Faculty of dentistry
5th year - Amal batch

Dental Committee 015

Prosthodontics 3

Sheet Slide

Number

13

Doctor

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- Slides were not sent by the doctor.
- The figures are taken from 2014 and google.
- Everything in the record is written, some info might be re-arranged for better understanding.
- Not everything in the record was clear, sorry for any mistakes.

Biometrics for constructing Complete Dentures

Biometrics is the person's identity. For example, fingerprints, eye prints, etc…
It is the technical term for body measurements and calculations. It refers to metric measurements related to human characteristics. (google)

So our goal is to construct a denture that satisfies the patient, without changing the patient's biometrics such as the facial identity.

Some patients request to not change anything about them such as their profile and their smile. In such cases, we really need to know the patient's biometrics; where and how were their teeth previously, how was their smile, and how was their facial expression previously. Here we are required to design a complete denture in which it satisfies the patient and restore how they previously were.

Old photographs and pre-extraction records might help us in these cases, but if we have a case where we don't have any information about how things were before edentulism, in this case we need to design the denture.

To be able to design the denture we need to understand the anatomical and physiological changes that happened during edentulism. When we really understand these changes, we would be able to know exactly how to design the CD and where exactly to set the teeth in a way to restore patient's profile and face shape.

Some of these changes are:

1. Decreased lower facial height with edentulism.

2. Resorption pattern.
Maxilla: resorbs primarily from the buccal and labial surfaces so it results in a smaller maxilla.

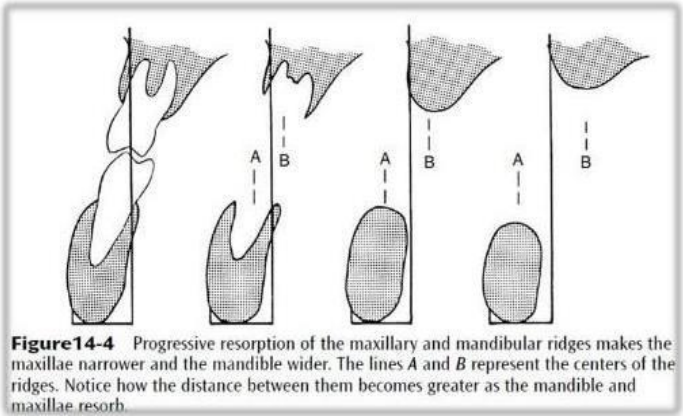


Figure14-4 Progressive resorption of the maxillary and mandibular ridges makes the maxillae narrower and the mandible wider. The lines *A* and *B* represent the centers of the ridges. Notice how the distance between them becomes greater as the mandible and maxillae resorb.

Mandible: The pattern of resorption depends on the area; anteriorly it resorbs more labially than lingually. In the premolar area, it resorbs equally labially and lingually. In the molar area, it resorbs mainly lingualy. As if it is becoming wider posteriorly, so as if the patient will have wider mandible with time giving you an impression that the patient is in class 3 malocclusion.
This different pattern of resorption between the maxilla and mandible, and the forward and upward rotation of the mandible gives the pseudo Class III appearance (habitual class 3 not skeletal). Unless it was skeletally confirmed that the patient is class 3, confirmation happens when we mount the upper and lower casts together on the articulator.

- The doctor was referring to a picture from the slides, the Dr pointed out the tongue space in dentate patients in relation to the cheeks. In edentulous patients, if I want to put the teeth on the crest of the ridge in the upper and lower arches, the tongue space would decrease so in this case we should set the teeth according to their pre-extraction site to be able to achieve good function and appearance. Also taking into consideration the cheeks, in edentulous patients the cheeks go inwards with time, we design the cd and set the teeth in a way to return the cheeks to their normal state before edentulism.

3. The bite force: in complete dentures, it is 4 times less than in natural dentition. So the type of food that edentulous patient's have is different from patients with natural dentition.

Note:

-Bite force differs from masticatory efficiency, bite force is the strength of cutting food.

