Cons 4/ Crowns &Bridges sheet No. #8

No slides, but you can refer to chapter #14 in Contemporary fixed prosthodontics.

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Impression making and tissue displacement (part 2)

Impression is a negative likeness for the teeth and the surrounding tissues from which we can obtain the working cast.

Materials used to obtain the final impression for fixed prosthodontics are Elastomeric impression materials-Rubber materials-, (the two Silicone types, Polyether, Polysulfide) and Hydrocolloids.

\*\*\*We cannot use alginate. It’s dimensionally unstable, has low tear resistance, poor details production, and needs to be poured immediately.

Agar Agar is rarely used bcoz it needs special equipments and watercoolant, also it’s dimensionally unstable bcoz it’s a hydrocolloid.

Elastomeric materials can produce an accurate impression to be used in the fabrication of a good cast.

I have my preparation, the gingival retraction was done and now I can make my impression. After making the impression we can see the ‘cuff” of material around the finish line.

\*\*Important features for impression materials: (very important)

1. Tear resistance, means when I take the impression out I don’t want the margins to tear.
2. Dimensional stability, means that I can leave the impression without pouring for 2 days for example and it remains the same(it’s shape and size)
3. Elastic recovery means that once you take it out from the undercuts it returns the same as it was in the pt’s mouth.
4. Weather the material used is hydrophilic or hydrophobic. Hydrocolloids are hydrophilic.

These 4 are very important; they will make the differences between the different impression materials.

\*\*Impression materials:

1-Irreversible hydrocolloids:

Alginate distorts easily, has low tear resistance, and water goes in and out of it. If you put wet gauze on it it’ll resorb the water. You can put wet gauze inside a plastic bag and then put the Alginate impression inside so you can have a humid atmosphere-neither loss nor absorption of water-.

2-Reversible hydrocolloids; Agar Agar:

Hydrophilic, has low tear resistance and low dimensionalstability, and it should be poured immediately (maximum within 15 min) but you still can use it as impression material for fixed prosthodontics.

Now let’s talk about elastomers:

1- Polysulfide:

Discovered in 50s, it’s almost hydrophobic, it gives very good surface details, it’s brown in color, we don’t use it in JUH clinics, it has better dimensional stability and tear resistance than hydrocolloids, but in comparison with silicone and polyether it’s the least one. It has good details reproduction, its polymerization shrinkage is 0.5-1.5%, and should be poured within one hour. It has poor elastic recovery from deformation (if there is undercuts or the material in the tray is too much it will deform when you take the impression out and this would affect the cast)

We need our impression material to have a very good elastic recovery.

Polysulfide should be used with a custom tray, to reduce the volume of the material.

Disadvantages:

It has a very long working time and a very bad odor (sulfur), it sometimes remains 10- 15 min inside the pt’s mouth and this is too much. Also it should be poured immediately. It’s affected by humidity and temperature, when they increase, setting time decreases. Polysulfide is not tolerated by the pt. the nonpolymerzed material is very sticky and messy.

Polysulfide is the least expensive you may find some who still use it!

2-Condensation C-Silicone:

Some disadvantages of polysulfideare overcomed, setting time is 6-8 mins, its highly dependent on the amount of catalyst added to the base(catalyst and base are in 2 tubes and you don’t have to use equal amounts of both, putting a little bit more catalyst will enhance the setting reaction) C-Silicone is less affected by temperature and humidity, its polymerization shrinkage 0.3-0.6%, and it’s very hydrophobic, means that when you pour it no proper wetting on the stone will occur.Sometimesyou need to use a surfactant to enhance the pouring.

Disadvantages: dimensionally unstable, poured within one hour.

Polysulfide and C-Silicone are dimensionally unstable due to the reaction type which is polymerization that produces a byproduct at the end of the reaction, which is alcohol for C-silicone and water for polysulfide, evaporation of this byproduct will lead to dimensional contraction.

C-silicon a rubber material thus it has excellent elastic recovery, excellent details production, very good tear resistance, and without an odor.

Dr.Suzan said that she will make a tutorial for these materials in the Cr/Br lab before the end of the semester.

3-Polyether:

Very hydrophilic could be used where you can’t obtain 100% isolation, good accuracy, very short working time 3-5 mins, dimensionally stable, but has low tear resistance, and low elastic recovery.

It’s main disadvantage is the stiffness, it’s a rigid material means if we have severe undercuts around the preparation we shouldn’t use it bcoz separation or breakage would occur , It has an unpleasant taste, it’s the most expensive.

Polyether has a property which is called “snap set” means that the material changes from plastic to elastic while mixing suddenly (this provides better working time bcoz it stays in the same consistency) while in silicones transformation from plastic to elastic occurs with time.

4-Addition silicone, A-silicone:

It’s also called polyvinyl siloxane.

