**Sheet no.: 22**

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Please refer to the slides, this sheet isn’t a correction to last year’s sheet

**Secondary impressions:**

1. **Tooth supported RPDs:**

Rest seats on the abutments direct forces through the long access of the teeth. No force can reach the tissues of the edentulous span

All the shock forces are absorbed by the teeth.Transmitted form the rest through the tooth to the PDL, and no force would reach the mucosa of the edentulous span.

In this case we can take an impression using either stock or custom tray, it doesn’t make any difference since all the support is provided by the teeth rather than tissues.

We use dentate trays either plastic or metal each have their advantages and disadvantages. Plastic trays are disposable, come in different sizes. The metal trays can be sterilized and reused also it’s more rigid so more dependable. In both of them is very important to put an adhesive before taking an impression. There’s no preference between them.

So once you choose your tray, you put on the adhesive, then you fill it with alginate up to the border of the tray, put it in the patient mouth. Slide 8 demonstrate it on the lower arch

This is our final impression; we’ve already made preparations on the teeth so Before taking the impression, an important step is to take a small amount of alginate on our fingers and wipe the surfaces of the teeth and the area of the rest seats, embrasures between the teeth, guiding planes to prevent air bubbles entrapment.

then we inspect the impression for details as in slide 9, we check for the rest seats , extensions , air bubbles.

We can use stock tray in case of class III; we don’t have to do border molding

The other alternative is using a custom tray; acrylic resin self cure or light cure , perforated for mechanical retention. Is it wrong to use it for class III? No but it’s easier to use stock tray but in case of class I kinnedy you have to fabricate a custom tray

So we use stock tray in when the edentulous area is short span tooth supported.

**Impression materials :**

In general we can use any elastic material: silicones (light or medium body we don’t use heavy body because we want details) , polyether, polysulfide and alginate

1. **Tooth mucosa supported RPDs:**

The support is provided by both the teeth and tissues “distal extensions”, displaceability of teeth and tissues aren’t the same; tissues are more displaceable approximately by 25 degrees. When a force is applied to the partial denture with distal extension the abutment tooth will move within its socket and PDL according to the fibers surrounding it, while tissues will displace 25 times more than the teeth

**Factors affect the support for the distal extension:**

1. **Contour and quality of the residual ridge.**Which means the more resorption of the ridge would be more susceptible to displacement because it has less amount of bone to provide support. The more developed ridge broad and rounded the better support would result. The thicker cortical bone the better support. The more resorbed bone the less cortical bone and more cancellous bone which is more susceptible for further bone resorption at a higher rate.

Also the quality of covering connecting tissue of residual ridge should be fair and dense rather than fragile (as in diabetic patients which is more susceptible to trauma)

Ideal ridge : 1. Rounded and developed 2. Dense CT 3. Good cortical bone support

1. **Extent of residual ridge coverage by the denture base.**one of the basic rules in fabrication of complete or partial dentures is to achieve maximum extension, to have best support, retention and stability. So the worse case you get regarding resorption of the bone, the more important you need to achieve maximum coverage.
2. **Type and accuracy of the impression registration :**depends on the material you use and your ability to handle it, meaning when I use alginate as my impression material it has different spacer than the one I use with silicone; alginate requires a bigger spacer.
3. **Accuracy of the fit of the denture base**. closely adapted fit without compression
4. **Design of the RPD framework.** In slide 15 on the left the design doesn’t have indirect retainer; it failed to have indirect retention though it’s a requirement for distal extensions which are rest seats anteriorly the furthest possible from the fulcrum, the upward arrow represent a bolus dislodging the denture away from the tissues the indirect retainer prevent it from sinking this way without it the major connector would sink in the floor of the mouth which will result in an injury.



**The design** can also predict the future resorption for this patient or trauma

1. **Total occlusal load applied**.

**Back to the third factor :**Type and accuracy of the impression registration:

As we said before the key is to know how to handle the material

We have two types of impressions: 1. Anatomic form 2. Functional form

And it depends on the status of the tissues which you’re going to take its impression.

For example when taking an impression for a case with a class III missing 4 and 5 when I take its impression it’s called **anatomic impression** because it was taken at rest without displacement where as in the case of distal extension and I applied pressure on it while taking the impression I’m causing tissue displacement as if we’re taking it under function so it’s called **functional impression**( applying force)

We can have distortion under tissue displacement as a result of:

1. the viscosity of the wrong choice of impression material at wrong situations
2. or insufficient thickness of the impression material ( like when taking alginate impression without enough spacing)

**Anatomic impression:** at rest

One stage impression method using an elastic impression material

Represent the hard and soft tissue at rest( neither teeth or tissues are displaced)

In this case if I took anatomic alginate impression to a case with distal extension ( only have teeth from 4-4 for example) at rest this will result the following when the patient close his mouth:

1. upon occlusal loading rest seats on the abutments will prevent the denture to sink into the tissues
2. while occlusal loading on tissues (when not displaced during impression making) will cause the denture to sink in them

In the previous pictures I have a proper design of the RPD “ using RPI which has better distribution of forces in class I”, taken with anatomic impression ; when the occlusal forces are applied to the rest it won’t move from its place while when it’s applied to the distal extension it will sink towards the tissues and upon maximum occlusal load the denture will sink in more, the most posterior part of the extension will sink in the most “you can picture it by comparing denture original position represented by the dots in the pictures and its position after applying force”

The conclusion: anatomic impression for class I will result in the following: “disadvantages”

1. Displacement of tissue
2. Increased compression will lead to trauma or necrosis to the tissues (**Bone loss on the distal end of the ridge**)
3. The tooth will become a fulcrum, by time and continuous displacement on that area resorption of bone would occur on the distal side of the tooth 🡪 then on long term mobility would occur to the tooth because we are losing support on the distal surface of the socket. **(Cantilever action of the distal extension base against the abutment teeth - Loosening of the abutments)**

So it’s not enough to use stress breaking mechanisms “which is RPI in class I”, we have to use functional impression.

