

/ Preventive Dentistry
5th Year- Dental Students
Al- Isra'a University
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Lec12: Pits and Fissure Sealants (2)

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General technique for sealant application: The preliminary steps for light-activated and the auto-activated resins are similar involve:

- 1- ***Cleaning***: All heavy stains, deposits, debris and plaque should be removed. After cleaning the occlusal surface.
- 2- ***Isolation of teeth***: Better to use rubber dam for isolation. However, dry field can be achieved by cotton rolls or bibulous pads, in combination with vacuum aspirator. Improper isolation may have a deleterious effect on the ultimate bond between tooth surface and sealants.
- 3- ***Dryness by air*** for at least 10 seconds.
- 4- ***Conditioner/acid etch*** (according to manufacture recommendation for time): Usually 35% phosphoric acid (liquid or gel form) is applied to create micro-porosities within enamel surfaces after application of sealants. Acid etch is applied to all susceptible pits and fissures of the selected tooth and extended it up to the cuspal inclines well beyond the anticipated margin of sealants (at least 2 mm).

Then surface should be rinsed thoroughly with water (at least 10 seconds) then dried (at least 10 seconds). The appearance of the enamel by the tooth conditioner/etchant should appear as white, dull, and chalky. If the enamel does not appear white and chalky, tooth conditioner is reapplied according to manufacturer instructions. Dry thoroughly before sealant application. Any droplet of water need to be dried, and avoid contamination with saliva; as the organic constituents of saliva interpose a barrier between tooth surface and sealant.

Note: If by any chance an etched surface is not covered by a sealant, or poor sealant retention ever present; the normal appearance of enamel returns to normal with one hour to a few weeks. Tooth will re-mineralize again from salivary constituents.

5- **Application of sealants:** All pits and fissures to be filled and the material brought to a knife-edge approximately halfway-up the inclined plane of the cusp ridge. Any bubbles must be broken before polymerization to prevent a defect. Polymerize is achieved with either auto-polymerization or a curing light (Follow manufacturer directions for time).

Note: If any voids are evident additional sealant are added without the need for any additional etching.

6- **Checking the sealant** with an explorer for proper placement (retention) and polymerization. For filled type sealants check occlusion with articulating paper and check interproximal contacts with floss. If sealant material is present interproximal, use a scaler to remove excess. If occlusion is high, use a slow-speed rotary bur such as a no. 4 or 8 round bur. Recheck the occlusion again.

7- **Recall** (re- evaluation): Sealants should be checked at each dental examination for retention in the first 3 months, then every 6 months. In presence of leakage re - sealing must be done.



Requisites for Sealant Retention: There are four commandments for successful sealants placement;

1- ***Surface cleanliness:*** Important for removal of heavy stain, deposit and debris. The slurry (pumice) must be non- fluoridated, oil free mixture to avoid contamination with the tooth.

2- ***Tooth have deep, irregular pits and fissures:*** Deep irregular pits and fissures provide a favorable surface contour for sealant retention compared with broad shallow fossa. Further it protect the plastic sealant from shear - force that's occur by masticatory movement.

Note: *Deep pits and fissure may increase the caries potential thus increasing the potential for sealants retention.*

3- ***Tooth Have a maximum surface area:*** Sealants do not bound directly to tooth surface but rather retained by adhesive forces. In order to increase the surface area thus the adhesive potential, tooth conditioners (; etchant) are placed, prior to application of sealants. It composed of 30 – 50% concentration phosphoric acid. Etchants may be in liquid or gel form. In another word; acid etch increases the surface area thus increase the adhesive potential.

4- ***Dryness:*** Teeth must be dry at the time of sealant placement, to remove any moisture, to remove any barrier between tooth surface and sealants.

Factors Affecting Sealants Retention: The longevity of sealants coverage (; clinical retention) is considered the measure of success. Studies showed that the highest rate of sealants are lost in the first year following the placements. Many factors affect the sealant retention these are:

- 1- *Types of sealants:* according to different generation of sealants and adhesive system.
- 2- *Type and Position of teeth* in the mouth: Retention of sealants on first molars are better than second molars. Mandibular teeth have better retention compared to maxillary, due to better accessibility and direct vision when placement of sealants. Further, the gravity aids in flow of sealant better than maxillary teeth.
- 3- *Clinical skill* of the operator.
- 4- *Age of the child:* affecting the behavior of the child in the clinic thus proper procedure as dryness of teeth.

5- *Eruption status of teeth*: sealing molars at an early stage provide good protection. Sealants are retained better recently erupted teeth than in teeth with more mature surfaces.

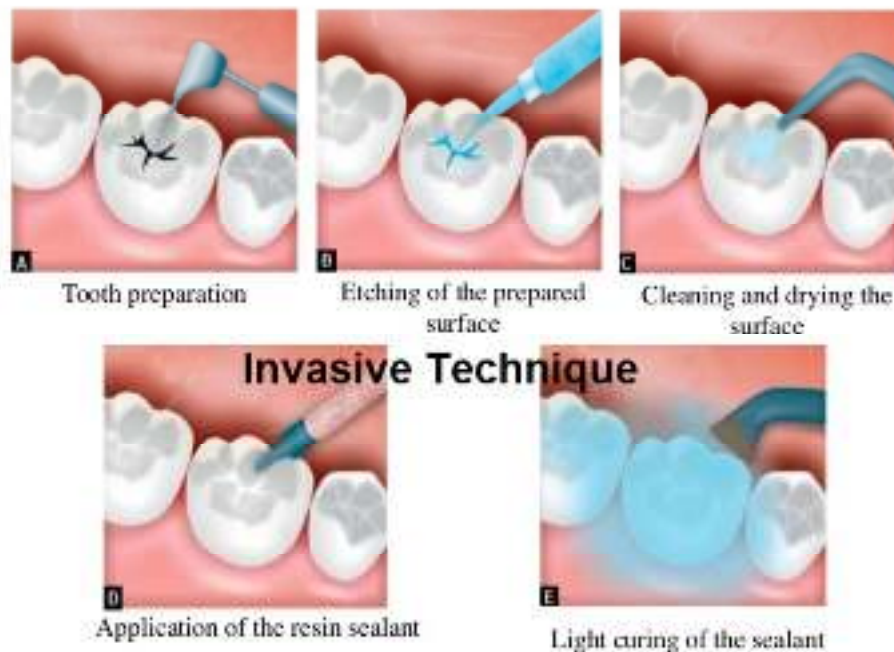
Sealants may be lost within years require the replacement. Thus recall is important. Studies showed that teeth with lost sealants develop less caries compared to non -sealed teeth may be attributed to the presence of tags that retained in the enamels following loss of sealants.

