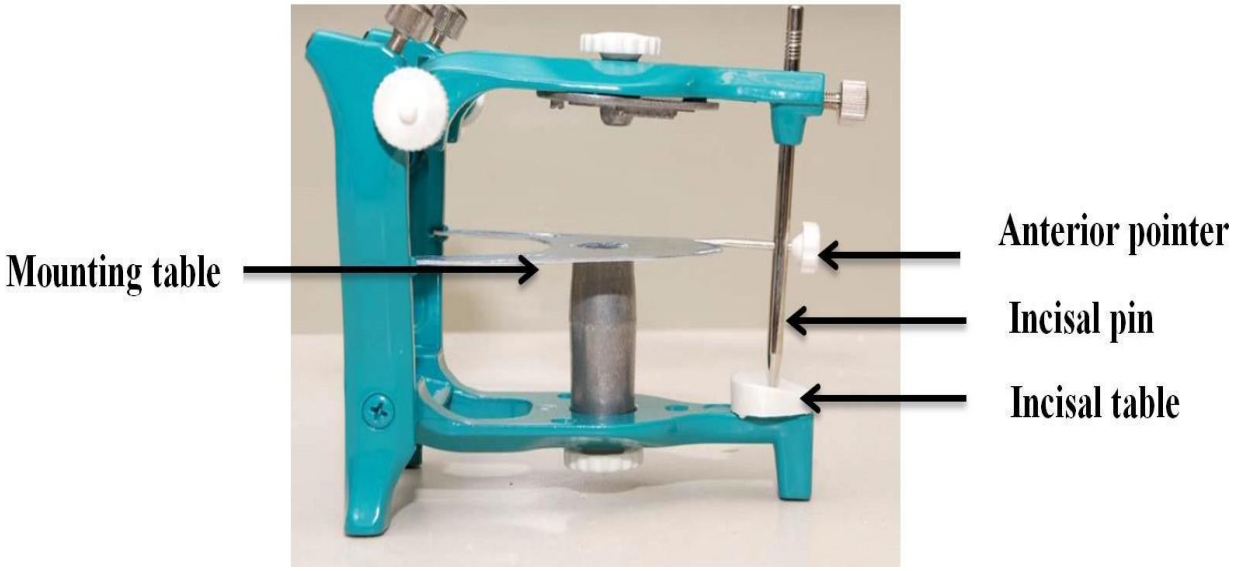
3- Dose not allows for lateral movements.

4- Condylar angle fixed at 30 degree angle.

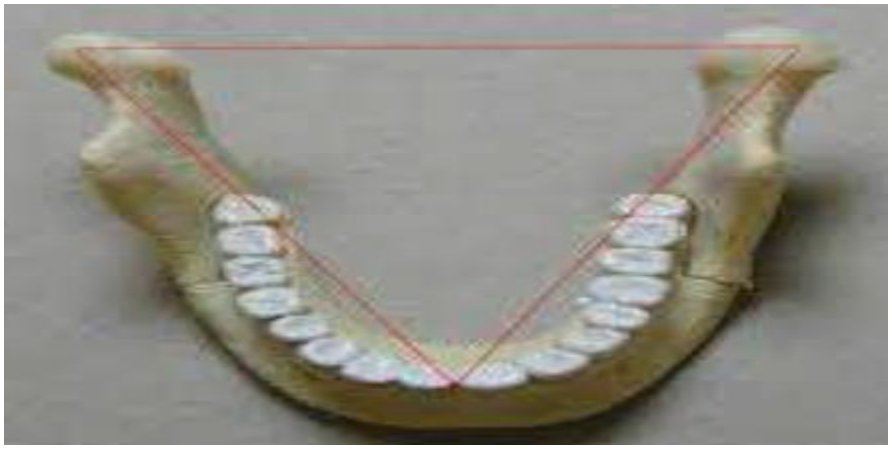
When the **articulators do not accept face-bow record**, the mounting is made according to ***Bonwill triangle***. (According to this theory, teeth move in relation to each other as guided by the condylar control and the incisal point. It is also known as the theory of equilateral triangle).

Bonwill found in mandibles that the inter-condyle distance as well as the distance from each condyle to the contact point of the lower central incisors was **4 inches (10 cm)** equilateral

triangle.



