**Prothodontics**

**Sheet No: 9**

**Date of Lec: 2/12/2015**

**Written by: Leen Musharbash ,Tala Ghishan.**

Bite Registration

Before we start with jaw relation we have to check *Lip and cheeks support,* *height of wax rim (amount of teeth showing), orientation of occlusal plane*, and draw the *canine line* and *the midline*.

If the upper wax rim is ready, put upper and lower bite blocks together to achieve even contact. If we have space anteriorly or posteriorly, we have to adjust the lower wax rim (*not* the upper) ,either by adding or removing until even contact is achieved.

Then we remove the upper , and put the lower inside the patient mouth, and start taking the vertical and horizontal jaw relations.

The **vertical relation** consists of:\*

1- rest vertical dimension (RVD).

2- occlusal vertical dimension (OVD).

3- Interocclusal space =FWS.

The **horizontal jaw relation** is centric relation.\*

\***\*Rest vertical dimension:** is the distance between 2 selected points , one fixed on the tip of the nose(maxilla) ,and one in the least movable part in the chin(mandible) and that when the maxillofacial tissue or muscles around the oral cavity are in a tonic or an equilibrium state ( relaxed )and the lips are slightly touching.

RVD: When the patient is relaxed, sitting in an upright position and breathing from his/her nose. When there is no stress on the joints, the lips are slightly touching and the teeth are separated.

* **Rest vertical dimension:**

The most applicable method used in clinics to measure the rest vertical dimension is as follow:

Determine two points:

1. Tip of the nose
2. Least movable tissues

Then ask the patient to pronounce the letter “M” multiple times, after a few times of doing so let the patient pronounce it one last time and when the lips slightly touch measure the distance between the two points.

Other methods include:

* Let the patient swallow, with slight touching of the lips..measure the distance
* Let the patient lick his/her lips and then measure the distance.

Make sure that:

* The points placed should be of adequate size.
* You measure top to top or bottom to bottom readings on the ruler.
* the patient is in an upright position.

**\*\*Methods of recording RVD (physiological method ) :-**

* Facial measurement (2 reference points): two points should be fixed on the patient face one on the tip of the nose, the other on the least movable tissue over the mentalis muscle.

1-phonitics:

* Ask the pt to say a prolonged M for 4-5 times(m is pronounced as biolabial sound ) When saying M, the lips slightly touch, and that gives a position of rest vertical dimension keeping in mind that the patient is in an upright position and is breathing from the nose .
* Take 10 readings

2-Swallowing:

* When the patient swallows, the condoyles move backward then forward and the lips slightly touch (same process as saying m)
* Take the rest vertical dimension during the swallowing cycle.
* Take 10 readings

3-facial expression : let the patient lick his/her lower lip

* Take 10 readings
* The total number of readings is30, take the most repeatable reading (not average).

\*\*Tools that we use for measurements:

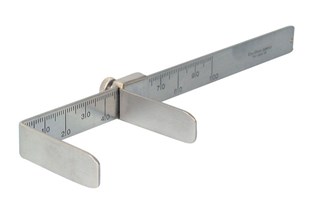
1-Ruler or scale: it should be short and rigid for it not to bend or be discomforting to the patient.

2-Divider:

* tip should be blunt not sharp .
* Approach patient from the lateral side, for reflexes to be less specially with patient whom have hyperactive mentalis muscle.
* If we approach the patient from front; greater reflexes in muscles and expressions will be shown.

3-willis gauge:

* Disadvantage: hard to use with obese patients or those with a double chin (l3'lo3'ah),we can't know where to stop, so In order to measure the distance u have to press hard on the chin until you touch the bone; otherwise the reading will be wrong .



**occlusal vertical dimension**: is the distance between 2 selected points when the teeth are occluded (in dentate patients) or when there is no space between two wax rims (in edentulous patients).

The difference between RVD and OVD is the **FREE WAY SPACE.**

After we measure the RVD we take the upper bite block and put inside the patient mouth then we ask the patient to occlude(the upper and lower wax rim) in centric relation that’s what we called OVD.

If RVD =8, OVD =10 so FWS =8-10 = -2 …. This means there is not enough FWS so we have to reduce the lower to create FWS. Repeat measurements.

Normal FWS in adult range from 2-4 mm and it increases with age.

Old denture wearers have the FWS range from 15-18 mm so they have certain criteria , we can't bring them all of the sudden from 16 to 4, if we do that we will have problems in the TMJ and the patient will refuse to adapt …so the solution is muscle reprogramming which takes 3 to 6 months .

\*\*\*This method of measuring the RVD is called **metric measurement.** For example FWS=3 not approximately 3.5, the second method is **phonitics** (by counting from 1 to 10 and seeing some words that have "s" and its counterpart ).

