

Making Decisions About Sealant Placement

There is strong evidence that sealants are effective when used on sound permanent posterior teeth in children and when used on non-cavitated caries lesions. In the latter case, evidence shows that sealants significantly reduce the percentage of non-cavitated lesions that progress to cavitated lesions in children, adolescents, and young adults.²

Based on this evidence, the American Dental Association (ADA) recommends sealing sound pit-and-fissure surfaces as well as non-cavitated pit-and-fissure lesions in children at higher risk for dental caries.³ An expert workgroup sponsored by the Centers for Disease Control and Prevention (CDC) also recommends sealing sound and non-cavitated pit-and-fissure surfaces in children at higher risk for dental caries.⁴ In other words, any lesion in the pit-and-fissure surfaces that is less severe than a cavitation should be sealed in children at higher risk.

School-based dental sealant programs grapple with the dilemma of how to best deal with cavitated caries lesions in children who may not receive restorative oral health care. Although sealants are not necessarily the treatment of choice for cavitated lesions, in these instances, it is up to the oral health professional authorized to select teeth for sealant placement in the program to decide whether to place sealants.

The following information may help in the decision-making process:

Sealing over cavitated lesions lowers the number of bacteria in the cavity by at least 100-fold.⁵

Small cavitated lesions as well as lesions radiographically into dentin can be sealed without removing all the softened infected tissue and will become arrested or inactive over time while they are sealed.²

The CDC expert workgroup acknowledged that school-based dental sealant programs treat only children at higher risk for dental caries who are often from families with low incomes and thus may lack access to oral health care. Therefore, the workgroup allowed that—in addition to making an effort to connect children who have cavitated lesions with a source of restorative oral health care—oral health professionals in school-based dental sealant programs who are authorized to select teeth for sealant application might choose to place sealants on small cavitated lesions with no visual signs of dentinal caries.

Sealants can be removed at any time, and a restoration can be placed. One does not preclude the other.

Caries Detection vs. Caries Diagnosis

The terms “caries detection” and “caries diagnosis” have distinct meanings. “Caries detection” implies finding a sign of the disease (e.g., finding a non-cavitated

lesion). This is the first step in the diagnosis process. “Caries diagnosis” implies determining whether lesion(s) or disease are present (detection); determining how severe the disease is, if it is present; and deciding whether lesions are active or arrested (assessment).

Diagnosis, not detection alone, should inform the assessment of future dental caries risk and help guide the process of how to manage oral disease. From the caries disease perspective, only active lesions require treatment. The type of treatment depends on the severity of the active lesion (i.e., whether it is cavitated or non-cavitated).

Because most cavitated lesions are not self-cleansing, they are considered active lesions and therefore require treatment—usually restorative treatment.

Non-cavitated lesions appearing on recently erupted posterior teeth in children at higher risk for dental caries are likely to be active and thus in need of treatment. In school-based dental sealant programs, sealant placement is the appropriate treatment for these lesions.⁴

Criteria and Methods for Selecting Teeth to Be Sealed

A variety of tools are available that can help oral health professionals in school-based dental sealant programs determine which teeth are good candidates for sealant placement. All the criteria and methods discussed in this module are primarily focused on identifying cavitated lesions in the pits and fissures of teeth (including occlusal surfaces, buccal pits, and lingual grooves), to determine whether to place sealants on teeth in school-based dental sealant programs.

To effectively place a resin-based sealant, the tooth surface must be kept dry. Thus, the area to be sealed must have erupted (i.e., it cannot be covered by soft tissue). Surfaces that cannot be isolated and kept dry should not be sealed. In some instances, it may be possible to seal the occlusal surface of a tooth that has partially erupted, but it may not be possible to seal the buccal pit or lingual groove, because the tooth has not erupted sufficiently. These other surfaces may need to be sealed at a follow-up evaluation.

Visual Criteria

ADA and CDC both support the use of visual assessment as the method of choice to decide whether dental sealants should be placed.³

Visual assessment alone is appropriate and sufficient to detect surface cavitation and/or other signs of dentinal involvement before sealant placement.

Before being assessed, the tooth surface should be cleaned with a toothbrush to remove debris and plaque.

To detect large cavitated lesions in which the dentin is clinically visible, the tooth surface does not need to be dried. However, to detect smaller surface breaks, the tooth should be dried with compressed air, when available. If sound surfaces or early non-cavitated lesions are to be detected (which is not

necessary in school-based dental sealant programs to determine which teeth need sealants) then the tooth needs to be thoroughly dried with compressed air for at least 5 seconds.

Non-cavitated lesions in pits and fissures may appear as a white, yellow, or brown discoloration (or a combination of these colors), which may be limited to the confines of the pits and fissures or may extend from the pit-and-fissure system. Very early lesions are visible only after air drying. More advanced lesions are visible when the tooth is wet or dry.