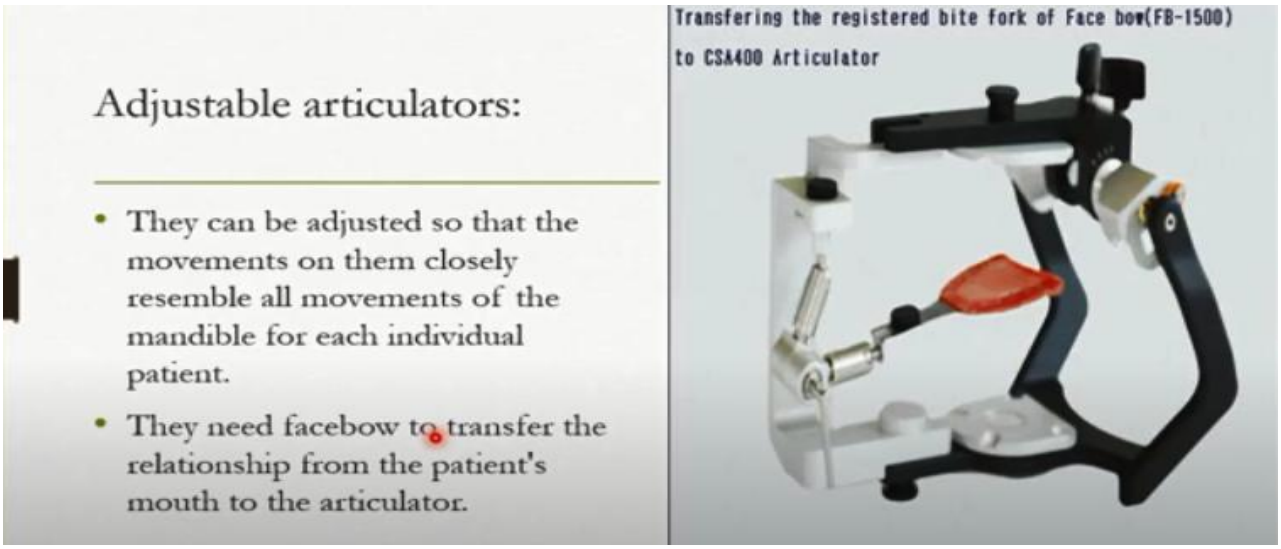




Bonwill Triangle

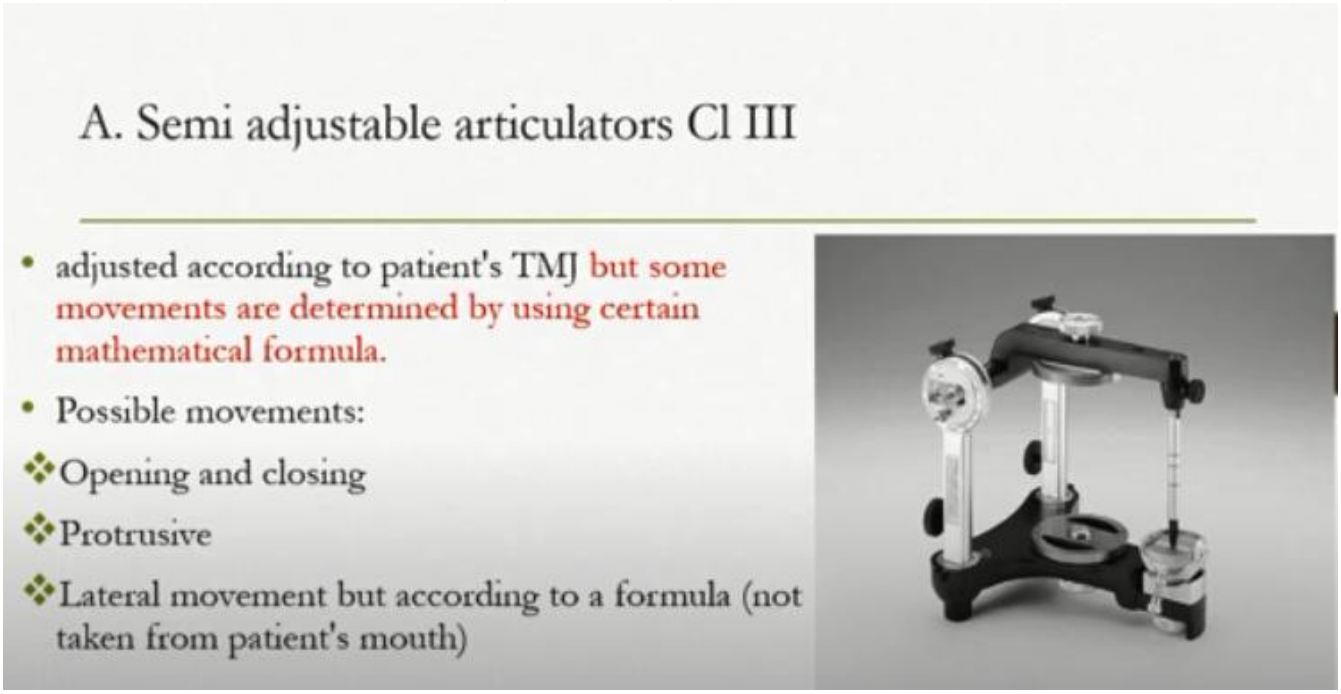
3. Adjustable Condylar Path Articulators:

These types of articulators differ from the fixed condylar path articulators in that it has **adjustable condylar and incisal guidances.** They can be adjusted so that the movements of its jaw members closely **resemble all movements** of the mandible for each individual patient.



A- Semi-adjustable condylar path articulators:

In these articulators ***the horizontal condylar path*** is adjusted by a protrusive record obtained ***from the patient***.

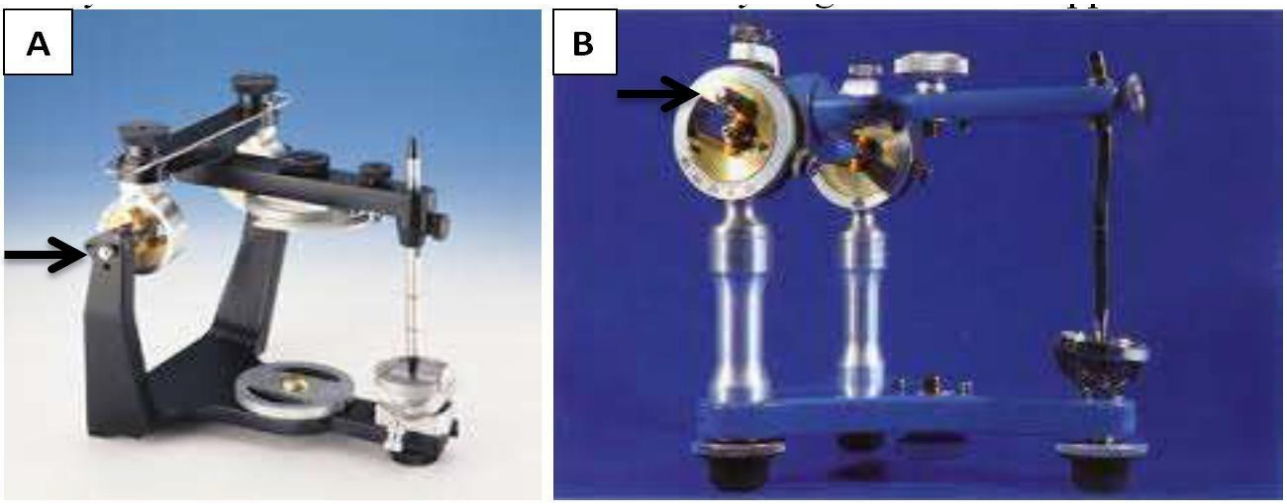


***The lateral condylar path* inclination is adjusted according to *the Hanau`s formula*:**

L= H/ 8+12.

Where; L= the lateral condylar path. H= the horizontal condylar path.

Some semi-adjustable articulators are **Non-Arcon**(**the condyles attached to the upper member of the instrument (non-Arcon)**, while others are **Arcon**. The term Arcon (mandibul**ar con**dyle) is commonly used to indicate an instrument that has its **condyles on the lower member of the instrument (Arcon).**



Semi-adjustable articulator. A: Arcon B: Non-arcon

B- Fully-adjustable articulators: An articulator that allows accurate replication of **three dimensional movement** of recorded mandibular motion. They differ from the semi-adjustable articulators in that the **lateral condylar path inclinations are adjusted according to records taken from the patient.**

This type of articulators can accept the following records:

- **Face-bow record**
- **Interocclusal record**
- **Protrusive record**
- **Lateral records**

B. Fully adjustable articulator

- they are adjusted according to records taken from the patient & no need to use the formula.
- All mandibular movements could be done
- Disadvantage is Multiple records are required with the possibility of errors.



- Note: **The semi-adjustable articulators are usually enough for complete denture construction.**