While in class III case with two rest seats “mechanical stress breaker” no displacement would occur so it’s ok to use anatomic impression

So I need to use an impression technique that apply little displacement on the tissues so that when the patient put on the RPD without pressing the tissues “ at rest”, tissues would be already slightly displaced. And upon occlusal load application the tissues won’t be displaced in a huge amount. This can be done by **functional impressions**.

Functional impression is accomplished by “Dual impression technique” which means taking teeth in their anatomic position and the mucosa in its functional position (through displacement ).

Dual meaning both anatomic and functional

Functional impression :

Need to record the tissue that supports the distal extension RPD in its functional form and relating them to the remainder of the arch (teeth ) in its anatomic form .

The more the mucosa displaces under function the more rebound there is likely to be , we don’t want to do full displacement for the tissues .

If we did the impression and the tissues were completely displaced , when delivering the partial denture ,without any occlusal load it wont do that much displacement , but the rebounding of tissues upon displacement will make the patient feel the distal extension high in occlusion.

Functional impressions :

3 types of functional impressions classified historically

In 1936 they realized that the anatomic impression for partial dentures have their disadvantages , so they created new impression techniques to overcome those disadvantages.

The first to think of a new technique is **MCLEAN :** in 1936

In a distal extension case ,He did a custom tray for the edentulous areas only , then did border molding like in any impression , and he used green stick as if it’s a wax rim , so on the occlusal part of the tray we put a block of green stick.

So what we have is a tray border molded on the edentulous areas and on top of it (on the occlusal part ) there is green stick.

How do we take the impression ?

Here (in the slide pictures) they used a type of silicone (blue in color) , but you can also use zinc oxide .

The reason for putting green stick blocks is to let the patient bite on them , to get the functional impression (the functional form of tissues ).

Now since I’m done with the functional part , I need to do the anatomic part ( because it’s a dual impression )

How can I relate it to teeth ? (anatomic part)

By doing “pick up impression “ bring a stock tray ( dentate ) fill it with alginate .

Note : this assembly( functional and anatomic ) should be done at the same time (together)

The disadvantage of this technique : is that I took the impression under occlusal load , so when I pour the impression , the cast that I’m going to make the final denture base on will have the tissues displaced , so the delivered denture is going to do displacement of tissues , this mucosa (soft tissue ) will be displaced all the time to the maximum , this in turn will reduce the blood supply and will cause necrosis and resorption .

**HINDELS:**  20 years later in 1952

same principle , custom tray is made just fit for edentulous areas , border molding , impression but **without** occlusal load (the impression here is just like in complete denture )

**in Mclean** the modification is on the custom tray of edentulous arches, we place green stick blocks and ask the patient to bite

**in Hindels** , we don’t put green stick blocks , the modification is on the stock tray that were going to take the overall impression on ”pick up impression” , the modification is by doing openings in stock tray corresponding to edentulous areas

in the patients mouth there is a tray that I already took the impression of the edentulous areas in , I want to do “pick up” so I fill the modified (opened) stock tray with alginate , put it in the patients mouth , do slight pressure on top of those edentulous areas , the result will be an impression showing the **anatomic** position of teeth carrying with it the other impression of the edentulous areas that I took under slight finger pressure in relation to the teeth toward the tissues (**functional** ) , without letting the patient do any occlusal forces on it , by that the tissues are not completely displaced .

since it includes both anatomic and functional its called dual impression technique .

**Altered cast technique :**

Is the final step in those evolutions

In clinics we don’t use Mclean or Hindels we use Altered cast technique .

Because Mclean have disadvantages and even Hindels although tissues are not completely displaced it has inaccuracies (how much finger pressure is done (calibration) , also there is a chance of rebound tissues having a high occlusion denture )

So they started thinking is it better to do the impression of the edentulous part at the impression stage or at metal framework stage , where the rest seats are in place and have a stable reference (which is the metal framework seated) , and at this point I can take impression of the edentulous area under **selective pressure** **technique .**

Selective pressure means that the primary supporting areas are taken under pressure because I want it under intimate contact and the secondary areas ( or areas that need relief ) I put wax on the cast because I want to do spacing , its not close fitted like zinc oxide and also not spaced as alginate all around .

Primary support areas as buccal shelf in mandible I don’t put any spacer in this area ( closely fitted) , but areas like crest of the ridge , knife edge I have to relief it with wax ….

Conclusion : its **wrong** to displace tissues **all together** whether mildly or completely , I need to do selective pressure .

So the best way to do it is on the metal framework (Altered cast ).

The distal extension itself, we make for it a tray but we make it according to the selective pressure idea , close fitted on primary support area and spacing on sec. , proper border molding , make sure the framework is properly seated , take an impression whether with elastic or zinc oxide because it will automatically give the differential displacement needed .

**Questions :**

What does dual technique include ? anatomic and functional

Who was the first to introduce this technique ? Mclean followed by Hindels .

What do we use in clinics ? Altered cast technique.