Non-cavitated and cavitated lesions with extensive dentinal involvement also may be accompanied by an underlying gray shadow. The shadow is often easier to see when the tooth is wet.

A cavitated lesion appears as a discontinuity or break in the surface owing to loss of tooth structure. The break can be confined to the enamel or may expose dentin to the oral cavity.

A child who received a dental sealant at a school-based dental sealant program on a non-cavitated lesion that extended into the dentin may subsequently have the lesion identified with radiographs taken in a dental office. If that situation is brought to the attention of the school-based dental sealant program, both the program and the dentist must understand that, based on the scientific literature, there is no reason to believe that the sealant placement caused harm. In fact, the sealant may have stopped the lesion from progressing before the dentist could assess the child.²

Criteria and Methods for Selecting Teeth to Be Sealed

Explorer Use (Tactile Criteria)

Explorers are not necessary for detecting non-cavitated or cavitated lesions.

Evidence suggests that use of an explorer does not improve detection.

Forceful use of an explorer on a non-cavitated, subsurface lesion can easily produce a break and cavitate it, thus damaging the tooth. Under existing guidelines and recommendations, this tooth would no longer be a candidate for sealant placement.

The explorer may be used gently to clean debris or remove plaque; to confirm and assess cavitation; and, once the tooth is sealed, to help assess sealant integrity and retention. Only in cases in which there is doubt about whether a cavitation is present, the explorer tip can be placed in contact with the tooth surface and moved very gently in the area of interest to see if a discontinuity or break is detected.

X-rays

X-rays should not be taken for the sole purpose of determining whether sealants should be placed.⁶

Whether taking x-rays results in more accurate assessment (compared with

conducting a visual assessment of occlusal surfaces) has not been determined.

Many non-cavitated lesions extend into the dentin; however, this does not mean that they are active and therefore in need of operative intervention. Thus, in occlusal surfaces, seeing a lesion in the dentin on an x-ray is not a diagnosis of surface cavitation or of an active infection.

Since the decision about whether to seal teeth is based on surface cavitation and not on whether a lesion is limited to the enamel or is histologically or radiographically into the dentin, taking x-rays will not alter school-based dental sealant programs' decisions about whether to seal a tooth.

Criteria and Methods for Selecting Teeth to Be Sealed

Magnification

Few studies have assessed whether the use of magnification in addition to unaided visual inspection results in improved assessment, and findings from existing studies have been inconsistent. Therefore, although magnification can be used in the assessment, it is not necessary and may not be helpful.

Technologically Advanced Tools

Technologically advanced tools, such as laser fluorescence, are designed to help oral health professionals interpret visual cues in detecting and monitoring lesions over time, especially early, non-cavitated lesions. These tools should be used only as adjunctive devices to detect caries lesions and are not required to detect cavitation.

Findings from validation studies of these tools indicate an increase in the detection of non-cavitated lesions, as well as an increase in the likelihood that a sound surface will be mistakenly identified as carious. Therefore, the use of such tools by themselves will lead to many sound teeth being misdiagnosed as carious and thus possibly precluded from receiving sealants. For this reason, and also because these tools are not needed to detect cavitation and are costly, their use in school-based dental sealant programs is not recommended.⁴

Selecting Existing Sealants for Repair or Replacement

Oral health professionals working in school-based dental sealant programs who evaluate long-term sealant retention should use their professional judgment when evaluating whether sealants placed the previous year need repair or replacement. When making decisions, they should consider the following:

Defects in sealant material (e.g., bubbles) do not require repair unless underlying tooth surface is exposed by the defect.

Catches in marginal areas do not require repair unless they expose non-cleansable caries-prone areas of the fissure system.

Although staining at the interface of sealant and enamel does not, of itself,

indicate caries, it may suggest an area of microleakage that could benefit from coverage with additional sealant material.

Before finalizing a decision on the need for repair of a partially retained sealant, it makes sense to attempt to dislodge the remaining sealant to ensure that it cannot be lifted off. If it can be lifted off, it must be replaced.⁷

Key Points

Dental caries is a multifactorial disease that results from the interaction between the bacterial biofilm (i.e., dental plaque), the environment (e.g., diet, saliva composition and flow rate, fluoride exposure), and the tooth structure.

Caries lesions can be classified into two categories: non-cavitated and cavitated.

In addition, lesions can be active or arrested. Only active caries lesions require management.

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Explorers are not necessary for detecting non-cavitated or cavitated lesions.

Evidence suggests that use of an explorer does not improve detection.

X-rays should not be taken for the sole purpose of determining whether sealants should be placed.

Oral health professionals working in school-based dental sealant programs who evaluate long-term sealant retention should use their professional judgment when evaluating whether sealants placed the previous year need repair or replacement.

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