⇒ Ways to restore the facial contour of the patient:

1. The primary impression and the function of the stock tray. (what we do in clinics)

   - What are the functions of the stock tray?

   A. To carry the impression material of choice.
   B. To position the labial and buccal contour of the patient in the normal position, not to cause distortion of the lips or cheeks.

It is really important to choose the appropriate tray that doesn't cause distortion to the lip or buccal mucosa, if the primary impression wasn't taken properly then the special tray won't be constructed correctly which will also cause distortion. Therefore, not allowing us to restore the facial contour.

- To know if our primary impression was taken correctly to restore the facial contour:

A. First we examine the profile of the patient.
B. Second, we put the primary impression in the patient's mouth and ask the patient to close their lips together and we assess the profile if is normal or not.

- If the profile isn't normal, there might be one of the two scenarios:

A. Excess impression compound and beyond the ability to be mold.
B. The tray's fit isn't correct. If it is distorting the lip, it means it is big and we need a smaller tray.

2. We didn't take it, but the Dr really likes to use it in the clinics. We use this technique in female and old patients, especially patients that have severely loose skin or incompetent lips and we don't want the secondary impression to effect the patient's facial profile.

Take a primary impression, and ask the technician to make bite blocks on the primary cast. Using the blocks we restore the patient's facial profile using the wax, we record the vertical dimensions, the facial profile and the bite. After that we do border molding using the baseplate as if it is a special tray, we do border molding for the baseplate we close the bite and record the usual movements but in this technique we don't ask the patient to protrude the tongue only to push it against the palate. Finally, we take the secondary impression using the closed mouth technique.

Notes:

- Even the border molding is done using closed mouth technique, we do the movements with the mouth closed. (2014)
- While we are taking the bite we do all the usual steps, but with extra caution for preserving the facial contour. Careful recording of the smile, smile line, canine line. In this way, even if the patient has short or incompetent lips and we take a secondary impression, it will all be good.
- A case that happened in the student clinics; the student didn't notice that the patient has a strong upper lip, to the extent that when the patient smiles, the lip reaches the flange of the denture, which means it reaches the whole sulcus, and results in breakage of the seal and the denture falls off. The student didn't realize that until the delivery, the fit was perfect but the minute the patient smiled, the seal broke and the denture fell off. To solve this problem, the Dr cut from the flanges and used the denture as a special tray, she border molded the area and took another impression using light body silicone and requested a laboratory hard reline. After that the seal was perfect and the problem was solved.

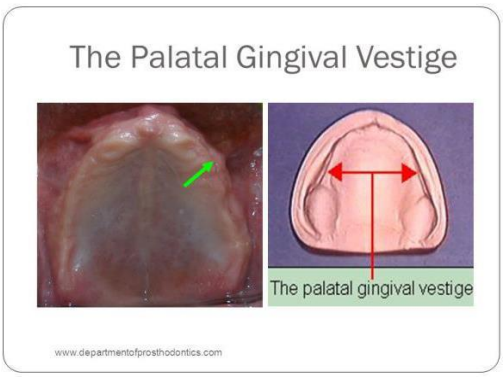
  (minute 12:55)

3. Biometric approach, in this approach the special tray should be 100% biometric for the patient. **Biometric tray** is a special tray that is 100% accurate and specific for the patient and at the same time preserves the facial contour and fully restores it.

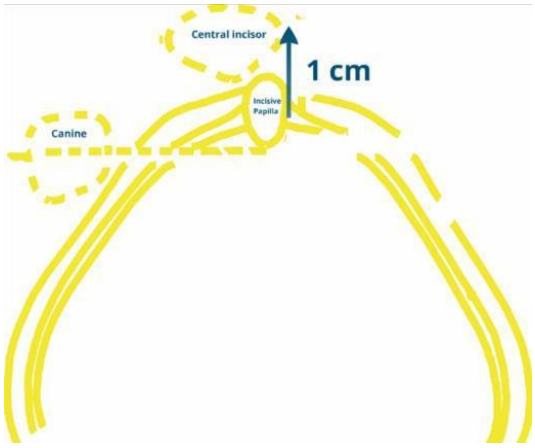
⇒ Maxillary Biometric tray:

- **Landmarks that guide us to know where to set teeth:**

1. Whenever we look at an edentulous patient, we will notice a raised fibrous line on the crest of the ridge all around and that is the **palatal gingival vestige**. This line indicates where the teeth were originally. It is a fibrous ridge on the palatal surface of the upper residual ridge which distinguishes the palatal mucosa from the vestibular mucosa and can be used as a guide in positioning of maxillary teeth.



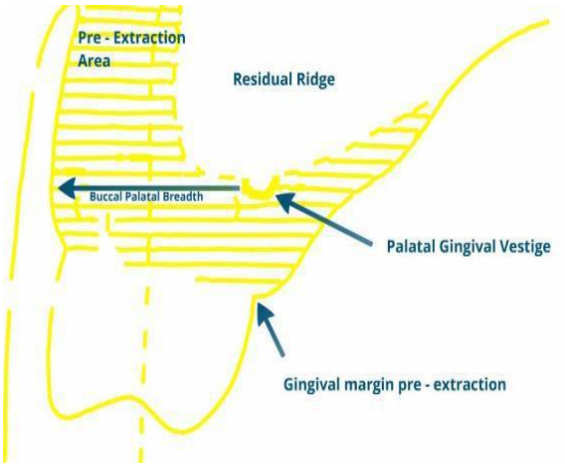
2. **Incisive papilla**. The central incisors are located 8-10 mm (1cm) labially from half the incisive papilla. If you extend a horizontal line from the posterior margin of incisive papilla this line will pass through the cusp tips of the canines.



3. **Buccal palatal breadth**, it is the distance between the palatal gingival vestige and pre extraction area. After resorption, the pre- extraction site ends up being the palatal gingival vestige.

This distance in the upper arch, on average:

- Central area = 6mm
- Canine= 8 mm
- Premolar= 10 mm
- Molars = 12mm



If we know the dimensions of this breadth, we would be able to know the correct site to set the teeth and know where our biometric tray should end. The tray shouldn't be before the dimensions of the buccal palatal breadth as the tissues will start going inwards. The normal special tray gives no result regarding the facial contour, it only border molds the sulcus to give the palatal seal. On the other hand, the biometric tray gives us a good seal and at the same time preserves or restores the facial contour.

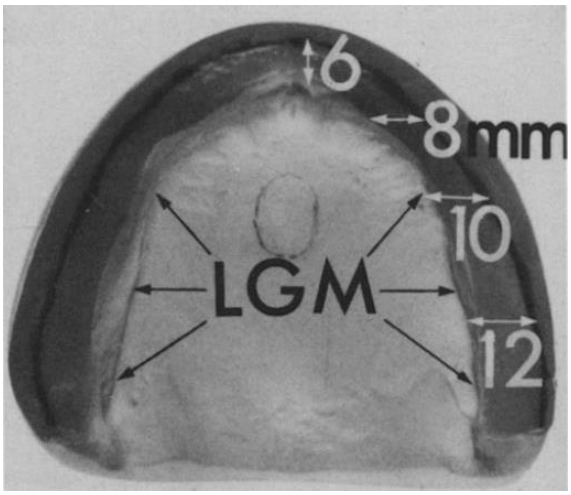
- **<u>How to construct the biometric tray:</u>**

1. Make a Primary impression, and fabricate the primary cast.
2. On the primary cast we mark the anatomical depth, and mark 5 mm shorter than the anatomical depth.
3. We fill this 5 mm with wax horizontally all around. (kind of like beading)

This allows us to pinpoint the landmarks like the buccal palatal vestige, incisive papilla and where the borders of this biometric tray will end. These measurements have to be precise so that the tray won't cause any inward movements of the tissues, and regardless of the ridge form.

