

PIT AND FISSURE SEALANTS

PREVENTION OF DENTAL CARIES
DEN 2318

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Dental Sealants



CATEGORIZATION OF PIT AND FISSURE SEALANTS

- A) Resin Sealants
- B) Glass Ionomer Sealants

What is in a Resin Restoration?

- 1) Resin Matrix: Bis-GMA, UDMA, TEGDMA
- 2) Filler Particles (Glass, Quartz, Silica)
- 3) Coupling Agent: Silane (Allows Resin Matrix to Bond to the Filler Particles)
- 4) Photoinitiator: Camphorquinone (starts the reaction)

What's different between a Resin Composite and a Resin Sealant?

1) Resin Matrix: Bis-GMA, UDMA, TEGDMA
Sealants are mostly unfilled resin

2) Filler Particles (Glass, Quartz, Silica)
Sealants have minimal or no Filler Particles

3) Coupling Agent: Silane (Allows Resin Matrix to Bond to the Filler Particles)

4) Photoinitiator: Camphorquinone (starts the reaction)

General Properties of Resin Restorations

- Micromechanical Bond
- Polymerization Reaction
- Shrink When Setting
- High Bond Strength
- Stronger Physical Properties
- No Fluoride Release
- Very Technique Sensitive
- Sets immediately once cured with light

As sealants are mostly unfilled resin with minimal or no filler particles, they will exhibit more polymerization shrinkage and weaker physical properties

TYPES OF RESIN SEALANTS

Filler:

a. Filled (more viscous):

- Glass or Quartz particles – increase the strength and resistance to wear forces

b. Unfilled:

- clear and less resistant to wear

c. Color:

- clear, tinted, or opaque
- colored sealants is quick identification for evaluation

Resin Sealant Polymerization: Photo or light cure

Advantages:

- No mixing
- Setting time controlled by operator
- Stronger Bond Strength

Disadvantages:

- Expensive to have light devices
- Proper care of light devices
- Moisture contamination significant inhibits sealant success
- No Fluoride Release

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Glass Ionomer Properties

- Chemical Bond
- Acid Base Reaction
- Releases Fluoride
- Lower Bond Strength than Resin Composite
- Not as strong as a Resin Composite
- Doesn't polish as nicely as a Resin Composite
- Not Technique sensitive
- Self Cure: Sets 1-2 minutes after placement
- Fluoride Release makes GI an excellent restorative material in Pediatric and Geriatric Patients



Glass Ionomer Acid Base Reaction: Auto or self-cure:

Advantages:

- Simplicity/No light needed
- Greater wettability
- Fluoride Releasing
- More resistant to moisture

Disadvantages:

- Longer Setting Time
- Operator cannot control the
- Weaker Bond Strength

setting time

Types of Sealants

Resin Sealant

- Similar to a Flowable Composite
- High Resin/ very low Filler content
- Better Bond to Tooth
- No Fluoride Release
- Must Etch Tooth First
- Light Cure
- Will Fail if Moisture Contamination

Glass Ionomer Sealant

- Weaker Bond to Tooth
- Fluoride Release
- Self Cure (takes longer to set)
- More Tolerant of Moisture Contamination

LIGHT- AND SELF-CURE DENTAL SEALANTS

- Pulpdent Seal-Rite
- Resin Sealant
- Light Cure
- Fuji Triage
- Glass Ionomer Sealant
- Chemical Cure



INDICATIONS FOR FISSURE SEALANTS

- Narrow, deep pits or fissures
- High caries risk individuals
- Newly erupted teeth

* Coalescence =
joining of 2 lobes



CONTRAINDICATIONS

- Active caries
- Self cleansing pits and fissures
- Low caries risk individuals
- Caries free for 4 years after eruption
- Uncooperative Patient
- Unable to adequately Isolate
- Teeth that already restorations



Sealant/Resin Composite Considerations

- Fluoride Inhibits Bonding between Resin and tooth Structure
- DO NOT use products with Fluoride prior to Resin Sealants/Restorations
 - This includes Fluoride Varnish and Prophy Paste
- **DO NOT engine polish with prophy paste before placing a sealant.**

**DO NOT ENGINE POLISH
WITH PROPHY PASTE OR
PEFORM ANY FLUORIDE
THERAPY PRIOR TO
PLACING SEALANTS.**

**FLUORIDE INHIBITS THE
BOND STRENGTH AND YOUR
SEALANTS WILL FAIL.**

TYPES OF ETCHANT



TYPES OF ETCHANT

Liquid Form

Pros:

- Better flow
- Greater wetting ability

Cons:

- More likely to get onto the tongue or gingival tissue
- Terrible taste
- Will irritate gingiva

TYPES OF ETCHANT

Gel Form

Pros:

More popular because the gel stays in place, more viscous

Cons:

Needs to be rinsed longer

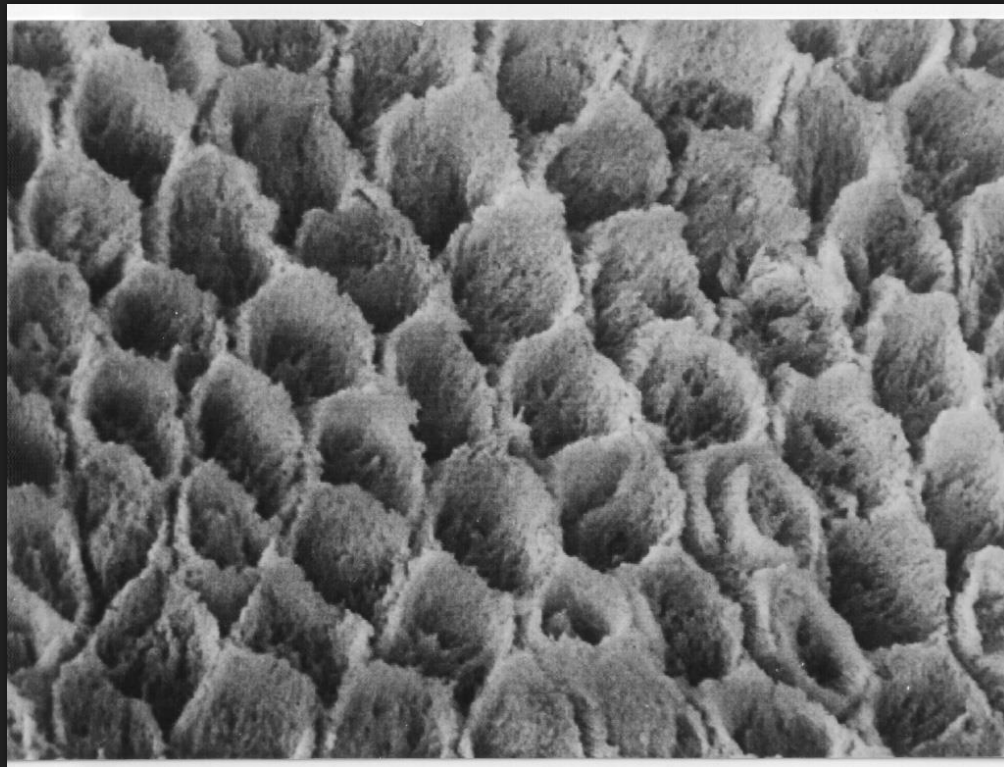
ACID ETCHING OR CONDITIONING TECHNIQUE

- To improve the seal of resin restorations by treating margins with 15% to 50% concentration of phosphoric acid before inserting the resin filling material

ACID ETCHING OR CONDITIONING TECHNIQUE

- By treating with acid, enamel surfaces will have microporosities. When the resin is placed on the etched surface, resin will flow into those porosities and form **resin tags** to lock-in the sealant material.

Effect of Acid Etchants on Enamel and Dentin



ACID ETCHING OR CONDITIONING TECHNIQUE

- Acid etching creates a larger surface on the enamel for bonding to resin
- This results in increased micromechanical bond between resin and enamel.

ACID ETCHING OR CONDITIONING TECHNIQUE

- Etched area must be kept clean and free of moisture until sealant material has been applied and cured.
- Re-etch the area again if it is contaminated by saliva.

Appearance of Etched Enamel

1. An adequately etched surface will have a dull, chalky white, opaque appearance.

2. If this appearance is not evident or if there is saliva contamination, re-etch the surface by using the same procedure.



ACID ETCHING OR CONDITIONING TECHNIQUE

The most common reason for dental sealant failure is saliva contamination.

Resin Sealant Technique:

- 1) Isolation (Rubber Dam or Cotton Rolls w/ Dry Angels).
- 2) Pumice tooth and rinse
- 3) Etch for 20 seconds, then rinse. Dry until frosty enamel present
- 4) Place resin sealant and light cure.
- 5) Check margins
- 6) Floss interproximal on distal and mesial
- 7) Check occlusion with articulating paper

PROPER SEQUENCE FOR PLACING DENTAL SEALANTS

Pumice → Etch → Rinse →
Dry → Place Sealant
→ Light Cure → Floss →
Check Occlusion

