

Pit & Fissure Sealants: The Added Link in Preventative Dentistry



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Disclaimer: Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

Conflict of Interest Disclosure Statement

- Richie Kohli does not have any conflict of interest associated with this course.
- Joan Ellison does not have any conflict of interest associated with this course.

Introduction – Pit & Fissure Sealants

Dental caries, a multifactorial disease continues to be prevalent among children and adolescents, particularly in underserved populations. According to the data collected from the 2015-2016 National Health and Nutrition Examination Survey, the prevalence of total dental caries (untreated and treated) in primary or permanent teeth among youth aged 2–19 years was 45.8% with the prevalence increasing with age. Disparities existed with socioeconomic factors such as race and economic status.¹ Pit and fissure sealants have been used for many years as an effective and integral component of a preventive dentistry care plan. Despite early controversy regarding effectiveness, safety and retention rates, pit and fissure sealants have been used to prevent occlusal caries in children and adolescents. However, this effective intervention has been underused, with socioeconomic factors being the main barriers.² Two main types of sealants, resin based and glass ionomer, provide clinicians with several variations and options for application. Public health and school-based sealant programs have been effective in reaching underserved populations. On-going research continues to support the use of pit and fissure sealants compared to no sealants as an effective means of preventing dental caries in children and adolescents.³

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Overview

This course presents an overview of dental pit and fissure sealants as a safe and effective way to prevent dental caries. The course starts with a brief look at the history of dental sealants followed by the current rationale for their use. Frequently asked questions about sealants are addressed along with the presentation of guidelines for sealant use. Information about materials currently used for sealants is presented along with general instructions for the successful placement of sealants. The use of sealants in public health programs is also addressed.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Describe the current findings and recommendations on the effectiveness and safety of pit and fissure sealants.
- Discuss why the use of pit and fissure sealants has been controversial.
- List and identify the different natural occlusal characteristics of human teeth that

- could benefit from sealant placement.
- Describe the proper steps in sealant placement.
- Discuss different types of sealant materials and their effectiveness.
- Discuss the use of pit and fissure sealants in public health programs.
- Use high quality evidence for health care decision making.

History of Sealant Use

Protecting the natural pits and fissures of newly erupted teeth from dental decay is not a new concept. There have been numerous references to reducing the decay susceptibility of pits and fissures since 1923 when H. T. Hyatt suggested a technique called prophylactic odontology. Subsequent approaches have used various materials and chemicals.

A breakthrough came in 1955 with Buonocore's "acid-etch technique" which allowed for sufficient bonding between the resin material and enamel.

The acid-etch technique offered promise for the one area of the human tooth that was particularly susceptible to dental caries. By 1955 there was a sufficient amount of research to support the use of fluoride in public water systems and topical application by dental professionals. Along with the use of fluoride, it was widely recognized that the reduction of fermentable carbohydrates in the diet, routine dental examinations, routine dental care, and the daily removal of plaque from the teeth reduced the incidence of tooth decay. At the same time it was apparent that the pits and fissures that form the occlusal surfaces of the human teeth remained vulnerable. Acid-etch technique provided the basis for further development of effective materials to seal the pits and fissures and thus dental sealants offered an added link in preventive dentistry.

In 1983 the National Institutes of Health published a report entitled, "[*Consensus Development Conference Statement on Dental Sealants in the Prevention of Tooth Decay*](#)." This report recommended the use of pit and fissure sealants as a safe and effective method of preventing pit and fissure decay. In addition, it addressed significant roadblocks to sealant

use such as availability, insurance coverage, and questions of enamel maturation.

Following the publication of this report, many states changed their dental practice acts to allow dental auxiliaries to place pit and fissure sealants. Currently all state practice acts allow dental hygienists to place pit and fissure sealants, and the majority of states allow dental assistants to perform this procedure. This information also resulted in many dental insurance companies looking at sealant placement not as an experimental procedure but as a cost-effective prevention measure.

Continued review of the dental literature indicates ongoing documentation of successful sealant retention rates, reduction of occlusal caries, and the economic impact of a caries-free population. Both public health programs and private practice surveys give positive results for the placement of pit and fissure sealants.

