

***Title of Lecture: Articulators &facebow transfer***

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***Sheet no: 7***

***Refer to slide no. :***articulators.pdf

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Before you start: pay attention that this sheet includes the extra notes and some further explanations for what is already in the pdf .

***Page.2***

The idea of having the articulator and the cast in the lab as if the patient is sitting in front of us all of the time, is to be able to mimic the movement that we can normally do with our TMJs and then to do a proper set up for our teeth or what other type of restorations rather than a complete denture.

**Classification of Articulators**

**Class I Articulator**

* An example of class I is the simple hinge articulator which is capable of only opening and closure (vertical movement).
* **What kinds of problems are associated with the simple hinge articulator?**
* Our goal of any restoration we do is to mimic the situation in natural teeth. Now, if we drew a line from the center of the condyle ( the reference point of the hinge axis) to the mandibular 1st molar or the anterior central incisor , we will find out that the arc of opening and closure( the distance from the center of the condyle to the restoration ie: the molar or the incisor) is always fixed (the same radius each and every time), imagining that the mandible forms a circle.
* the problem is that in the simple hinge articulator this distance or radius is much smaller than that in the patient's mouth(see page.4) therefore the arc of opening and closure in the articulator is much more curved than the actual arc of the patient .that's why a crown restoration made on the simple hinge articulator will be found to be too high or too low in the patient's mouth ; because we are not using the proper articulator.

* **If so, what are the indications for using the simple hinge articulator?**

**Class II Articulator**

-Capable of vertical and horizontal movement the using the knobs you can move it to right or left(horizontal movement) or you can open it or close it in a vertical movement.

-it's made on average distances that’s why it's called an avg value articulator.

-we can't do adjustment on it or orient the motion on the TMJ which means it can't accept a facebow transfer.

**NOTE:**

**Both classes I & II don’t accept a facebow transfere (will be explained later on) unlike classes III & IV which do accept facebow transfer.**

* **Bonwill 's triangle:** an equilateral triangle (4 Inches= 10 cm) formed of a line connecting the center of the 2 condyles and lines connecting each center of condyle to the midline between the mandibular central incisors.
* The avg value articulator is made according to bonwill's triangle avg distances.

**Avg value articulator uses:**

1-could be used in cases demonstrations (same as simple hinge).

2-simple single crown restoration (its capable of lateral movement).

3- three units bridge restoration.

4- complete dentures.

- **Avg value articulator** **cant be used for:**

1-fixed restorations.

2-restoring complete or full quadrants.

3- full arch maxilla or mandible.

For these restorations we need something more from the patient on the articulator which can't be done using the avg value articulator because it has a fixed condylar angle (30 degree) and the incisal table is also has an inclination equals 30 degree ( these are fixed avg values).

**Class III Articulator**

-it allows for orientation of the cast relative to the joint , this means we can do facebow transfer on it.

- In page.7 the articulator contains readings which indicate that it can be adjusted.

-the condyler angle: the angle by which the mandible descends along the median eminence with the horizontal plane when it's moved forward during protrusion (when the translation begins).

- If the condyler angle was 60 on the articulator and shallower (40) in the patient's mouth and the restoration was made based on the measurements on the articulator.

-the semi-adjustable articulator has two type : arcon and non-arcon

- based on the picture in page.7 there is a sphere in which a slot enters through it , this sphere represents the condyle and the slot represents the articular eminence.

-if the sphere is connected to the lower member of the articulator and the upper member which articulates with it was the articular eminence (temporal bone) then it mimics the normal anatomy and this articulator is considered an arcon. and if the sphere descends from the upper member opposite to the normal anatomy ( condyles in upper member and the eminence in lower member) then the movement will be opposite to that in Actual TMJ, which is confusing, and this articulator is the non-arcon articulator.

**History of Articulators development**

It started with the simple hinge articulator then the avg value

After that the non-arcon was created and since it was opposing the normal anatomy the arcon was created to solve the problem because its more accurate than the non-arcon.

NOTE:- In avg value articulator which we use in the lab the movement is opposite to that in the patient's mouth which resemble the non-arcon articulator.