Some patients may have resorption and that will lead to a space in the special tray (later on discuss how to deal with this space). Here the most important thing is to identify where the borders of the tray will end.

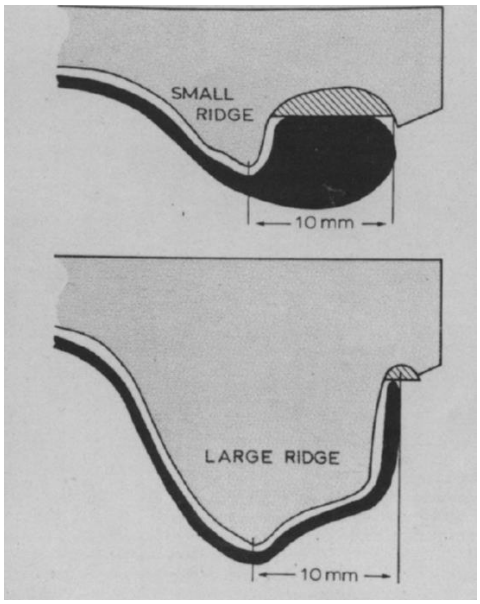
4. On the wax mark the measurements. They are taken, ***vertically*** in the incisor region and ***horizontally*** in the other regions, these measurements are approximately 6 mm (incisor), 8 mm (canine), 10 mm (premolar) and 12 mm (molar). This change of direction of measurements is related to the muscles and their direction with teeth.



5. Draw a line on the wax joining these measurements together. Now when we spread the acrylic sheet of the tray on the cast, the peripheries of the sheet should end on this line.

(minute 21:38)

- Here is a cross section of casts, in the lower figure the ridges are well formed as in the upper figure there is more resorption. To compensate for this resorption and restore the soft tissue support, the tray's borders should be thicker than the one in the lower figure, which has less resorption. We put the same measurements for both patients (10mm), the final placement of the teeth is the same and in both situations we make sure we have the space we need for the impression. But what differs here, is the thickness of the denture. (The one with more resorption needs thicker denture to compensate for that resorption)



So the idea of biometric approach is that we compensate for the resorption using the tray itself, not the wax during bite registration.

⇒ Mandibular biometric trays:

We construct a mandibular biometric tray but it is less important than the maxillary.

For the mandibular biometric tray, we only care about one muscle which is the ***mentalis*** as it effects the stability and contour. Unlike the other muscles, they effect the teeth and flanges of denture indirectly, for example, the buccinator muscle indirectly effects the masseter.

We should always keep in mind the inward collapse, that happens as result of resorption. As the resorption in the lower is more lingually than buccally, the inward movement happens more in the pre molar area, in cases of long standing edentulism or severe resorption the inward movement may also be clear in the molar area.

If we take a cross section of the lower tray, we notice that tray will follow the resorption pattern of the mandible. In the molar area, we have lingually more resorption than the buccally, in the pre molar area the resorption is almost equal on both sides, and anteriorly it is more labially than lingually.

So constructing the lower biometric tray should be in accordance to the resorption pattern, so in the area of anterior area the border will be inclined labially to compensate for the resorption. In the premolar area it is almost equal on both sides, and in the molar region the buccal flange of the tray is thickened so that the impression material is supported to make sure the buccinators muscle is well supported and won't collapse. (2014)

Notes:

- If the patient's first denture was constructed correctly and the patient is comfortable with it and it restores the patient's profile, this denture can help us. We use alma gage that measures the distance between the incisive papilla and central incisor and based on that measurement we make the maxillary rims.

- The Dr showed an x-ray of a severely resorbed ridge, the bone doesn't even show on the x-ray because of how resorbed it is. To reach this severity of resorption the patient must be edentulous for a very long time, around 25- 30 yrs, or has some sort of disease. The Dr said she encountered patients with very severe resorption that she was scared to break the mandible while taking the impression. Complete dentures here have no retention only stability, we use cusp less teeth. She emphasized on the importance of restoring the facial contour in these patients.