An added benefit of placing pit and fissure sealants is the positive dental experience it provides for children. Almost without exception, the placement of pit and fissure sealants is painless and non-traumatic. Pit and fissure sealants provide both primary prevention by averting the onset of caries and secondary prevention by averting the progression of early caries to cavitation.

Rationale and Patient Selection

Epidemiological investigations confirm that although occlusal surfaces make up 12% of the tooth surfaces in the mouth; approximately 90% of caries in permanent teeth occurs in the pit and fissures. Further, caries in pit and fissures increase dramatically in permanent teeth between the ages of 11 and 19.¹ The deep developmental pits and fissures on the occlusal surfaces predispose them to carious lesions. Unlike smooth surfaces, occlusal surfaces receive little protection from fluoridated water and topical fluoride application. Pit and fissure sealants act as a physical barrier between the occlusal fissures and the oral environment, preventing the food debris and ingress of bacteria. According to a Cochrane systematic review conducted in 2017, pit and fissure sealants reduced caries between 11 and 51%

compared to no sealant when measured after 24 months. Similar outcomes were found at specific points up to 48 months.³ A systematic review conducted by Wright et al (2016) reported up to 80% reduction after 2 years.⁴ Numerous studies^{4,5} have been conducted citing success rates and clinical protocols for sealant use. Many cite similar principles and scientific theories that underlie the use of pit and fissure sealants in private and public programs including the following:

- Dental caries on occlusal surfaces of posterior teeth among children and adolescents that may continue into adulthood is considered a worldwide problem.
- Pit and fissure sealants prevent the growth of bacteria promoting occlusal caries formation and can arrest caries progression.
- For equivalent outcomes, the least invasive approach, using the simplest intervention for managing dental caries, is preferred.
- Minimizing the cost of preventing or controlling pit and fissure caries is desirable.
- Strategies for sealant use (e.g., patient selection, clinical decision making) may differ between individual care and community programs.
- Sealants have been demonstrated to be a safe and effective long-term method to prevent pit and fissure caries.
- Effective sealant use requires meticulous application techniques, particularly moisture control with some materials. Sealant retention should be checked within one year of application.
- Long term effects of sealant placement is often dependent upon parental motivation and the presence of a dental home for the patient.

Systematic reviews of evidence based clinical recommendations for the use of pit-and-fissure sealants as a useful resource in making evidence based decisions about sealant use.⁴ These recommendations are not a standard of care, but should be integrated with the practitioner's professional judgment and the individual patient's needs and preferences.³

Guidelines for patient use in private practice differs somewhat from guidelines used in

community sealant programs. Those seeking treatment in private practice settings are more likely to have continuous care, comprehensive diagnoses, and treatment options. People treated in community sealant programs are more likely to be episodic users of primary dental care services.

Risk assessment techniques for dental caries are useful in determining which patients would most likely benefit from the protection provided by the sealant. Tooth morphology, caries history, family history, home care, history of dental care, and eruption schedule (age) all play a role in selecting this procedure for a patient. Radiographs should be used to determine the extent of any incipient decay.

In spite of the high prevalence of preventive dentistry therapies, there is an unequal caries experience (treated and untreated) among 2-19-year-old children by ethnicity and family income level, with Hispanic children and those from lower income level families having the highest rates.¹ To improve this situation, dental health professionals should promote proper oral health practices and encourage sealant application to permanent teeth as early as possible, especially in those children who have had caries in their primary dentition.

As noted above, tooth morphology plays a role in selecting specific teeth for pit and fissure sealants. The photograph of a normal first mandibular molar shows the natural occlusal morphology that tends to make cleaning difficult and creates areas for food impaction (Figure 1). It also illustrates a less than ideal situation for diagnosis of incipient lesions. The following photographs, which show the anatomy of the tooth surface in detail, further illustrates the need to seal these types of fissures (Figures 2-4).

It has been well-documented the tooth surface is constantly undergoing a remineralization and demineralization process. This makes the decision to cut into the tooth versus a non-invasive procedure a difficult one at best.

Types of Pit and Fissure Sealants

Curing of sealant materials occurs one of two ways. Some sealants are chemically cured



Figure 1.