* In the semi-adjustable articulator the slot doesn’t resemble the exact anatomy (no curves) . and some of them can't perform the Bennet's movement. Besides that, they have a fixed intercondylar distance =110mm and it can't be adjusted.

**Class IV**

-the most advanced one.

-accept 3D dynamic registrations.

-accept a facebow transfer.

-its fully adjustable , everything from the intercondylar distance, Bennet's movement ,Bennet's angle , condylar guidance angle and even the incisal guidance table can be adjusted!.

-an example is the Denar mark 2 articulator(see page.9) in which the intercondylar distance can be lengthen or shorten and it could be adjusted according to the readings in the patient's mouth.

**Uses of the semi-adjustable and the fully adjustable articulators**

The semi-adjustable articulator could be used almost for all restorations except the complicated ones eg: a patient who needs crowns on all teeth and has deviations and problem with occlusion this case need a fully adjustable articulator.

* So in 90% of the cases we can use the semi-adjustable articulator, while the fully adjustable are rarely used (we don’t need them usually) when there is a real complicated case.
* Pantographic tracing: an instrument that is attached to the patient's mandible to record all of the movements that the patient will perform in the shape of lines that we measure the angles between them to get our readings.
* In the last 10 years a computerized Pantographic tracing is being used, the patient is asked to do the movement and the readings will be calculated on a computer

NOTE:

An important thought to keep in our minds is that we can use all of these articulators to make a complete denture except for the simple hinge articulator.

Face-BowTransfer

*page 10-16*

\*\*In the average value articulator : we do

-Relation between maxillary and mandible oriented by the centric relation (CR)

-we put the MAX. cast on the mounting table in order to mounting it to the articulator.

\*\* arbitrary face bow is composed of –bite fork which used to carry the material and then insert it in the patient(Pt) mouth ,so you get impression of the MAX teeth .

\*\* Face bow "with the bite fork " is used to do mounting/transfer or relay the MAX. teeth on the semi adjustable articulator .

* We place the fork on the articulator and then we place the MAX. cast on it and mounting it .

So the Face bow is resemble the mounting table in the average value articulator .

\*\* How to do mounting for the MAND. Later on ?? by the centric relation just like what we did when using average value articulator.

\*\* why we do not use any flat surface rather than the face bow ??

Because arch opening and closing …. Which mean to be sure that the relation btw MAX. and the hinge axis of the movement in the pt. , is transfer to the articulator precisely .

\*\* Clinical re amount : to regist CR again in the Pt mouth after placing the denture …. Then transfer to the articulator again ,in order to

re do fine tunings to the occlusal, because of the nature cumulating ERRORs from bite ,to transfer ,processing …….

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\*\* Two type of the face bow which is more accurate ??

Kinematic which locate exactly the condyle hinge axis .

\*\* it have also two element and screw to control its length …

And also two arms linked with 2 styli ,one at each side .

* We palpate and let these styli to touch what I thought is the center of the condyle…- and ask the Pt to open and close about 20 mm " the rotational movement only " …..by doing this styli will rotate in one point which mark the center of the HING AXIS .
* By measure the distant btw the 2 point we know the transverse hinge axis length and transfer it to the articulator .
* Transfer the fork to the accurate point on articulator and do the Mounting for the MAX.
* This process is time consuming , it take about 1 hour .

\*\* Arbitrary face bow

This device is manufacture so that when we put these pieces in the external acoustic meatus , they are far from the transverse hinge axis 13 mm , the anterior part of should be parallel to the inter papillary line

* Another reference point is needed – as simple as when you determine any 3D space to transfer it we locate 3 point at least –

The third reference point of occlusion anteriorly is on the nasium .OR other types take the infra orbital foramen as 3rd point .

Actually the 3rd point prevent the up and down movement of the fork and it should also be determined in Kinematic face bow .

* When this fork transfer to the articulator the manufactures account this "13 mm " distance .

Patient with complicated mouth anatomy we use the Fully adjustable articulator

\*\* 5 mm error is acceptable but more than this we use the Kinematic one