33 Pit and Fissure Sealants

CM Marya

Over the last few decades, several advancements have been made in caries prevention. Along with systemic and topical fluoride, the increased acceptance and use of pit and fissure sealants have without question had an impact on the prevention of caries.

Fluorides have been found extremely effective in preventing caries on smooth surfaces of the teeth, but less effective on occlusal surfaces. Sealants protect the occlusal surfaces, inhibiting bacterial growth and providing a smooth surface that increases the probability that the surface will stay clean.

It has been documented for decades that sealants are safe, effective, and underused. The latest data available indicate that in the United States only 15 percent of children aged 6–17 years have dental sealants (Cherry-Peppers G, Gift HC, Brunelle JA, Snowden CB. 1995). Gonzalez CD, 1996 report indicates just 10 percent of the sample had sealants on their permanent molars. Why there is underusage of a proven preventive material is hard to explain. Dentists continue to identify lack of insurance coverage for sealant application as a major barrier to patients receiving the service.

CLASSIFICATION OF PITS AND FISSURES (FIG. 33.1)

Nagano classified occlusal fissure into five types on the basis of fissure morphology: V, U, Y, I, IK types.

A pit and fissure sealant is an organic polymer (resin) that flows into the pit and fissures and bonds to the enamel surface mainly by mechanical retention.

Majority of sealants are made of Bis-GMA (Bisphenol A-glycidyl methylacrylate).

PURPOSE OF SEALANT

1. To provide physical barrier to seal off the pit or fissure.
2. To prevent the bacteria and their nutrients from collecting within the pits or fissures to create the acid environment necessary for the initiation of dental caries.

CRITERIA FOR THE IDEAL SEALANT

1. A viscosity allowing penetration into deep and narrow fissures even in maxillary teeth.
2. Adequate working time.
3. Rapid cure.
4. Good and prolonged adhesion/bonding to enamel.
5. Low sorption and solubility.
6. Resistance to wear.
7. Be compatible with the oral tissues (minimum irritation to tissues).
8. Cariostatic action.

Types of Sealants

A. Based on generation (Figs 33.2 to 33.5)

1. Generation 1 Sealant (photocured via UV light).
2. Generation 2 Sealant (auto or chemically-cured).
3. Generation 3 Sealant (photocured via visible light).
4. Fluoride containing sealants.

B. Based on fillers

1. Unfilled.
2. Filled sealant (fillers increase abrasion resistance, bond strength).

   Fillers: glass and quartz particles.
3. Fluoride –Releasing.

C. Based on Color

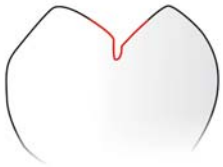
Helps in quick identification for evaluation during maintenance assessment:

1. Clear: Esthetic but difficult to detect in follow-up (Fig. 33.6).
2. Tinted/opaque sealant: easy to detect.

D. BIS-GMA *versus* non BIS-GMA sealant

U Type : Almost the same width from top

V Type: Wide at top and gradually narrowing at base



I Type: Extremely narrow slit

IK Type: Extremely narrow slit with a larger space at bottom

Inverted Y

Fig. 33.1: Types of fissure

Fig. 33.2: UV-light cured (1st generation) pit and fissure sealant

Fig. 33.3: Self/autocure (2nd generation) sealants

Types of pit and fissure sealants

Based on	*Types*	*Characteristics*
Generations	1. First generation sealants	1. Photo-cured via UV light
	2. Second generation sealants	2. Auto- or chemically cured.
	3. Third generation sealants	3. Photo-cured via visible light.
	4. Fluoride containing sealants	4. Double protection.
Fillers	Unfilled	1. Flow is better.
	Filled	2. More resistant to wear.
Color of the sealants	1. Clear	1. Esthetic, but difficult to detect on recall visits.
	2. Tinted	2. Can be easily identified.
	3. Opaque	3. Can be easily identified.

Fig. 33.4: Visible light-cured (3rd generation) sealants

Fig. 33.5: Fluoride containing (4th generation) sealants

Fig. 33.6: Clear pit and fissure sealants

Advantages and disadvantages of the chemically-cured and light-cured sealant systems

	Advantages	*Disadvantages*
Self-cure:	1. Simple to use 2. Less expensive—does not require additional equipment	1. Once mixing has started, the operator must continue mixing and immediately place the sealant, or stop and make a new mix if a problem should occur. 2. The catalyst and base must be mixed prior to placement, increasing the chance of incorporating air bubbles into final product.
Light-cure:	1. Operator has control over the initiation of polymerization 2. Supplied as single liquid so no mixing is required.	1. Requires extra-piece of equipment that can break down. 2. High cost of curing light and shorter shelf-life of material.

