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| Areen Obeidat | Done by: |



Prosthodontics III

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Hand Out

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Designed by: Hind Alabbadi

we already know how to fabricate a denture

**Lecture Outline :**

***\*\****Pattern of bone resorption.

***\*\****Landmarks to positions of the predecessors.

***\*\****The biometric method of impression making.

***\*\****Biometric special trays.

Land marks to determine lip support and***\*\*.***

vertical dimension of occlusion

through the conventional steps .

in this lecture we will talk about a new approach

of fabricating dentures , known as the

**Biometric approach** , which depends on certain

measurements , the aim of these measurements

is to put the patient's oral structures

(lips & cheeks) to where they were previously (before extracting the teeth) .

\*\*The patterns of bone resorption :

 **Maxilla** : always resororbs Labially & Buccally only (from outside only)

 **Mandible** : Anteriorly : the same as the maxilla (more labially than lingually)

 Premolar area : Even resorption (buccal = lingual)

 Posteriorly : More Lingually .

That’s why the *mandible seems wider than the maxilla* posteriorly , when seen in patients who went through a long period of edentulism , so the pt will look like he has a skeletal class 3 pattern , whereas he's not !

\*\*Consequences of Bone Resorption :

1)reduction of the ridge dimensions .

2)reduction in the Pre-Extraction morphologic face height .

3)reduction in the rest face height

The face is divided into 3 thirds (upper , middle & lower) the lower third gets collapsed (LFH will be reduced) upon teeth extraction and loss of support

4)it causes the mandible to rotate Forward & upward … this will also give an impression of a class 3 pattern and will cause a reduction in the vertical dimension as well .

So , Again , the goal of the biometric approach is to put all these things back to their original position .

\*\*Mechanism of Complete Denture Support :- The Forces produced on occlusal surfaces by masticatory muscles are transmitted to the ridge

-The Maximum biting forces are 5-6 times less for complete dentures wearers than those in dentates .

-The Mean denture bearing area in edentulous maxilla is about 23cm2 Whereas its about 12cm2 in the edentulous mandible (half the maxilla) ; that’s why the retention & the support are much way better in maxilla as opposed to the mandible .

Denture space: is that space in the mouth which was formerly occupied by the teeth and the supporting tissues which have since been lost

(in the in dentate patients its about 45cm2 )

In the conventional way of dentures fabrication , its generally accepted that impressions of edentulous mouths should place the lips & cheeks in their pre-extraction positions ,

And the means of achieving this differ considerably between operators . (this is done during the bite registration step by the adjustment of the wax rims according to the certain guidelines regarding the naso-labial angle , lips support ….etc)

But the question is : How can we achieve that proper support by the custom tray/Biometric tray ??

The goal of the tray in this case is *not only* to carry the impression material inside the patient's mouth , but also to restore the facial contour .

 In the conventional way : the primary impression is done by a stock tray , that was selected in a way that provides a space for the impression material between the ridge & the tray itself. (the space is dependent on the type of the impression material)

 In the biometric approach : the tray is selected not only to provide the needed space , but also to achieve the lips & cheeks support .

So , if the ridge was severly resorbed , youu should think about a large tray (in order to fill all the lost space –due to resorption process- and to regain the support that the patient had before any extraction took place , Regardless the amount of space that youu will have for the impression material )

When placed in the mouth , the empty tray should satisfactorily restore the facial contour and provide an airtight seal between the tray and the oral tissues . Thus, the empty tray should be retentive before the impression is taken .

\*\*Guidelines for the fabrication of the Biometric tray :

-The palatal gingival vestige : is almost always found in every edentulous maxilla , ranging from being prominent to indistinguishable (the same as the fovea palatine )

It’s a raised fibrous tissue that’s found on the upper residual ridge palatally

(the remnant of the gingival margin on the palatal side of the dental arch, which after teeth extractions remains visible as a cordlike elevation )

It resembles the lingual margins of the teeth before being extracted

it distinguishes the palatal mucosa from the vestibular mucosa buccally , and can be used as guide for positioning the maxillary teeth .

In general , youu can **not** say that the biometric approach is better than the conventional one !

And there is **NO** certain indications for that approach !

A severly resorbed ridge is **NOT** an indication to go through the biometric approach .