It’s the most commonly used bcoz it’s very accurate and very dimensionally stable, no polymerization byproduct, it has longer working time than C-silicone, 3-5 mins but both have the same setting time, it has the lowest polymerization shrinkage 0.05-1.6%, it can be poured up to one week but you better pour it ASAP (very dimensionally stable means you are safe but don’t delay the pouring), it’s hydrophobic, temperature sensitive means that increasing the temperature will decrease the setting time (significant change), it has high tear resistance and it’s less rigid than polyether, it has excellent and fast elastic recovery. You should mix it without gloves bcoz it contains sulfur and it will be affected by the latex, it has neither any taste nor any smell, and it’s expensive.

Addition silicone light and heavy bodies are chemically the same but they have different viscosities, light body is less viscous contains less fillers and has higher shrinkage. We use a very thin layer of light body silicone, it gives very good details.

\*\*Impression making:

You can use a stock tray or a special tray, heavy body acts as if it’s the special tray. You can use perforated trays; don’t forget to put an adhesive. Using a custom tray will increase the accuracy and reduces stresses during removal and reduces polymerization shrinkage.

\*Hydrocolloids impressions need bulk bcoz they have low tear resistance while elastomers don’t.

The dr said that we know tray requirements so she didn’t mention them.

\*Impression techniques:

3 main techs:

1. two stages (putty and wash)
2. Onestage (double mix)
3. monophase.

2 stages>> the first one is heavy body and the second is light body.

\*\* Putty and wash:

2 different colors, one heavy and one light body.

We take an impression with heavy body and after it sets we take the light body impression.

Steps:

1-Select the tray inside the pt’s mouth.

2- Apply adhesive and wait it 5 mins to evaporate.

3-Isolate your area.

4- Make the heavy body impression, it won’t reach the sulcus I want the light body to reach this area, we make heavy body impression while the retraction cord is in place. In heavy body we use equal amounts of base and catalyst, we mix them in our hands, we forma cylinder, we place the material inside the tray, don’t over fill to prevent deformation the tray itself will deform. Some manufacturers provide them already mixed but the mixed type is expensive.

5- Keep the tray inside the pt’s mouth and wait the setting.

Don’t depend on the excess material outside to check the setting bcoz inside the mouth temperature and humidity accelerate the setting. (The material becomes rigid doesn’t mean that the setting rxn is done.)

6- make the light body impression, after you trim the excess heavy body to provide space for the light body, you also trim out interdental tags bcoz they will prevent seating of the light body, we need our impression to sit passively in the mouth.

Sometimes we make escape channels through which excess light body goes out. Before making the impression the retracted sulcus is washed and dried and you should prevent touching the teeth with latex gloves bcoz this will affect the setting.

You start injecting the material from the most distal embrasure.

In JUH clinics we use an auto mixing device (gun) with a small tip for injection. You have to inject the light body all around the heavy body impression not only around the preparation.

7-snap removing the impression and inspect it, it should be accurate.

\*\*One stage double mix:

I need an assistant to mix the heavy body and place it in the tray and I put the light body, both heavy and light body are placed inside the mouth at the same time, this tech is recommended with A-silicone and polyether, bcoz they have high dimensional stability and lower shrinkage.

Apply the same steps (tray selection, placement … etc.).

\*\*monophase:

You use one consistency, one color, medium (regular) body. Used in impressions for implants, and removable prosthodontics.

Custom tray is recommended to reduce volume.

\*Evaluation of the impression:

Good finish line with no bubbles nor interruption and there is a cuff of the material (registering 1-2 mm beyond the finish line)

Errors:

1. Streaks mean that the mixing was improper and incomplete.
2. Separation from the tray bcoz you didn’t use the adhesive.
3. Voids due to improper retraction or improper light body injection.
4. Tearing due to inadequate gingival retraction, or pre mature removal.
5. Exposure of the tray, due to improper tray selection or excessive pressure.
6. Inaccurate details due to inadequate retraction or oversetting of the material before insertion inside the mouth.
7. Decreased flowability occurs when you keep mixing for a longer time.
8. Bubble formation.

After evaluating your impression you need to disinfect it. Wash it with water before disinfection thus you will eliminate 95% of whatever there is. Disinfection is either by immersion or spray.

-Disinfection of hydrophilic materials (polyether) is by spray; don’t soak them in the disinfectant.

-Sodium hypochlorite is the best disinfectant, dilution 1:10 for 10-30 mins.

-You can use gluteraldehyde, phenolic compounds or iodophores.Iodophore with polyether is not compatible. Elastomers are disinfected by immersion, put them inside the bath.

The dr at the end of the lecture showed the equipments used for hydrocolloids impression. They’re converted from solid to gel and this transformation depends on the temperature, the setting starts from outside to inside while in elastomers it occurs from inside to outside.

*“A good impression is not taken; it’s made by the Dentist”*

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Sorry if there is any mistakes, feel free to contact me for asking.

Good luck.