RATIONALE FOR USING PIT AND FISSURE SEALANTS

1. **A very high proportion of dental decay occurs in pits and fissures**
   The change in the pattern of caries in recent years is such that it now principally involves the pits and fissures of molar teeth in children and adolescents. Recent data shows that the relative proportion of pit and fissure lesions has increased to 84 percent of the total new caries experience.
2. **Pits and fissures remain at risk of caries for long periods of time, not just within the first few years after eruption.**
   The period of caries susceptibility has extended due to a slowing of the rate of progression of dental caries. Hence, the theory that teeth should be sealed within two years after eruption needs to be reconsidered.
3. **Fluoride has limited effect in preventing pit and fissure caries.**
   The effect of systemic or topical fluorides in preventing dental caries is noted principally on the smooth surfaces of teeth; the effect on pit and fissure caries is relatively small. Even with optional fluoride therapy, pit and fissure caries may be delayed, but not prevented, on the same scale as smooth-surface lesions. Approximately 1 mm of enamel is present on smooth surfaces, whereas the base of a fissure may be close to, or even lie within dentine.
   Thus in the event of fissure caries, the underlying dentine becomes rapidly involved, while on a smooth surface it may take 3–4 years for a lesion to penetrate into dentine. Hence, the inclusion of pit and fissure sealants forms an important part of any caries control program because it is intended for those caries-susceptible areas least benefited by fluoride.
4. **Fissure sealants are effective at preventing pit and fissure caries and are best used as part of an overall preventive program.**
   The British Society of Pediatric Dentistry (2000) has stated that "Sealants are highly effective in preventing dental caries in pits and fissures of teeth when applied by trained operators in clinical trials and community health programs. When used appropriately, sealants result in improvements in oral health but their use on all occlusal tooth surfaces for preventive reasons will result in wastage of scarce resources". Sealing of pits and fissures in all patients may be considered to be ideal treatment and is justified for all patients classified as "high risk". However, financial and other constraints demand that guidelines for patient and tooth selection should be established.

PROCEDURE OF PIT AND FISSURE SEALANT APPLICATION

Sealant Placement Guidelines

Step 1: Prepare the Teeth

Plaque and debris might interfere with the etching process or sealant penetration:

- Clean the pit and fissure surfaces
- Utilize a dry toothbrush, prophy cup with pumice or prophy paste, or air abrasion
- Use an explorer to remove any debris in the pit or fissure
- Rinse for 20–30 seconds
- Re-evaluate surface for residual or loose debris.

A widening of the fissures with rotary instrumentation is yet another type of fissure conditioning that has been recommended before etchant and sealant application. This is known as the invasive pit and fissure technique.

Step 2: Isolate the Teeth

Adequate isolation is the most critical aspect of the sealant application process. Salivary contamination of a tooth surface during or after acid etching will have a deleterious effect on the ultimate bond between enamel and resin.

- Use cotton rolls, dry angles, and/or rubber dam.

Some of the disadvantages of Rubber dam include: discomfort during clamp placement, need for local anesthetic in some instances, difficulty in securely placing a clamp onto a partially erupted tooth, an increase in the cost and need for sterilization of the armamentarium.

Another alternative to the rubber dam is the Vac-Ejector moisture control system, which consists of a bite block and rubber tongue shield that connect to the high-speed evacuation line, providing a clear, dry field for sealant procedures. Clinical studies have found that sealant retention with the Vac-Ejector, either with or without a chairside assistant, is comparable to that with sealants placed under rubber dam or cotton roll isolation.

Step 3: Dry the Surfaces

- Dry teeth with air for 20–30 seconds
- Check to make sure there is no moisture coming out of air syringe tip.

Step 4: Etch the Surfaces (Fig. 33.7)

There are various etchant materials available, but the most frequently used etchant is 37 percent orthophos-phoric acid. This is available as both a liquid solution and a gel. One should always apply the etchant onto all the susceptible pits and fissures of the tooth and extend it up the cuspal inclines well beyond (at least 2 millimeters) the anticipated margin of the sealant:

- Apply etchant as directed by manufacturer
- Usually between 30 and 60 seconds
- If using a gel or semi-gel: Apply gel and let stand for the allotted amount of time
- If using a liquid: Continue to apply etchant throughout the etchant time.

Step 5: Rinsing and Drying the Teeth (Fig. 33.8)

- Rinse surfaces for 60 seconds
- Check for effectiveness of etchant by drying with air; surface should appear "chalky white"

- If not, repeat etching procedure
- Placement of new cotton rolls and/or dry angles
- Dry teeth with air for 20–30 seconds.