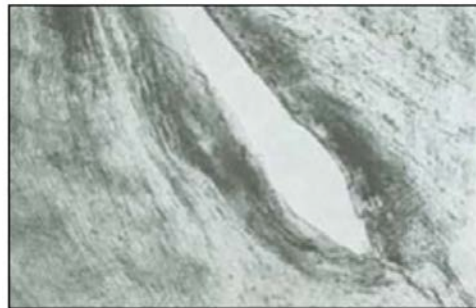


Figure 2.

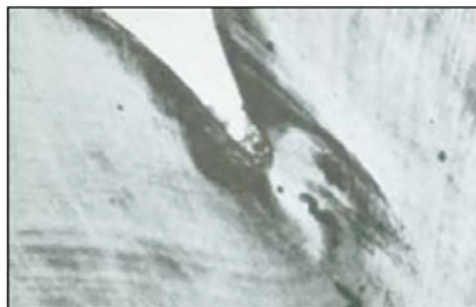


Figure 3.

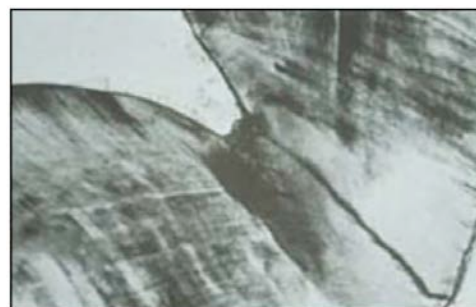


Figure 4.

through a process called autopolymerization. These materials are dispensed as two components. As soon as the components are mixed the polymerization begins. The curing is complete in approximately 60 seconds. Other sealant material is cured with visible light. When using the light cured materials,

it is very important the curing light is of high quality and is tested frequently for the value of the light emitted. Resin-based sealants are not fluoride releasing and their application is more technique sensitive (moisture concerns). In the mid-1990s safety concerns were expressed regarding leaching of bisphenol-A (BPA) from the sealants and a possible oestrogenic effect. However, studies have concluded that the short term risk of oestrogenic effects from treatments using BPA resins is insignificant and that BPA released orally may not be absorbed at all or may only be present in nondetectable amounts in the systemic circulation.^{6,7}

Glass ionomer based sealants are less vulnerable to moisture and have fluoride releasing properties. The fluoride is released from the sealant after polymerization. Previously, compared to resin-based sealants, a lower retention of glass ionomer sealants had been reported but the caries prevention effect is significantly higher with the glass ionomer, as it releases fluoride. With the development of resin modified photopolymerizable ionomers, this disadvantage has been minimized.³ Resin-modified glass ionomers (RMGI) undergo more wear than pure resin sealants. However, there is evidence of residual RMGI retention in the deepest portions of the pit and fissure, with sustained fluoride release. Recent studies show little difference in overall caries prevention, however, more conclusive research is needed.^{3,8}

Dental material manufacturers offer a variety of sealant materials designed to meet the preferences of individual operators. These products include sealant materials that are unfilled, filled with an opaque, clear, and colored and those products that change color when cured. Convenient unit-dosed material is also available. There appears to be no difference in the retention rate. The filled materials are often easier to see and monitor, but the clear materials allow the operator to continue to see the filled fissures. Sometimes operators prefer the colored sealants to make monitoring retention easier. Patients and parents should be consulted prior to the placement of colored sealants. The dental personnel should be aware of the filler content in the sealant being utilized. The higher the percentage of filler,

the more important it is to check and adjust the occlusion when the sealant is high in occlusion.⁹ It is very important that the curing light penetrates the sealant being placed to ensure maximum polymerization.

Sealant Utilization Considerations

Multiple studies confirm the reduction of pit and fissure carious lesions with the placement of sealants, but sealant placement continues to be underused. Some of the same questions that were brought up when sealants were first introduced continue to be concerns even as scientific evidence supporting the use of sealants continues to grow. It is possible these considerations are responsible for the under-utilization of this proven preventive procedure. The following list includes some common questions that continue to be asked regarding the use of pit and fissure sealants:

Sealing Incipient Lesions – Do the Caries Continue to Progress?