Placements of sealants over carious teeth:

Sealing incipient lesion in pits and fissure was recorded to decrease the viable counts of bacteria, due to effective elimination of the nutritional source by the impenetrable marginal seal. This greatly depends of the retention of the sealants. Sealant can be used in presence of initial caries in an invasive technique, where the fissure are widened with a small bur before placement of the sealants.

The advantage of this technique involve;

- The ability to diagnose the extent of the carious lesion if present.
- Provide a higher retention rates for sealants following mechanical preparation of the fissure area.
- Reduced risk of micro- leakage when fissure are enlarged.



Preventive Resin Restoration (PRR):

In a presence of active caries a restoration for teeth is needed. The conventional way is by removal of carious tissue of enamel and dentine, while the intact other fissures in the same tooth are opened for prevention. This philosophy is known *as extension for prevention*.

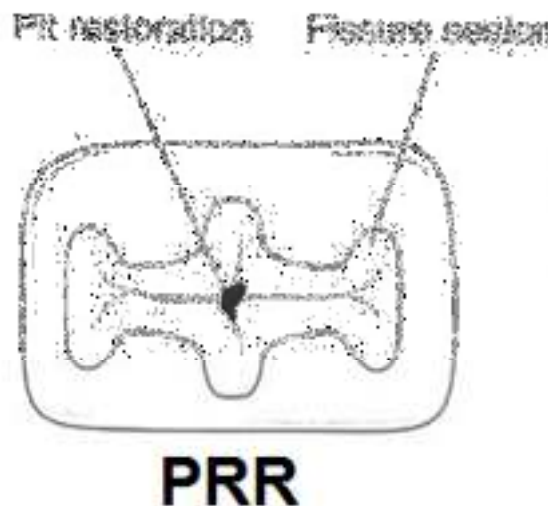
The PRR, is a technique consists of *removal of carious tissue* and instead of cutting sound enamel, *sealants are allowed to flow* into adjacent caries-susceptible areas to seal them from oral environments. It is a preventive measures combined between pits and fissure sealants and fissure caries filling.

The objective of this technique:

- 1- Is the prevention of secondary caries attack.
- 2- Minimal loss of tooth structure.

Procedure:

- 1- Removal of active- caries in affected area only by hand piece.
- 2- Application of a bonding resin restorative material (resin composite restoration or glass ionomer cement).
- 3- Covering all restorative material and any remaining fissured anatomy by sealants.



Sealants for proximal enamel surfaces:

The concept of sealing the proximal enamel lesion can be considered to be an extension of fissure sealing. If it is possible to etch occlusal enamel then it is possible to etch and seal proximal enamel and increase its stability in cariogenic environments. This technique was proposed as a treatment for non-cavitated incipient lesions on proximal surfaces.

The proximal sealant technique is likely to be suitable for the primary dentition as the progression of enamel caries into dentine occurs relatively quickly, and the timely placement of sealants can halt progression of the lesions. The technique requires first *separation of the teeth prior to placement of the sealants* (in two appointments) and *the need for repeated radiographs at initial and periodic examinations* to check for progression of the lesions. These may be difficult to be achieved in young children. An alternative method would be to seal the teeth while it is possible to gain access to the proximal smooth surfaces before the contacts with adjacent teeth are established.



Appendix

- The need and method for cleaning tooth surface prior to sealant placement are controversial. Some suggest that acid etching alone is sufficient for surface cleaning, while the others advice proper cleaning of surfaces.
- **Cleaning of tooth surface** prior to placement of sealant is by the use of fluoridated or non-fluoridate prophylaxis paste the to be treated with acid etch. As some reported that fluoride will net affect the bound of sealants.
- **Dis advantage of the rubber dam** during sealant placement include; discomfort during clamp placement, need for local anesthesia, difficulty in placement of clump if the tooth is partially erupted, it is technically not feasible to place rubber dam when different quadrants of mouth are selected to place sealants.
- **Acid etch used** is usually phosphoric acid 37% for 20 second. If the tooth was treated with fluoride the another 15 second is added to compensate for greater acid resistance of the enamel.
- Liquid form acid etch is much easier to be applied using sponge or cotton pledged. Continue to apply acid etch throughout the etchant time. While the gel form is applied by a supplied syringe and left undisturbed for all of time. Both liquid and gel form are equal in abetting retention.
- When drying tooth surface before application of sealant be careful that the air stream is not moisture- laden.
- In application of sealant, material should not only fill the fissures but should have some bulk over the fissures.
- In sealing over carious lesion, studies showed that lesion will not progress for as long as 3- 5 years.