Step 6: Application of Sealant Material (Fig. 33.9)

During sealant application, all the susceptible pits and fissures should be sealed for maximum caries protection. The sealant material can be applied to the tooth in a variety of methods. Many sealant kits have their own dispensers, some pre-loaded that directly apply the sealant to the tooth surface:

- Self-curing: Mix equal parts of the two components
- Will polymerize in 60–90 seconds
- Light-curing: Apply with syringe provided by manufacturer
- Apply curing light to material
- Will polymerize in 20–30 seconds.

Step 7: Evaluate the Sealant

The sealant should be visually and tactually inspected for complete coverage and absence of voids or bubbles. Small voids in the sealant can be repaired simply by adding new material to the void and polymerizing.

Step 8: Occlusal Evaluation

- Check occlusion with articulating paper
- Adjustments must be made with filled resins

Step 9: Re-evaluation

- Recall patient for having the sealants evaluated on a six-month basis.

INDICATIONS FOR USE

A sealant is indicated for children and adults:

1. Who may be at moderate or high risk of developing dental caries, for a variety of reasons.
2. With incipient caries (limited to enamel of pits and fissures).
3. Who have sufficiently erupted permanent teeth with susceptible pits and fissures.
4. Who have existing pits and fissures that are anatomically susceptible pits and fissures.
5. A deep or irregular fissure, fossa, or pit is present, especially if it catches the tip of the explorer (for example, occlusal pits and fissures, buccal pits of mandibular molar, lingual pits of maxillary incisors).
6. The fossa selected for sealant placement is well isolated from another fossa with a restoration present.
7. An intact occlusal surface is present where the contralateral tooth surface is carious or restored.

CONTRAINDICATIONS

A sealant is contraindicated if:

1. Patient behavior does not permit use of adequate dry field (isolation) techniques throughout the procedure.
2. There is an open occlusal carious lesion.

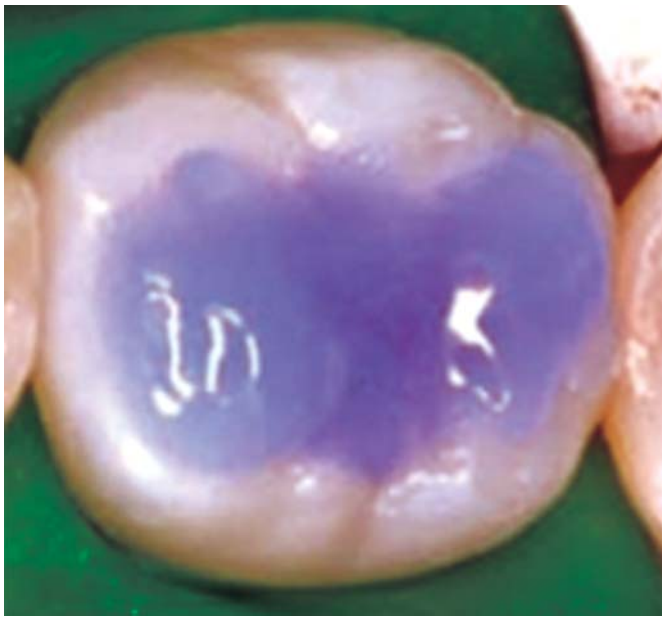


Fig. 33.7: Etching of surface

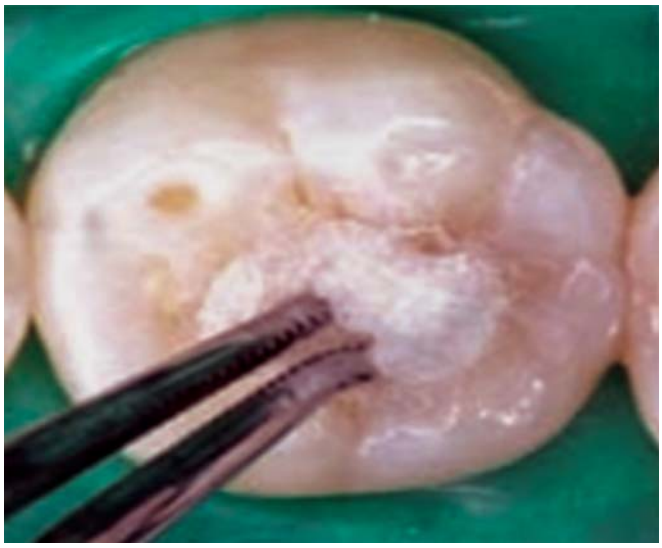


Fig. 33.8: Drying the teeth

3. Caries, particularly proximal lesions, exist on other surfaces of the same tooth (radiographs must be current).
4. A large occlusal restoration is already present.
5. If pits and fissures are well coalesced and self-cleansing.
6. Life-expectancy of primary tooth is limited.
7. When patients is allergic to methacrylate.