Research findings consistently indicate the caries process is inhibited when sealants are applied to incipient lesions. These findings have been demonstrated radiographically and microscopically. A systematic review by Griffin et al., 2008¹⁰ examined the effectiveness of sealants in preventing caries progression and found that the median annual percentage of non-cavitated lesions progressing was 2.6% for sealed and 12.6% for unsealed carious teeth. They concluded that sealing non-cavitated caries in permanent teeth is effective in reducing caries progression. The intact sealants provide “100% protection” in preventing caries. The percent of progression of carious lesions increase minimally over time as sealant integrity was compromised. Despite this good evidence, a recent survey on dentists’ perspectives on evidence based recommendations suggested that the U.S. dentists have not adopted evidence-based clinical recommendations regarding the sealing of non-cavitated caries lesions (NCCLs).¹¹ According to practice guidelines published by the American Dental Association in 2018, experts recommend the use of sealants plus 5% sodium fluoride varnish applied every 3-6 months or sealants alone, versus fluoride varnish only.¹²

Retention Rates - What if the Sealant Falls Out?

Sealant effectiveness is greatly related to sealant retention. While placing sealants, steps need to be taken that enhance sealant retention such as having a very dry field, although newer products may not require this as the products are hydrophilic or while using glass ionomer products. Sealant retention is principally the result of resin tags penetrating the microporosities that occur when enamel is etched properly and the field is dry. In general, properly placed sealants do not fall out. In a systematic review by Griffin et al., 2009, it was found that surface cleaning with toothbrush and assistance during sealant placement may result in higher retention.¹⁰ Cochrane Database of Systematic Review³ evaluating caries prevention by sealants concluded, the reduction in caries ranged from up to 51% in 12 months with similar results at 48 months. If the occlusal bulk wears away or is lost, there is clinical evidence the resin tags remain and the surface is protected. The photograph in (Figure 5) shows a sealant with the tooth structure dissolved leaving only the resin tags.

Griffin et al., 2009 in a systematic review reported that teeth with fully or partially lost sealant were not at a higher risk of developing caries than were teeth that had never been sealed.¹⁰ Inability to provide a retention-check examination to all children participating in school sealant programs because of loss to follow-up should not disqualify a child from receiving sealants.¹⁰ Further, a 2014 study by Fontana et al¹³ suggested that occlusal surfaces without frank cavitation that are sealed with a clear sealant can be monitored with International Caries Detection and Assessment System (ICDAS), quantitative light-induced fluorescence (QLF), or DIAGNOdent, which may aid in predicting the need for sealant repair.

Etching Removes Enamel - Will the Unsealed Etched Surface be More Susceptible to Caries?

Remineralization begins as soon as saliva coats the surface and forms an organic pellicle over the etched tooth structure; thus, the tooth surface is protected. For reference, the etching process used for sealants removes about 10



Figure 5. Sealant with the tooth structure dissolved.

microns of enamel and polishing with pumice removes about 4 microns.

Cost Effectiveness - Do You Save Money?

For years, average cost of a one-surface amalgam restoration has remained about double the cost of a sealant. Studies suggest sealants are cost-effective, particularly in children at increased risk for tooth decay.^{14,15} Having auxiliaries perform this procedure can also reduce the cost. Placing sealants at the time of the recall appointment and using a risk assessment protocol to determine which surfaces to seal are also ways to reduce cost.

Removing Tooth Structure - Is it Necessary?

Using a bur to clean out pits and fissures and the placement of a composite resin restoration is a common procedure instead of placing a sealant. The procedure, preventive resin restoration, is billed as a one surface restoration. Local anesthetic is used in many cases and auxiliaries cannot do the procedure. Air abrasion is sometimes used to clean out pit and fissures prior to placement of sealants. Many states interpret the use of air abrasion as removal of hard tooth structure and, therefore, not all auxiliaries will be allowed to place the sealant materials. Labor is a major cost in the dental office; it is more effective to use qualified auxiliaries.

Payment - Do Insurance Companies Cover this Procedure?

Medicaid coverage in all 50 states covers the placement of pit and fissure sealants. Most Health Maintenance Organization's dental plans cover sealants as a preventative procedure. Also, many of the fee for service plans cover

sealants because they have determined the use of sealants is a cost effective method of preventing higher cost restorative treatment. The Centers for Medicare and Medicaid Services (CMS) national oral health goal is to increase the rate of sealants in the Medicaid/Children's Health Insurance Program (CHIP) population.