*Its Only a different way of thinking to fabricate a complete denture & can be applied to any case ..*

-The incisive papilla : if youu divide the papilla into

Two halves (anterior&posterior) And then youu go

10mm forward from the *mid point* ,this is where the

centrals should be positioned .

If youu draw a line from the *posterior border* of the

incisive papilla , and this line crosses the ridge , this

resembles the middle of the canine position .

the papilla seems to be changing its position by time , but the fact is that its constant & it seems to be doing that due to the resorption of the bone labial to it .

So, those 2 landmarks (the palatal gingival vestige & the papilla) help us to know the original position of the teeth before the occurrence of bone resorption .

-the distance between the palatal gingival vestige & the buccal/labial surface of the tooth (your artificial tooth) is known as : BuccoPalatal breadth

 For the incisors its found to be about 6mm

 The canine ͌ 8mm

 The premolars ͌ 10mm

 The molars ͌ 12mm

In the *biometric approach* , the primary impression is done using Alginate or compound ( most likely by Alginate , to get more details like the palatal gingival vestige… )

Tray selection (as said before) is done so the tray will support both the impression material & the cheeks and lips . The goal here is to record the full width of the peripheries/sulcus ,

Then , youu will get the primary cast .

By the *conventional way* , we learned to take the primary impression to the full depth , and to make the special tray from the cast to be shorter by 2-3 mm than the full depth .

Here , we have the A line & B line

The A line represents the Mucogingival junction .

Then youu go down 5mm from there to demarcate the B line , which represents the full depth of the sulcus . (bearing in mind that the primary impression is always over extended )

Another way to demarcate the B line is the same that is used in the conventional way when constructing the special tray (by going 2-3mm shorter than the full depth of the sulcus)

Then , youu fill the sulcus all around with wax up to the B line .

Then youu mark your measurements (the BuccoPalatal breadth ,the incisive papilla …etc)

\*\*Note that when youu use that approach , youu should have an experienced & skilful technician ; because most of these measurements are marked by him \*\*

The next step is to construct your acrylic biometric tray (close-fitted ) , the borders of the tray should be thick (the thickness depends on the amount of ridge resorption) so , the more resorption in the ridge (the smaller the ridge), the thicker are the borders, the more the gained support .

 In this picture , youu can notice that the tray thickness is 10mm , so youu can know that its taken from the premolar area , according to the measurements of the BuccoPalatal breadth

Since we are returning the supporting structures back to their original state by using that approach , so we **don’t** need to do border molding ! the tray will be retentive by its own if your measurements were applied correctly . (if not retentive , then your measurements were wrong or your impression was not correct )

but the question that arises is how can we achieve the periphera seal ??

The thick acrylic tray will push the cheeks outward , the cheeks will push it back in an inward direction as a reaction , this reaction produces the peripheral seal

The next step is the final impression , its taken usually by an elastic material (light body silicon (more than enough) / polyether / poly sulfide ..) while taking the impression youu do the border molding movements as usual .

**\*\*The Mandibular Biometric tray :**

The incisive papilla & the palatal gingival vestige are not found in the mandible as in the maxilla , so we need new land marks (these land marks are dependent on the pattern of resorption )

For example , in the anterior area , the resorption is more labially , so I construct the custom tray with an inclination labially to counteract the resorption that occurs there !

Whereas in the premolar region , the resorption is even buccally & lingually , so the acrylic thickness is even at both sides as well .

In the molar region , the resorption is more ligually , so ore acryl is added lingually .

(youu add acryl roughly with no certain measurements )

Them youu place it intraOrally , check the support & compare it with the maxillary one , check the stability as well , then go for your final impression .

\*\*Biometric lower trays are constructed to prevent the inward collapse of lips and cheeks , and to hold them in their former upright positions, so that the impression material is supported as it runs round the edge of the tray and up between the tray

and tissues.

\*\*The front of the biometric tray slopes forward to support the lower lip and in this way the labial sulcus is correctly defined.

\*\*In the molar region , the buccal flange of the tray is thickened , so that the impression material is supported to delineate the form of the buccinators (the modulus ?) as its middle fibers sweep lingually towards the pterygomandibular raphae

**Good Luck !**