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Solving the SEALANT DILEMMA

Sealants can be effective for caries prevention if clinicians have a strategy for predictable, successful results.

By Daniel H. Cook, DDS, MS, Director of Pediatric Dentistry, Scottsdale Center for Dentistry

The benefits of using sealants have been well documented in many studies over the years. The goal of placing a sealant is to prevent caries and the need for a dental restoration. This is accomplished by bonding a physical barrier to the tooth that prevents the metabolic exchange of organisms between the pits and fissures of the tooth and the oral environment.

Despite the well-documented benefits, many questions remain regarding the

clinical use of sealants. This is underlined by the fact that sealant use in clinical practice is significantly lower than expected given the scientific data available. I have used sealants in my pediatric dental practice since 1972 (the Nuva Seal system and Nuva Lite) and have placed an estimated 100,000 sealants in addition to overlying sealant coverage as part of preventive resin restorations.

Over the years, I have discovered that I must continuously explore my thinking about sealants to best use this effective preventive technique in my practice.

There are three key issues surrounding the sealant dilemma that require answers

from me on a continuing basis:

1. My **core beliefs** about sealants and the subsequent development of my conclusions from these beliefs.
2. The need for a **foolproof** sealant diagnostic scheme.
3. Developing a **clinical technique** for sealant placement that is predictably successful.

Core beliefs

After studying the literature and having conversations with my colleagues, I developed a set of beliefs for sealant use. The primary basis for my beliefs comes from a review of sealants done by Robert J. Feigal, DDS, PhD, which was published in the *Journal of Pediatric Dentistry*. After reading Feigal's work and other sealant literature, I developed four core beliefs:

- Sealants are effective caries preventive agents to the extent they remain bonded to teeth.
- Sealant loss (at least partial loss) is a regular event and should be expected.
- Partial sealant loss yields a surface with the same caries rate as a non-sealed surface.
- Regular sealant resurfacing (partial replacement), when necessary, is important in long-term caries protection.

From these core beliefs, it was a natural extension to reach the following conclusions:

- Every permanent first molar will be sealed or restored as indicated. "Watching" pits and fissures makes no sense.
- Expect sealant loss and prepare parents and children for this eventuality.
- The ongoing repair of sealants is necessary to prevent caries.
- Use a rubber dam, clean and re-evaluate the pits and fissures for caries, bond before sealing, and use a flowable composite, such as UltraSeal XT Plus as the sealant material.

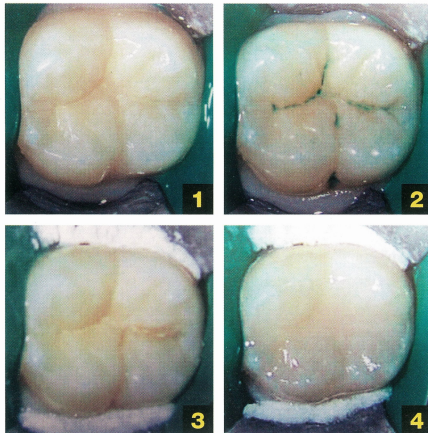


Fig. 1 The tooth pre-sealant. **Fig. 2** Sable Seek caries indicator dye is placed as a guide for pit and fissure cleaning. **Fig. 3** A tooth after the pits and fissures have been cleaned with air-abrasion and OraSeal caulking has been placed. **Fig. 4** The completed sealant.



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UltraSeal XT Plus, Shade A2 from Ultradent. Use a flowable composite as the sealant material.

- Be open to changing the technique as improvements become available.
- The sealant fee must reflect the time necessary for a sealant. Take repair and maintenance into consideration.
- It is necessary to have a scheduling system for sealants and re-sealants that is efficient and economically viable.

Foolproof diagnostic scheme

The second issue in my process required developing a foolproof diagnostic scheme. My dilemma was inconclusiveness regarding whether the tooth I was looking at required a sealant or a preventive resin restoration. I found that I frequently took excessive chairtime trying to decide whether the tooth was caries-free (for sealant treatment) or had a cavity that required restoration. Making an incorrect decision created an inefficient treatment plan—the sealant became a restoration or the restoration became a sealant. Parents and patients also were disappointed when they found out the planned sealant was a cavity and a restoration would be necessary. There are also unplanned and unpleasant financial implications for the parent if there is a treatment plan change to a restoration.

Determining caries status

What is the caries status of this tooth? The JADA March 2008 issue published a report from the ADA Council on Scientific Affairs titled "Evidence Based Clinical Recommendations for the Use of Pit-and-Fissure Sealants." It is an excellent report and, in my opinion, is required reading for serious clinicians doing sealants. However, I disagree with the statement, "Visual examination after cleaning and drying the tooth is sufficient to detect early noncavitated lesions in pits and fissures." This is contrary to my personal clinical experience and a simplification of the caries diagnosis (or lack of caries) related to sealants.