Technique

Dentists, dental hygienists, and, in many states, dental assistants can place sealants. State practice acts make the determination as to who can diagnose, supervise, and place sealants. Many states require some type of educational program, sometimes with a laboratory as well as a clinical program, to qualify auxiliaries to place sealants. Placing sealants is not without problems. New materials and improved dental equipment has certainly made the application procedure easier and more successful. Potential problems start with the age of the patient. Many 6 - to 7 year olds have never had a dental procedure outside of examinations and cleanings. This procedure should be as pleasant as possible. This might be the introduction of dentistry to a child and if the least bit traumatic, could set a pattern for life.

Procedures for Pit and Fissure Sealant Placement

Procedures for pit and fissure sealant placement may vary based on type of sealant and manufacturer. Referring to the manufacturer's instructions is recommended before proceeding. Below are basic procedures indicated for resin-based sealants. Exceptions for chemical cured and/or glass ionomer sealant placement are noted.

Tray Set Up

Prior to the start of the procedure, a tray with all necessary instruments, supplies, and equipment should be prepared. The items listed below are included in the sample tray set-up (Figure 6). Each operator needs to determine what should be included on the tray based on personal preferences and the sealant material being used.

Step One - Clean the Tooth Surface

The tooth surface must be thoroughly cleaned prior to the placement of the sealant. Cleaning can be accomplished using hydrogen peroxide,



Mirror
Explorer (No. 5)
Cotton Pliers
Isolation Device such as cotton rolls
or other substitutes
Saliva ejector
Syringe Tip
Slow Speed Handpiece
Toothbrush
Material
Directions
Curing Light
Articulating Paper

Figure 6. Tray set-up.

a toothbrush, a prophy cup or brush, or a prophy jet. Products containing fluoride and/or glycerin are contraindicated and should not be used to clean the tooth. After cleaning, the surface should be rinsed approximately 20 seconds. An explorer should then be used to examine the entire tooth surface for any remaining debris and previously undetected pathology (Figures 7-8). If debris remains, the tooth surface should be cleaned again. If pathology is detected, the decision to seal the tooth should be reevaluated.

Step Two - Isolate the Tooth Surface

Isolation is the most critical issue in the proper placement of resin based sealants. If the surface of the etched tooth is contaminated by saliva, the resin material will not adhere because the remineralization process begins as soon as saliva touches the etched surface. Sealant loss and immediate failure of retention are most often linked to moisture or salivary contamination. A rubber dam is the ideal method for tooth isolation for sealants, but it is not always possible or appropriate for young



Figure 7.



Figure 10.



Figure 8.



Figure 11.



Figure 9. Isolation Methods.

children. Cotton rolls, dry field pads, dry field kits, and single tooth isolation are all used with success. Figure 9 illustrates acceptable isolation methods. If using a glass-ionomer product, isolation is not necessary as these products are not sensitive to moisture contamination.

Step Three - Etch the Tooth Surface

Etching the surface of the tooth, also called conditioning, is accomplished by using 38% phosphoric acid. The acid use in etching the tooth has the additional benefit of killing the bacteria in the pit and fissures. This acid is available in liquid and gel. If a gel is used, it is important to use a gel product that is specifically designed for pit and fissure sealants. Other gels may be too viscous and will not flow

properly into the pits and fissures. The etching time is approximately 20 seconds for both primary and permanent teeth. Figures 10-11 illustrate the placement of acid on the tooth surface.

Step Four - Rinse and Dry the Tooth Surface

After etching for 20 seconds, the surface needs to be rinsed with water to remove the acid. Suction and air should be used to thoroughly dry the etched tooth surface. Again, it is extremely important to avoid salivary contamination. If the tooth surface is contaminated by saliva, it will be necessary to repeat the etching process (Figures 12-13).

A properly etched surface will appear chalky (Figure 14). A microscopic view of an etched tooth surface (Figure 15).

Step Five - Apply the Bonding Agent/Primer (Optional)

Place a thin layer of bonding agent, gently thin bonding agent with air; cure according to manufacturer's instructions. This step is optional. Some manufacturers will recommend the use of a bonding agent to increase the retention of the sealant.



Figure 12.