**\*FWS** is the distance that exists between the upper and lower teeth when the mandible is in rest position & is usually 3-4 mm >>>patient must be in an upright position, is breathing from the nose and there is no stress on TMJ>>>> separation posterior between teeth is called FWS.*(during statics)*

**\*\*Closest speaking space**: is totally different from FWS (which is a static position),it is the closest relation of incisal seats and inscisal edges of the mandibular teeth to maxillary teeth *during function* ,so it is a dynamic process equal around 1mm.(it is difficult for us ,so just to know it)we measue it in the try in step,we ask the patient to pronounce some words ,then determine the overlap between upper and lower, it should not exceed 1 mm.

\*\*\*You should know the following (from last year’ lecs):

-curve of Spee, curve of Wilson are in dentate patients.

-Compensating curve is in edentulous patients.

-Condyle movement in sagital, horizontal, vertical plane.

- Puzzle movement is border movement (envelop) of the mandible.

**\*\*\*Centric relation:**

is the most retruded relation of the mandible to the maxilla when the condyles are in their most posterior superior unstrained position in the glenoid fossa from which lateral movement can be made.

*its bone-bone relation*

-it remains *constant* throughout life.

##Definitions are in the Glossary of our book.

**\* Methods of retruding mandible:**

1- Put your index on the area of the premolar or molar region and ask the patient to relax his/her jaw, the mandible will move backwards automatically. Here the mandible is in the hinge axis, the patent can’t move his mandible left or right, then ask him to bite ONLY on his/her posterior teeth, then guide (NOT push) the mandible to most retruded position.

2) Ask the patient to swallow, hold the lower while doing so. The condyle would go backwards when swallowing.

3) Use this method with difficult patients Ie: slow learners or those with TMJ problems or patients with habitual class 3. On the upper block put green stick or wax at the post dam area and then ask the patient to roll his tongue to that mark.

4) Fatigue technique: we ask the patient to open and close his mouth many times, this is to fatigue the lateral pterygoid muscle and anterior part of temporalis. Then the mandibular guidance could be performed without any difficulties and hence you can achieve the centric relation.

5) supine position: you adjust the dental chair where the muscles help to elevate the mandible (backward against gravity-Not commonly used).

An extraoral method is the gothic tracing.

**\*\* Why should the mandible be in the retruded contact position (RCP)??**

1-because it is the only repeatable position

2- Only position that is visible on the articulator when transferred (lateral movements are possible)

3-it is the only correct clinical position to be recorded.

4- Non working condyle has shown to return to the retruding position with each chewing/swallowing cycle

**Notes:**

- the articulator is never as accurate as the oral cavity due to the absence of tissues.

-We fail to record the centric relation when the you record a class I for example on the articulator and then observe spaces anteriorly or poteriorly when placing it in the patient’s mouth.

-Def. of Centric relation, eccentric movements, protrusive movement, and hinge movements should be known. (refer to the glossary of our book)

- Hinge movement: opening and closing of the mandible are the only two movements that could be done when the patient relaxes his/her mandible.

- protrusive movement: sliding the mandible anteriorly with contact posteriorly for stability.

- Christensen’s phenomena: separation of post teeth with protrusion. Present in dentate people.

**\* When we use the centric relation??**

It is mainly used in complete edentulous patients and in Kennedy class 1 &2 (bilateral free end saddle) in RPD patients. Do not use ICP.

\***What is the difference between centric relation and intercuspal position??**

CR: mainly for edentulous patients

ICP: mainly in dentate patients

And the difference between them is 1 -2mm

**\*\* Requirements for a recurrent centric relation:**

Exert equalized vertical pressure and retain the record’s condition until the cast has been mounted to the articulator.

**\*\*\* Method used to measure a vertical relation:**

1. Ask the patient to relax
2. Ask the patient to close not bite (biting would distort the wax, or cause deviation)
3. Midline and canine lines should coincide
4. Tongue retrusion
5. Head position should be upright
6. Supine position if indicated
7. Fatigue technique if indicated
8. Ask the patent to relax his mandible and guide it to the CR.

-Some difficult patients, resist the guidance of the mandible so as a last resort you ask the patient to protrude the maxilla so unconsciously he will retrude the mandible because the maxilla is fixed.

-some keep massaging the temporalis muscle so as for the muscle to relax.

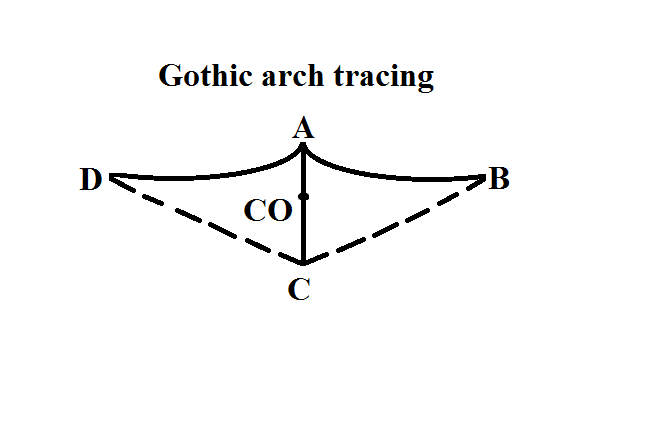
* How does a habitual class 3 take place?

