**Cons sheet #17**

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Last lecture we discussed direct composite veneers, and porcelain laminate veneers (PLVs) and their indications, now we’re going to start with their contraindications.

* PLV contraindications:
1. Lost enamel due to caries, restoration, erosions, malformation in enamel structure like amelogenesis imperfect or dentinogenesis imperfecta.
2. Badly damaged teeth structure.
3. Teeth with extensive stresses like bruxism.
4. Teeth with severe discolouration you cannot solve with veneers.
5. Poor oral hygiene. (patient selection is very important).
* Tooth preparation
* To prepare or not to prepare. To choose the intra-enamel preparations or the laminate (prep-less) veneers?
1. The advocates who prefer tooth preparations argue the bulkiness of the restoration. We don’t want a bulky over contoured restoration, since over contouring affects the periodontal health and aesthetics.
2. The advocates who prefer the laminate/prep-less veneers argue the more conservative approach of not preparing the tooth, and the fact that it stays a reversible process, and that the veneers are too thin to be over contoured or to compromise periodontal health.
* The preparation approach is better for multiple reasons:
* Studies have shown that cementing veneers without tooth preparation does not increase the risk of developing gingival problems because the veneers are very thin and won’t cause any problems.
* Most clinicians prefer preparing the tooth because it results in:
1. Stress reduction inside the restoration.
2. Gives a space for the resin and for the restoration to be adapted without over contouring.
3. Facilitates the positioning of the veneer. (easier to position)
4. Facilitates the cementation.
5. Tooth preparation removes aprismatic hypermineralized enamel layer which can be resistant to acid etching increasing the bond strength on prepared enamel.
* Tooth preparation for PLV:
* 3 basic designs:
1. Intra-enamel tooth preparation (window design)
2. Feathered (beveled) incisal edge preparation
3. Butt preparation (a flat edge)
4. Overlapped incisal edge preparation which is prepared using a chamfer bur palatally.
* Cervically the preparation should be very thin using a chamfer.
* Preparation is best kept in the enamel. And hence the name intraenamel preparation for a veneer.
* The thickness varies between 0.3 mm (at the gingival margin due to the reduced thickness of enamel) to 0.7 mm elsewhere, depending on the enamel thickness already present and the amount we need to remove.
* Supra- or equi- gingival finish line, there is no need to make it sub-gingival because the veneer is so fine and thin it doesn’t require a subgingival preparation. And a subgingival finish line will make your impression and cementation difficult.
* Round internal angles to release any potential stress propagation that will affect the ceramic material
* Chamfer finish line.
* Proximal extension labial to contact point because it’s best kept natural. And extending the veneer beyond the labio-proximal line angle will close the diastema.
* No undercuts.

Window design:

* Not used any more.
* Inferior in terms of aesthetics
* Theoretically it’s the **strongest design** (followed by the feather edge and finally the overlapped design), no contact or stresses on the restoration.
* Porcelain is the weakest link in the system. So if you’re seeking strength this design is the strongest. But it’s outdated now.

Feather edge design

* Covers the labial surface of the incisal edge.
* Not very preferred because of the stress.
* Not indicated when incisal edge elongation is wanted.
* Not the best aesthetics but good.

Overlapped incisal edge design

* Most common.
* One of choice of desirable crown elongation
* Reduces stress by increasing the surface area.
* Protects the luting resin from occlusion contacts.

\*\*Important notes:

* Even with minimal preparation large area of exposed dentine especially in cervical parts were found.
* Exposed dentine is the weakest link in PLV, the more exposed dentine there is the more the durability and life time of the veneer becomes questionable.
* The best veneer longevity is with the least dentine exposure, we want the enamel to cover at least 90% of the surface.
* The vulnerable area for leakage is the dentine-composite interface.
* All the margins on the veneer are best kept enamel for better bonding.
* Chamfer finish line always.
* Tooth preparation:
* Facial reduction using the guiding preparation burs.
* Remove the tooth structure in between using a high speed diamond chamfer bur.
* Proximal reduction, make sure that you have a smooth and continuous chamfer up to the contact point without breaking it.
* **Chamfer finish line.**
* When multiple veneers are required and contact points are to be broken it is done using metal strips.
* The Incisal reduction is the same as in the preparation of a full coverage crown; create depth orientation grooves of 0.5 mm and then join them together, then remove the tooth structure in between.
* Lingual reduction, create a lingual chamfer with a round end tapered diamond bur, holding it parallel to the lingual surface.
* Finish the surface with a finishing bur just to remove any sharp edges.
* Always when preparing a tooth keep your bur parallel to the surfaces you are preparing.
* Finally we are ready to take the impression; we take it using any of the materials that we know. Sometimes we use retraction cords if we feel that our finish line is slightly subgingival.
* Temporization:
* Do we need to temporize? Most of the cases we don’t need temporization since it’s an intraenamel preparation that is sometimes even done without anesthesia and the patient is not left with increased sensitivity.
* Sometimes we temporize when the patient is left with an unaesthetic appearance.
* We do temporization in the case of veneers to give the patient an idea about the final restoration.
* We make wax up and a vacuum sheet and we use direct composite or bisacryl.
* We have to keep in mind that we can’t is a cement that has eugenol. We use non eugenol containing cement, and sometime we don’t even use cement.
* Temporization is important especially in lower teeth, since we fear movement of teeth after preparation there.
* Materials we use: Cold acryl, bisacryl, direct composite.
* We make it using an index or directly.
* Sometimes we use spot itching and then we apply our composite, it will bind. This is easier for us and we won’t risk using something that has eugenol.
* How do they do veneers?
* In the past it was done using a platinum foil that was placed on the die and then the porcelain was built on it.
* Now we use refractory die technique; now we have materials that can withstand high temperatures and can be placed in the oven without any problems. The problem here is removing your porcelain of the stone. We use grind blasting; sand blasting using aluminum oxide particles to remove any impurities (remove stuck stone particles).
* Casted veneers: we use wax then the wax is changed into ceramic (impress: pressable ceramics). Excellent adaptation.

The problem with impress since it’s a castable material it’s monochromatic. This can be solved by staining.

* CAD/CAM technique: blocks of ceramic that we cut into veneers.
* What types of materials that we can use for veneers?
* We can’t use zircon for veneers since it’s not esthetic and it doesn’t bond properly to teeth.
* We can use:
1. Feldispathic porcelain (highly esthetic but brittle).
2. Impress.

2 types: impress 1, impress 2. (Lucite reinforced and lithium disilicate reinforced).

* As the discoloration increases, the opacity of your porcelain must increase, the color of the cement must be more opaque and the depth of the preparation must increase to be able to mask the color of the prepared tooth.
* Veneers cementation:

Cementation of veneers is the most important step that affects durability and strength:

* We use light cure resin cement.
* Light cure because:
1. The veneer layer is thin so light can easily go through it.
2. We don’t use chemical cure or dual cure because we don’t want discoloration to happen due to tertiary amines.
* We have to prepare our tooth and veneer and apply cement in between:
1. Tooth surface has to be prepared as if we are using composite: we itch using phosphoric acid then we apply bonding agent and we cure it.
2. Porcelain:
3. Itch using 9.5-10% hydrofluoric acid for ( 90 seconds with feldispathic porcelain, 60 seconds with impress 1 and 20 seconds with impress 2).

Itching your surface increases surface area for bonding and increases wettability and it also cleans your fitting surface.

1. You rinse as much as you itch.
2. Then it has to be silenated (apply silane) to be able to achieve a chemical bond between the porcelain and the risen cement.

 (silane bonds the organic materials to inorganic materials).

Some people apply heat to the silane coupling agent to increase its reactivity. Heat evaporates the excess solvent.

Here we use glass ceramic materials since they contain silica that will be itched out in the itching step.

1. Now we try the veneer inside patient’s mouth, the porcelain is already coated with the coupling agent so now you can simply wipe it with acetone and cement it.

The doctor likes to try the veneer and then prepare the fitting surface.

* The bond between the porcelain and tooth structure is responsible for the strength and durability of the veneer.
* You can never use a bonding agent instead of cement. Why?
1. It has inferior properties.
2. Increased incidence of debonding.
3. Increased incidence of leakage.
* Never forget to use mylar strep during cementation because if resin cement gets between teeth it can never be removed after curing. We can also use tiflon.
* How do we remove excess?
* We cure the cement for a couple of seconds then we remove the excess using floss (before complete setting).
* Sometimes we use a blade to remove whatever excess is left after the previous step, but we should be very careful.
* We finish using fine grid diamond bur, and then polishing.
* To open a contact that has been closed by cured cement we might use ortho metal streps.
* Veneers cementation is very technique sensitive.
* Veneers try in:
* Very hard, we use PIP to find high pressure areas and remove then. This is rarely done in veneers since they are a thin layer of porcelain so it either fits or it doesn’t. But try in is still acceptable.
* We ask the patient not to move at all during try in because the veneer with move if he does.
* Occlusal adjustments are done after cementation.