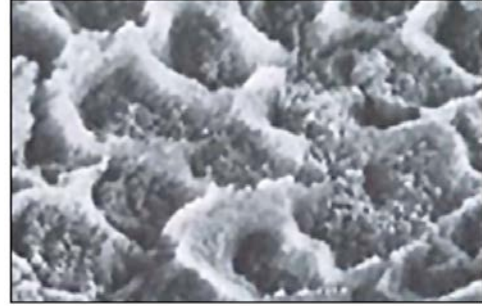


Figure 15.



Figure 13.



Figure 16. Placing sealant material with syringe.

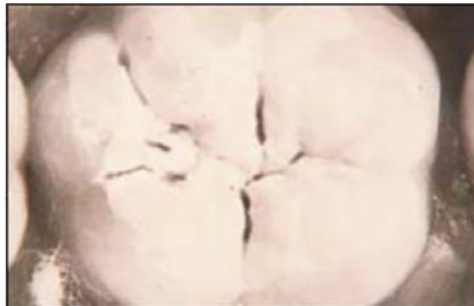


Figure 14.

Step Six - Apply the Sealant Material

It is important to be familiar with the particular sealant material being used. Some clinicians find it helpful to place a photocopy of the manufacturer's instructions on the tray set-up and review them before beginning the procedure.

Chemically cured sealant material includes two components that must be mixed just before placement. The curing process starts as soon as the materials are mixed and there is a limited amount of time when the material can be successfully placed in the pits and fissures.

Light cured sealant material is placed as dispensed without any mixing. The curing

process does not begin until it is exposed to the light source. (Figure 16).

Sealant material is placed on the prepared tooth using a syringe (Figure 16). Regardless of how it is delivered, it is important to limit the amount of material. The sealant material should be placed only in the pits and fissures. Too much material can result in occlusal interference. Over manipulation of the product may result in bubbles. Although occlusal interference is not a major concern, the amount of material should also be limited when sealing pits and fissures on lingual and buccal surfaces.

Step Seven - Curing the Sealant

After the light cured sealant material is applied and the operator is satisfied all surfaces are coated using the correct amount, the sealant should remain undisturbed for 10-20 seconds before applying the curing light. This delay allows the resin to flow into the etched surface. It takes about 30 seconds of concentrated visible light to set the light cure material. The tip of the curing light wand should be held approximately 3 to 5 mm from the surface of the sealant (Figure 17).



Figure 17. Curing light wand positioning.



Figure 18. Curing light wand positioning.



Figure 19. Curing light wand positioning.



Figure 20. Pit and fissures being checked.

As previously stated the curing process for chemically cured sealant material begins as soon as the material is mixed. After the material is applied and the operator is satisfied all surfaces are coated using the correct amount, the sealant should remain

undisturbed for 60 seconds. The sealant material will be completely cured 60 seconds after mixing.

Step Eight - Evaluate the Sealant

Immediately after the material has cured the sealant should be evaluated for retention, flaws, and occlusion. Use an explorer to check for retention and flaws. If a sealant is going to fail, it most likely will do so immediately. If there are bubbles, voids, or any portion of the material comes out, more sealant material may be added. It will be necessary to re-isolate and etch before placing the material again. The occlusion of the sealant should be checked with articulating paper (Figures 18-19). If there is any indication of interference, the excess sealant material should be removed using a round finishing bur in a high or slow speed handpiece.

Some additional recommendations:

- Treat one quadrant at a time
- Use of an assistant and four-handed dentistry can expedite the process and help ensure proper technique, particularly when isolation is critical.
- Patient and clinician should wear safety goggles.

Documentation

An appropriate entry should be made in the patient's record indicating the date, surfaces sealed, and type of material used. Depending on the circumstances the operator may want or need to provide other pertinent information.

Follow-up

Pit and fissure sealants should be checked annually (Figure 20). If some or all of the material has been lost, it should be replaced. Regular radiographs are helpful to follow the success of this procedure. Parents and patients must be educated about the importance of re-evaluating the sealants and an overall preventive dentistry regimen including proper homecare, fluoride exposure (either systemic and/or topical) and the avoidance of cariogenic foods and drinks.

Public Health Programs

Pit and fissure sealants can be placed in many settings; therefore, it is a portable procedure.