Isolation



Resin Sealant Step 1: Pumice

Pumice Powder



Fine

200g

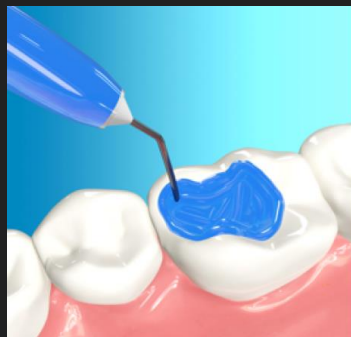


Resin Sealant

Step 2: Phosphoric Acid

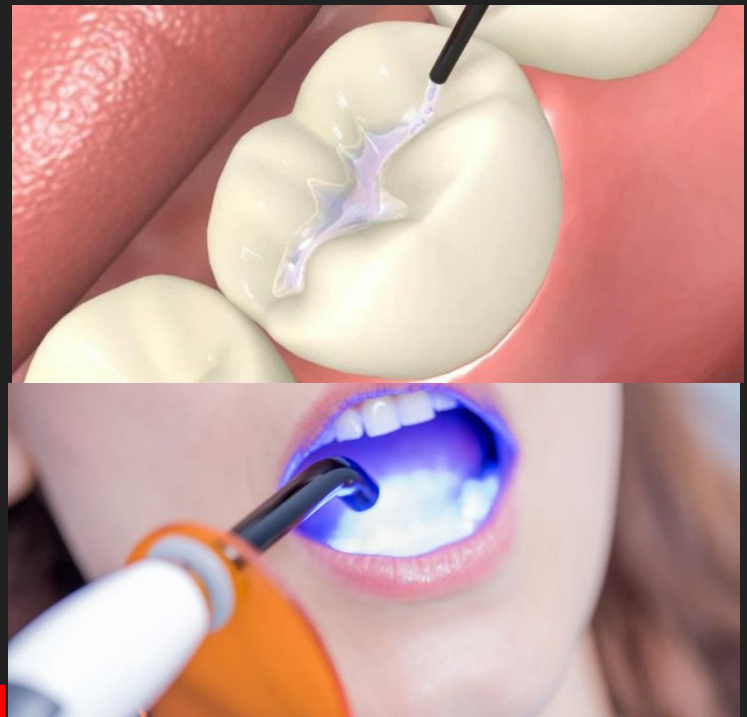
Etch Enamel (and rinse and then dry)

The Phosphoric Acid Etch “opens” the enamel rods. The gel is left on the tooth's surface for about 20 to 30 seconds, and this controlled erosion it creates gives the smooth enamel surface a frosty appearance.



Step 3: Place Resin Sealant (and light cure)

- After dispensing sealant onto tooth, while it is still in liquid phase, run your explorer through all of the grooves to make sure that the sealant flows into all the deep fissures that we want to seal.
- This also helps to eliminate voids.
- **DO NOT PLACE TOO MUCH SEALANT MATERIAL. Only use enough sealant material to fill the pits and fissures!!**



Check Margins and Occlusion

- Check margins with explorer to make sure you cannot debond (“pop out”) sealant
- Unfilled sealants will wear easily, and occlusal adjustment at the time of placement is usually unnecessary. This applies to the GI sealants as well.
- Occlusal adjustment when filled sealants are being used requires articulating paper
 - a. After using articulating paper, note any markings on the sealants.
 - b. Remove any markings with a hand scaler

ADA Statement on Bisphenol A and Dental Materials

<http://www.ada.org/en/member-center/oral-health-topics/dental-sealants>

Reviewed by: Caries Workgroup, ADA Council on Scientific Affairs

Topic last updated: October 19, 2016

- Although dental materials used to treat and prevent caries, including dental sealants, can contribute to very low level bisphenol A (BPA) exposure for a few hours after placement, based on current evidence, there is **no** health concern relative to BPA exposure from any dental material.

Source: ADA Professional Product Review, August 2016

SEALANTS ARE SAFE



Source: ADA Professional Product Review, August 2016.

ADA.

The American Academy of Pediatric Dentistry compiled the following list of BPA-free dental sealants and the manufacturer

- Aegis (Bosworth)
- Clinpro (3M ESPE)
- Conseal F (Southern Dental Industries)
- Conseal Sealant (Southern Dental Industries)
- Delton Light Cure (Dentsply Professional)
- Delton (Dentsply Professional)
- Ecuseal (Zenith)
- Embrace Wet Bond (Pulpdent Corporation)
- Fluroshield (Dentsply Caulk)
- Fuji Triage Glass Ionomer (GC America, Inc.)
- Guardian Seal (Kerr Corp.)
- Helioseal F (Vivadent)
- Helioseal (Ivoclar Vivadent)
- LC (Dentonics)
- Natural Elegance (Henry Schein Inc.)
- Pit & Fissure Sealant Kit (Carlisle)
- Prisma-Shield (Dentsply)
- Riva Protect Glass Ionomer (Southern Dental Industries)
- Sealant (Bisco)
- Seal-Rite (Pulpdent)
- UltraSeal XT plus (Ultradent Products, Inc.).

The End