My observation of the photos included with the ADA report is inconclusive as to whether there is caries despite the claim that they are noncavitated lesions. I have cleaned like-appearing pits and fissures using caries indicator dye (Sable Seek) and air-abrasion (the Crystal Air unit by Crystal Mark) and found no caries; I have cleaned like-appearing pits and fissures and found cavitated lesions. This is the diagnostic dilemma I face many times every day I work with patients. Is this a cavity or not? My answer is: I don't know!

Each pit and fissured tooth has three choices for an answer to the caries question:

There is no caries. This diagnosis is obvious and simple to treatment plan: sealant (Fig. 1).

There definitely is caries with dentin involvement. Once again, this diagnosis is obvious and simple to treatment plan: preventive composite restoration.



OraSeal Caulking from Ultradent seals rubber dam leaks around the clamp.



Sable Seek caries indicator dye from Ultradent.

I don't know if this is caries. Is this early caries (non-cavitated lesion) or a frank carious lesion (cavitation)?

Overlying the diagnosis is the question: Can I place a rubber dam for isolation? If not, then postpone the sealant or restoration until a rubber dam can be placed. Obviously, if the caries is significant, an interim treatment is necessary to keep the tooth healthy until a rubber dam can be placed.

What is the resolution of this diagnostic dilemma? I had to re-think my diagnostic process for the "I don't know" if this is a carious pit and fissure. It became necessary to accept the obvious—that I didn't know. As a result, the "I don't know" tooth now becomes a tooth that is diagnosed as caries and treatment planned for a preventive resin restoration. The parents are told that we don't know if there is caries and that we will plan on a small filling and then place a sealant over the filling. They are further advised that if no pit and fissure caries are found we will do a sealant only.

The benefits of this foolproof diagnostic scheme:

- The diagnostic process is simplified and standardized.
- We are prepared to do a restoration 100% of the time for the "I don't know" tooth.
- We can give the parent good news if a preventive resin restoration was

treatment planned and exploration of the tooth reveals the differential diagnosis is incorrect and there is no caries (no cavity and less expense).

The downside is obvious. A youngster may receive a field block for a tooth that was misdiagnosed as caries and requires a sealant instead. My personal data collection shows that **85% of the pits and fissures I**

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diagnosed as "I don't know if this is caries" are cavitated when cleaned with air-abrasion under anesthesia with a rubber

dam in place. Lesions tend to be deeper than expected when originally examined after cleaning followed by air drying and illumination.

Technique for sealant placement

The final step to solving my sealant dilemma was developing a predictably

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successful technique. Sealant placement is a technique-sensitive procedure that requires a disciplined approach.

My technique:

1. Anesthetic for patient comfort (if adequate, topical only. If necessary, tissue infiltration).
2. Rubber dam placement.
3. Caries indicator dye placement as a guide for pit and fissure cleaning (Fig. 2).
4. The pediatric dentist cleans pits and fissures with air abrasion and evaluates them for cavitated lesions.
5. Place a caulking material, as needed, to prevent moisture leakage around the rubber dam clamp (Fig. 3).
6. Acid-etch.
7. Bond.
8. Flowable composite, my sealant material of choice (Fig. 4).

Summary

Sealants are an effective caries preventive agent to the extent they remain bonded to teeth. Therefore, every permanent molar is carefully diagnosed and subsequently sealed or restored with a systematic and disciplined technique when adequately erupted to place a rubber dam. These sealed teeth are then maintained until the patient graduates from my pediatric dental practice. **CPA**

Reading List

- For further study, Dr. Cook recommends these articles:
- Feigl RJ. Sealants and preventive restorations: review of effectiveness and clinical changes for improvement. *J Pediatr Dent* 1998; 20:85-92.
 - Simonsen, R. Pit and fissure sealant: review of the literature. *J Pediatr Dent* 2002; 24:393-402.
 - Yartzel AR, Karamica A, Celik C, Ogunsoyler G, Dayangue B. A two-year clinical evaluation of pit and fissure sealants placed with and without air abrasion pre-treatment in teenagers. *J Am Dent Assoc* 2006; 137:1401-5.
 - Rodrigues J, de Vita T, Cordeiro R. In vitro evaluation of the influence of air abrasion on detection of occlusal caries lesions in primary teeth. *J Pediatr Dent* 2008; 30:15-8.
 - American Dental Association, Council on Scientific Affairs. Evidence-based clinical recommendations for the use of pit-and-fissure sealants. *J Am Dent Assoc* 2006; 139:257-89.