SEALANT RETENTION

Sealants are both cost-effective and underutilized in prevention of occlusal caries. The long-term efficacy of sealants is well documented. Sealants are lost most frequently from the lingual

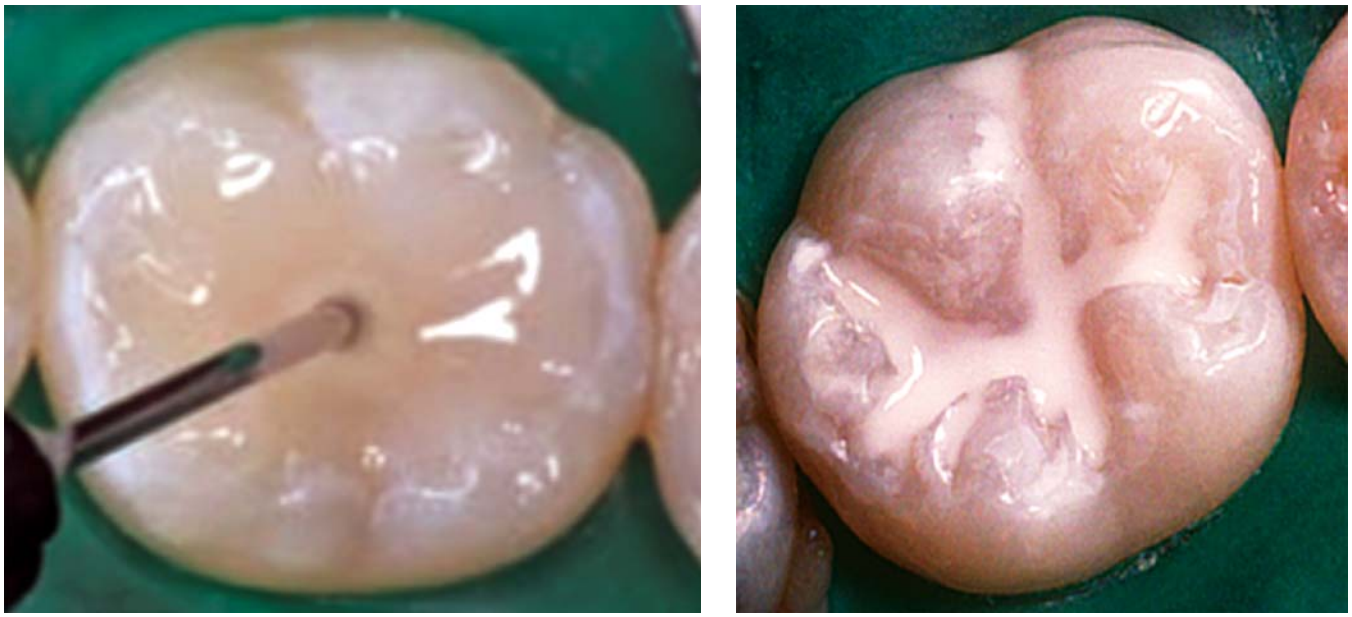


Fig. 33.9: Occlusal surface with pit and fissure sealant

surfaces of maxillary molars and the buccal surfaces of mandibular molars. This can be attributed to the shallower pits, which increase the difficulty of complete etching and retention. Most clinicians find that retention rates are less for primary teeth; up to 50 percent less according to Lein. The theory behind this reduction in retention is the direction of the enamel rods in primary teeth. The ends of enamel rods in permanent teeth form an angle perpendicular to the outer enamel surface, whereas the enamel rods in primary teeth often form an angle that does not allow for optimum retention. Initial retention failure of sealants is historically attributed to technique errors, the most common of which is moisture contamination.

Other technique errors that can affect retention are inadequate etching, incorporation of air bubbles into the sealant material (which weakens the material), and incomplete removal of debris from the pits and fissures prior to etching. Sealant retention depends not only on proper application, but also on the eruption status of the tooth. When a tooth is not completely erupted, the retention rate is lower—possibly due to difficulties maintaining a dry tooth surface during application. Without a doubt, the retention rate is lowered when an operculum is present over the distal marginal ridge of a molar. One study found a replacement rate of 54 percent on molars when an operculum was present, although no replacement was necessary on molars sealed later in the eruption process.

Undoubtedly, sealants are susceptible to occlusal wear. This is a problem only if the seal at the margins of the sealant is not maintained.

Again, this emphasizes the importance of continued evaluation of the sealant. In the past, fluoride treatment prior to the sealant placement was contraindicated, because it was felt that the fluoride interfered with the bond between the sealant and the tooth surface. Recent research suggests that fluoride use prior to sealant placement may not adversely affect the bonding strength of enamel and sealants.