This has led to many uses by public health dentistry. Most of the historical studies that were used to determine the efficacy of dental sealants were done in public health settings. Since this procedure can be done with minimal equipment and costs, those with access problems can be accommodated. There are governmental programs such as “*Seal America*” and SEALS which provide resources for community groups to start sealant programs.

There has been more focus on population-based health at the state and national level. United States Public Health Service has established a national health objective for the year 2020 to increase the proportion of children and adolescents who have received dental sealants on their molar teeth. Oregon’s Senate Bill 660 states “By using evidence-based data and best practices, the Oregon Health Authority shall promote oral health throughout this state by ensuring the availability of dental sealant programs to students attending school in Oregon.” A report released by the Centers for Disease Control and Prevention in 2016, reported that overall sealant use prevalence has increased to 46% during the period of 2011-2014 as compared to 31% measured from 1999-2004 but disparities still exist among socioeconomic groups.¹⁶ Pew Children’s Dental Campaign released a report focusing on prevention, examining states’ efforts to

improve access to sealants for low-income kids. They reported that 39 states and the District of Columbia do not have sealant programs in a majority of high-need schools—those with a high proportion of children most at risk of decay. Unfortunately, two states have no programs in these schools. “Only 13 states have met the Healthy People 2010 goal of sealing the permanent molars of at least half of their 8-year-olds.”¹⁷

Conclusion

Dental sealants are an evidence-based clinical practice and are recommended by federal agencies (Centers for Medicare and Medicaid Services; Centers for Disease Control and Prevention; U.S. Department of Health and Human Services) as well as by professional organizations (American Dental Association; American Academy for Pediatric Dentistry) as an effective preventive method to avoid decay in permanent teeth in children. Dental sealants are truly the added link in preventative dentistry. Ongoing research continues to find this procedure effective, safe, and of a low enough cost that all populations can access this service. With the use of fluorides, regular dental evaluations, patient education, plaque control, reduction of sugar exposure, and the use of dental sealants, future generations will have healthy, non-restored dentitions.

Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: www.dentalcare.com/en-us/ce-courses/ce673/test

- 1. According to the Cochrane Database of Systematic Review, what is the one-year reduction in caries following properly placed dental sealants?**
 - A. 51%
 - B. 86%
 - C. 75%
 - D. 39%

- 2. How does the cost of placing a dental sealant compare to the cost of placing an occlusal amalgam restoration?**
 - A. A sealant costs twice as much as a restoration.
 - B. A sealant costs about the same as a restoration.
 - C. A restoration costs about 50% less than a sealant.
 - D. A restoration costs twice as much as a sealant.

- 3. The need for placement of dental sealants has become more of a necessity because:**
 - A. Occlusal surfaces are protected by fluorides.
 - B. The American diet contains less fermentable carbohydrates than in the past.
 - C. Disease trends indicate the majority of caries are occlusal.
 - D. The placement of two surface amalgams that cover the occlusal surfaces.

- 4. Which of following methods of protecting the occlusal surfaces of teeth removes the least amount of enamel?**
 - A. Preventive resin restorations
 - B. Prophylactic odontotomy
 - C. Dental sealants
 - D. Small amalgam restorations

- 5. Which of the following is the most critical step in the placement of resin based pit and fissure sealants?**
 - A. Material selection
 - B. Light curing
 - C. Isolation
 - D. Cleaning the tooth surface

- 6. What is the appropriate curing time for light cured sealant materials?**
 - A. 10 seconds
 - B. 30 seconds
 - C. 80 seconds
 - D. 120 seconds

- 7. When saliva touches the tooth surface, what takes place immediately?**
 - A. Demineralization
 - B. Remineralization
 - C. Activation
 - D. Nothing