Because the patient lost his posterior upper and lower teeth first,he starts to depend on anterior teeth so class 3 develops as he tries to approximate upper and lower centrals to bite then after some time he lost his anterior teeth as well, however in his cortex in the brain the patient is still programmed to protrude the mandible so that’s how a habitual class 3 develops!

So you have to explain to the patient what happened to him and to train him to bite on posterior teeth, in the first and second follow ups the patient will come to you with ulcers on the crest of the ridge ( not on the buccal sulcus) but eventually he will learn it’s just a matter of time and adaptation.

* All methods mentioned before are called intraoral methods

Now we’ll start with extraoral method **Gothic arch technique:**

It is a method of measuring retruded contact position; the technique uses the horizontal movement of the mandible in the form of tracing.

We have two styli coming from upper and lower, the styli will draw on carbon paper outside patients’ mouth when jaws are in centric relation the styli will be in the middle giving this shape.

Indicated in well developed ridge and NOT in highly resorbed ridge.

It could also be intraoral method.

It is not that much applicable in clinics.

* Bite registration is the most crucial step in constructing a complete denture. We have to stabilize the mandible all the time sometimes we forget or it would be difficult because the ridge is highly resorbed,so as a result of not stabilizing the denture base the lower record block move in this case you would have recorded the CR but upon mounting it to the articulator you will notice that the relation between the two jaws is class 2.

so some prosthodontics prefer denture base to be as the permanent denture base (especially for highly resorbed ridge) for two reasons: 1) You would prepare the patient with high expectation the retention that he’ll obtain. 2)To be more retentive so lowering the chance of movement of the lower base.

* Heel contact/clash (الزعانف): extention of acrylic denture base to the retro molar area in lower and maxillary tuberosity in the upper. It is more preferable for the beginners to cut those areas especially the lower to cut it upto lower 7 because while retruding the mandible sometimes it stops before even reaching the centric relation.
* Now we do the grooves in upper and lower, 2 grooves on upper and 2 on lower. Some do 3 grooves on upper (two grooves at molar region and one at the premolar region that acts as anti rotational groove), and these grooves should be sharp and not shallow (deep enough) without any undercuts, then we put material in the upper jaw and secure both jaws together.

Material to be used to secure both jaws:

1-Wax (Alu wax, Modelling wax)

Alu wax is designed as horse shoe shape and it’s expensive.

Modelling wax is cheap and easy to control and gives working time more than 4 mins so it’s good for the use with difficult patient.

2-Silicone: we have bite registration paste in a gun we put in grooves and guide the mandible, it will quickly set.

Mainly we use it in bite registration in dentate patients but its problem is that it might separate and it’s expensive.

3-Green stick: we put it in hot water then we use it.

Some people use plaster or zinc oxide eugenol paste but it is a messy material and might easily separate so it won’t secure both jaws well.

Material you see yourself confident and convenient in using it, you can use. the doctor prefer using modelling wax.

Staple pin method can be used but it’s expensive.

After removal of the locked upper and lower jaw you immerse them directly in cold water or heat the wax knife and do complete sealing and finally we have to mount them to articulator.

Once you mount them, the incisal pin should be tightened and should not be moved because it’s the one that preserve the VD. The incisal pin could only be moved when we do curing otherwise VD will be lost.

* Errors could occur due to:

1. Resilience of denture supporting base. Some areas are very resilient while others are hard which might give a false recording.
2. Stability and retention of recording base in atrophic ridges as we said we prefer to use permanent denture base
3. TMJ problems/ neuromuscular problems like Parkinson’s disease or facial palsy.
4. Difficult patient either a slow learner or habitual positioning of the mandible.
5. Heel clash/contact.
6. Skill of dentist especially beginners.

Before you dismiss your patient you have to choose the teeth size and shape according to size and shape of the face, gender, age and facial complexion.

All of our patients are elderly patients and they usually request white coloured teeth however you have to explain to them in a scientific way that the natural teeth are not white in colour they tend to be more yellowish and this yellowish colour increases with age due to lack of blood supply. You have to explain to them that choosing white colour would enhance the artificial look. However if the patient insisted they have to sign a consent form that they chose this colour to avoid any conflict.

If the patient asked you to change the colour of the teeth at insertion what would you do?

We take an index of the teeth as a guide so as not to lose the setting of our teeth, and then we remove each tooth and replace it with the new one. The new teeth will bond with the base by addition of acrylic however we have two disadvantages 1)colour change in the acrylic base 2)weak bond between new teeth and acrylic this could be resolved by doing wax up and do heat curing.