INCIPIENT FISSURE CARIES AND SEALANTS

Advantages of the invasive technique, where the fissures are widened with a small bur before the placement of sealants, are the following:

1. The ability to diagnose the extent of the carious lesion if present.
2. Higher retention rates for sealants were obtained following mechanical preparation of the fissure area.
3. The risk of microleakage was also reduced when the fissure was enlarged.

Considering these points, in cases of deep and narrow fissures that are discolored and suspected of being carious, the invasive pit and fissure sealing should be chosen.

PREVENTIVE RESIN RESTORATIONS

A logical extension of preventive sealant strategy involves the use of resin restorative materials plus in discrete areas of caries attack on a fissured surface. First reported by Simonsen and Stallard (1978), this 20-year-old concept has gained wide approval. The procedure involves removal of those areas of teeth involving caries, followed by bonding resin restorative

material into them, and finally covering all restorative material and any remaining fissured anatomy with sealant. The obvious saving of tooth structure is significant. By avoiding the old philosophy "extension for prevention" tooth preparation and replacing it with the idea of discrete removal of caries, there is a major reduction in intracoronal preparation and tooth structure loss.

The longevity of the PRR is dependent to a great extent upon the retention and repair of the overlying sealant.

This method is indicated where caries within a fissure has just reached the dentine. Under ideal circumstances the fissure sealants can successfully prevent pogression of caries, therefore sealing of the very superficial lesion is a viable option compared to the more destructive conventional restorative approach, which involves the removal of healthy tooth structure to gain good access.

FLUORIDE CONTAINING SEALANTS

The addition of fluoride to sealants was considered since 1976 and efforts to combine the two continue today. Basically, two methods of incorporating fluoride are used. In one, a soluble salt of fluoride is added to unpolymerized resin. After sealant is applied to the tooth, the salt dissolves and fluoride ions are released. The other method involves an organic fluoride compound, which is chemically bound to resin. However, it is questionable whether this fluoride releasing sealant will have any clinical effect on caries, since sealants usually do not penetrate to the depths of the pit and fissures, where caries usually initiates.

PUBLIC HEALTH SEALANT PROGRAMS

These programs are school based, school linked or the combination of the two. The American Association of Community Dental Programs has developed a manual "Seal America: The Prevention Invention", which provides information to the public health program administrators.

In 1990, the United States Public Health Service published a national health objective for the year 2000, stating that 50 percent of children should have sealants on one or more permanent molar teeth.

Instructions to the Patient or Parent

It is necessary to receive consent from the parent or guardian of a minor or a mentally impaired patient prior to placing a sealant. The patient and/or parent must understand that sealants can only help prevent caries on the tooth surfaces where the sealants are applied; and that plaque control, fluoride therapy, and sugar discipline are still necessary to prevent decay on the rest of the tooth surfaces. Discuss the life-expectancy (the retention rate, which varies from patient-to-patient) of sealants with the patient/guardian. Use a mouth mirror whenever possible to show the patient and/or parent which tooth has been sealed. Explain that it may feel "high" immediately after placement, but that it should feel normal in two to three days through normal chewing action. If it does not, the patient should return to the dental office to have the excess height reduced.

The patient or parent should be advised to check the sealant during routine oral hygiene procedures and to contact the dental office if there is any sign of sealant loss or breakage. Inform the patient or parent of the need for six-month recall appointments to monitor sealant retention. At the recall appointment, the sealed tooth should be categorized and treated according to one of the three following categories:

Recall status of tooth	*Treatment*
All pits and fissures covered	No treatment required
Sealant missing from some of all of the pits and fissures; exposed surface sound	Reseal the exposed pits and fissures (i.e. sealant replaced)
Sealant missing from some of all of the pits and fissures; caries present	Restore carious pits and fissures (i.e. restorative procedures)

COST-EFFECTIVENESS

Sealant effectiveness and cost-effectiveness are dependent upon disease levels and the selection of patients and tooth surfaces to be sealed. Thus, another critical way in which sealant usefulness can be increased is by developing and applying evidence-based caries risk assessments to individual patients.

To achieve maximum benefit, sealants should:

- Be used for targeted prevention in high risk children and young adults.
- Be applied to teeth such as mandibular molars that are likely to develop caries.
- Be used in conjunction with other preventive measures.
- Employ contemporary resin materials (second or third generation resins), or glass ionomers with appropriate viscosity and surface wetting properties.
- Be placed by dental auxiliaries (dental therapists or dental hygienists) to reduce their overall cost.
- Be monitored overtime and re-applied as needed.

Clinical Considerations

- When there is an indication for placement, then sealant should be placed as soon as possible. However, susceptible sites of teeth can be sealed at any age depending on assessment of risk factors:
  - Where there is a real doubt about the caries status of a susceptible site on clinical examination, e.g. a stained fissure, then a bitewing radiograph should be obtained. If there is clear evidence that the lesion is confined to enamel then the surface can be sealed and monitored clinically and radiographically.

- When the evidence is unclear, then removal of the stained areas in the fissures (enamel biopsy) should be performed.
- If the lesion extends into dentine after removal of staining, then a sealant restoration ("preventive resin/GIC restoration") may be placed. A more extensive cavity will require a conventional restoration.
- For more extensive lesions showing involvement of the DEJ, a preventive resin restoration (PRR) is undertaken.
- The choice between resin/composite and glass ionomer sealant should be based on adequacy of moisture control. As the resins are most durable they should generally be preferred, while GIC should be used in cases where moisture control is difficult, e.g. in erupting or newly erupted teeth. GIC sealants in these cases are regarded more as a temporary sealant or a Fluoride release vehicle, rather than a true sealant.

Fluoride-containing sealants have not shown superiority to regular sealant. Glass ionomer sealants have failed miserably in comparison to resin-based sealants, showing very poor retention. The major benefit of resin sealants, that of excellent retention and thus physical blocking of the fissure system, appears much more important for caries prevention than the transient benefit of fluoride release over the short-time glass ionomer sealants are retained.

Unfilled sealants perform better than filled sealants. Colored or clear resin sealant is a matter of personal preference; however, it has been shown that the ability to assess retention properly in colored sealants is much less error prone than with clear sealants. Use of an opaque color may interfere with the potential for laser fluorescent diagnosis of caries under a sealant.

Autocured sealant appears to have equivalent documentation of performance compared to visible-light-cured sealant.

The use of an intermediate bonding layer, or the incorporation of the benefits of the advances of the past decade in dentine bonding agents into newly formulated pit and fissure sealants, is perhaps the most exciting new potential development for the future of pit and fissure sealant materials.

The advantages of invasive sealants and PRR are:

1. There is minimal removal of tooth structure, hence greater tooth strength.
2. There is no marginal leakage, with a reduced risk of recurrent caries.
3. Local anesthetic is not normally required.
4. The restoration can be completed in one visit and polishing is not required.
5. Caries in adjacent pits and fissures is prevented without fissure removal.
6. Pleasing aesthetics are obtained.
7. The restorations are cost-effective and can be easily repaired.

The fissure morphology and the occlusion (e.g. load bearing area) largely dictate the choice between filled and unfilled products.

Strict adherence to moisture control must be observed. Saliva control can normally be achieved by the correct placement of a sufficient number of cotton rolls. Gaining adequate control of the oral environment at the time of placement is critical for long-term success of resins, when used for PRR or as plain sealants.

SEALANT FAILURE

The success of sealants is dependent upon a strong sealant-to-enamel bond, with sufficient mechanical retention being the primary determinant of clinical success. Improper technique is the major cause of failure or early loss of sealants; therefore, it is imperative that the operator strictly adhere to proper sealant placement. The following list describes common technique errors:

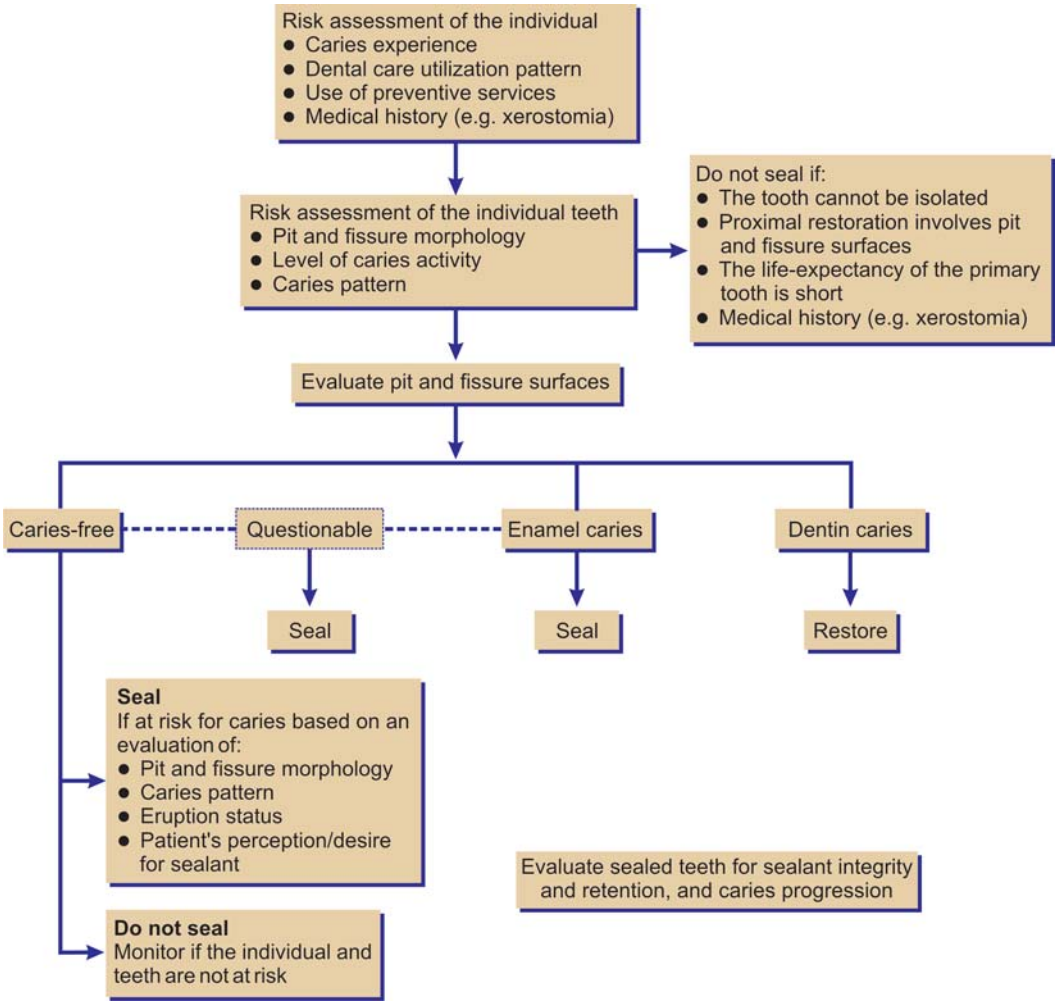
1. *Contamination* may be caused by either saliva or calcium phosphate products as described earlier. The enamel surface must be re-etched if contaminated.
2. *Inadequate surface preparation* may be caused by improper cleansing prior to applying the etchant and/or the etching process itself.
3. *Incomplete or slow mixing* of self-cure sealants affects polymerization of the Bis-GMA material. If polymerization is negatively affected (e.g. starts to set-up before placement), a new mix should be made.
4. *Too slow application of the material* results in a less viscous (thicker) mix that cannot flow easily into the pits and fissures, causing an incomplete seal. Place material within the time frame recommended by the manufacturer.
5. *Air entrapment due to whipping or vigorous mixing* can occur during the mixing of self-cured sealants. It is important to replace the caps on the resin bottles since moisture can be lost through evaporation. The result is a less viscous material which does not flow properly.
6. *Overextension of the material beyond the conditioned tooth surface* results in a weakened sealant in the areas that are overextended. If the sealant margins extend beyond etched tooth structure, those areas will cause increased micro-leakage beneath the sealant and/or fracture of the sealant. The sealant should be replaced, confining the area of placement to etched tooth structure.
7. *Outdated materials* may not serve as an effective sealant.

NEWER SEALANTS

1. WetBond Pit and Fissure Sealant

The difference between Embrace WetBond pit and fissure sealant and traditional sealants is that it bonds chemically and micromechanically to moist tooth surfaces. It integrates with the tooth structure to create a strong, margin-free bond that virtually eliminates microleakage. This is the first pit and fissure sealant resin that can be applied in a moist field. It forms a unique Resin Acid-Integrating Network (RAIN) that improves penetration into pits and fissures and provides superior sealing of the margins. No bonding agents are required (Fig. 33.10).

Guideline for Sealant Use in Individual Care Programs



Guidance on Sealant Use in Community Programs

1. **Define the community**
(check all that apply)
— School system(s)
— Municipality(ies)
— Neighborhood(s)
— State
— Homebound
— Managed care system
— Institution(s)
— Other, _____

2. **Assess Community Need for Dental Sealants**
(check all that apply)

Needs

— High pit and fissure caries level and low proximal caries level
— Low sealant prevalence
— Poor access to dental care
— Low income

3. **Weigh Supports Constraints for Sealant Program Development**
(check all that apply)

Supports	vs.	*Constraints*
— Adequate human resources		— Lack of human resources
— Adequate fiscal resources		— Lack of fiscal resources
— Community values oral health		— Community does not value oral health

Contd...

Contd...

— Support for public health programs
— Practical

— Lack of acceptance of public health program
— Impractical to implement a program
— Legal issues (i.e. supervision)
— Concerns about liability

— Dental community support

— Dental community does not support

4. Select Approaches for Increasing Sealant Prevalence
(check all that apply)
— Direct service

— Sealant promotion (public professional, third party)
— Policy development (e.g. Medicaid rules, state practice acts)
— Other, _____
— No program

5. Define Specific Population
(check all that apply)
Population Groups
— Schoolchildren
— Special populations
– Head start
– Residential care
– Military
– Managed care organization
– Other _____
— Other, _____

Modifiers
— High % of low income people
— age or grade _____
— high caries risk status
— Increase in caries risk
— Geography _____
— People with disabilities
— Other, _____

6. Identify Individuals to be Evaluated for Sealants
(check either "all people" or "some people")
— All people (assumes consent)

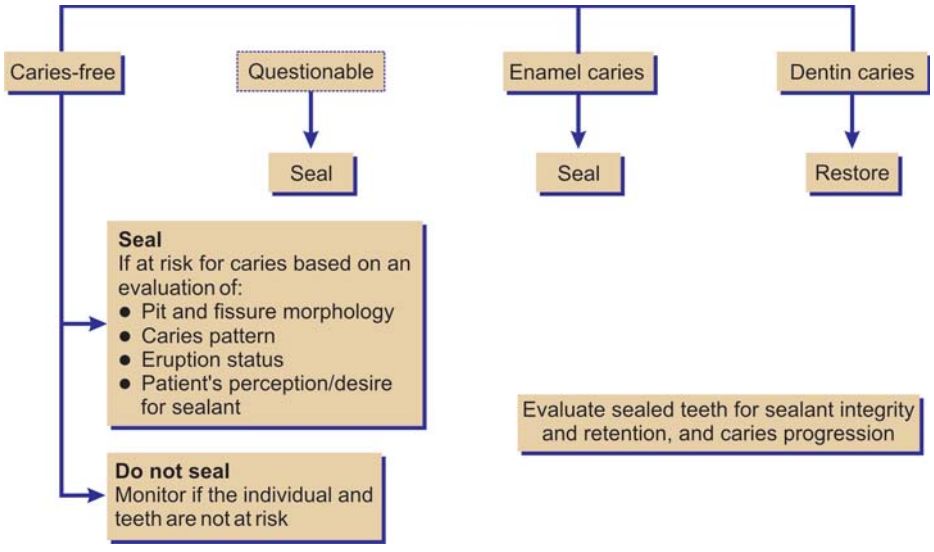
— Some people (assumes consent)

Selection factors
(check all that apply)
— Low SES
— Lack of dental care
— Other, _____

7. Identify Teeth/Tooth Surfaces Risk Assessment of the Individual
(caries experience, dental care utilization pattern, medical history, preventive behaviors)

Evaluate Tooth Status
(do not seal if the tooth cannot be isolated, restoration of proximal caries will involve the pit/fissure, or life-expectancy of the primary tooth is short)

Evaluate Pit and Fissure Surface for Sealant Application



Risk Factors for Sealants

Children	*Risk factors*
Low risk	No new or incipient caries in the past year Good oral hygiene Regular dental visits
Moderate risk	One new, incipient or recurrent caries in the past year Deep pits and fissure High familial caries experience History of pits and fissure caries Early childhood caries Frequent sugar exposure Decreased salivary flow Compromised oral hygiene Irregular dental visits Inadequate fluoride exposure Treatment for braces
High risk	Two or more new or recurrent carious lesions in past year Deep pits and fissure Sibling or parents with high caries rate History of pit and fissure caries Early childhood caries Frequent sugar exposures Decreased salivary flow Compromised oral hygiene

2. Illuminating Pit and Fissure Sealant

Through the use of a UV pen light, Seal-N-Glo fluoresces a blue/white color. The fluorescent glow provides clinicians with a visual verification of the sealant margins at the time of placement and offers the easiest way to verify retention and inspect margins during patient recall appointments.

3. Pit and Fissure Sealant With ACP (Amorphous Calcium Phosphate)

It is resilient and flexible, creating a strong, long-lasting sealant. This light-cure has a controlled flowability that keeps the sealant on the tooth structure while completely filling occlusal surfaces. It forms a chemical and thermal barrier that protects the tooth enamel on the occlusal surface from caries. Pit and fissure sealant is a light-cured sealant that contains the "smart material" amorphous calcium phosphate (ACP) that slowly releases calcium and phosphate ions, the basic building blocks of teeth (Fig. 33.11).

Fig. 33.10: WetBond pit and fissure sealant

Fig. 33.11: Pit and fissure sealant with ACP

ACP is referred to as a "smart material" because it only releases calcium and phosphate ions when the surrounding pH drops to a level where it could start to dissolve the tooth. Once the calcium phosphate is released, it acts to neutralize the acid and buffer the pH. It forms a chemical and thermal barrier that can help keep patients free from carious lesions on the occlusal surfaces.