- 8. When placing the sealant material it is important to:**
- A. Use the maximum amount of material to insure full occlusal coverage.
 - B. Use all of the material in the dispenser.
 - C. Use the minimum amount of the material to cover all the pits and fissures.
 - D. Use air to move the material around.
- 9. After placing the sealant, it is necessary to evaluate the procedure by doing which of the following?**
- A. Exploring for voids or bubbles.
 - B. Checking how securely the sealant is attached to the tooth surface.
 - C. Checking the occlusion for premature contacts.
 - D. All of the above.
- 10. Which of the following is the most appropriate method for removing excess material from a polymerized sealant?**
- A. Scraping with a sharp instrument.
 - B. Using a finishing bur with a hand piece.
 - C. Using prophy paste and a brush.
 - D. All of the above.
- 11. How do acid etching and prophylactic polishing compare with regard to loss of tooth structure?**
- A. Etching removes approximately 10 microns and polishing removes approximately 4 microns.
 - B. Etching removes approximately 4 microns and polishing removes approximately 10 microns.
 - C. Both procedures remove the same amount of enamel.
 - D. Neither procedure removes tooth structure.
- 12. Which tooth surface benefits the least from the caries reducing effects of fluoride?**
- A. Incisal surfaces
 - B. Smooth surfaces
 - C. Pits and fissures
 - D. Proximal surfaces
- 13. How do patients seeking dental treatment in private offices differ from those treated in community sealant programs?**
- A. They are episodic users of primary dental care services.
 - B. They seek treatment when in pain.
 - C. They are more likely to have continuous care.
 - D. They do not differ in how they use the dental care system.
- 14. Tooth enamel that is etched but not covered with sealant material will:**
- A. Decay
 - B. Demineralize
 - C. Discolor
 - D. Remineralize
- 15. Most of the historical studies that proved the efficacy of dental sealants were done in which of the following environments?**
- A. University settings
 - B. Private dental offices
 - C. Public health settings
 - D. Dental hygiene clinics

References

1. Fleming E, Afful J. Products - Data Briefs - Number 307 - April 2018. Centers for Disease Control and Prevention. Accessed February 17, 2020.
2. CDC. Promoting Health for Children and Adolescents. 2019 Sep 10. Accessed February 17, 2020.
3. Ahovuo-Saloranta A, Forss H, Walsh T, et al. Sealants for preventing dental decay in the permanent teeth. *Cochrane Database Syst Rev*. 2013;(3):CD001830. Published 2013 Mar 28. doi:10.1002/14651858.CD001830.pub4.
4. Wright JT, Tampi MP, Graham L, et al. Sealants for Preventing and Arresting Pit-and-fissure Occlusal Caries in Primary and Permanent Molars [published correction appears in *Pediatr Dent*. 2017 Mar 15;39(2):100]. *Pediatr Dent*. 2016;38(4):282–308.
5. Al-Sabri FA, El-Marakby AM, Mourshed BD, et al. Efficiency of Fissure Sealants in Dental Caries Prevention Among Young School Children. A Comparative Evaluation. *International Journal of Medical Dentistry*. 2017 Oct/Dec;21(4):271–278. Accessed February 17, 2020.
6. Fung EY, Ewoldsen NO, St Germain HA Jr, et al. Pharmacokinetics of bisphenol A released from a dental sealant. *J Am Dent Assoc*. 2000;131(1):51–58. doi:10.14219/jada.archive.2000.0019.
7. Söderholm KJ, Mariotti A. BIS-GMA--based resins in dentistry: are they safe?. *J Am Dent Assoc*. 1999;130(2):201–209. doi:10.14219/jada.archive.1999.0169.
8. Mickenautsch S, Yengopal V. Caries-preventive effect of glass ionomer and resin-based fissure sealants on permanent teeth: An update of systematic review evidence. *BMC Res Notes*. 2011;4:22. Published 2011 Jan 28. doi:10.1186/1756-0500-4-22.
9. Tilliss TS, Stach DJ, Hatch RA, Cross-Poline GN. Occlusal discrepancies after sealant therapy. *J Prosthet Dent*. 1992;68(2):223–228. doi:10.1016/0022-3913(92)90318-5.
10. Griffin SO, Oong E, Kohn W, et al. The effectiveness of sealants in managing caries lesions. *J Dent Res*. 2008;87(2):169–174. doi:10.1177/154405910808700211.
11. Tellez M, Gray SL, Gray S, Lim S, Ismail AI. Sealants and dental caries: dentists' perspectives on evidence-based recommendations. *J Am Dent Assoc*. 2011;142(9):1033–1040. doi:10.14219/jada.archive.2011.0324.
12. Slayton RL, Urquhart O, Araujo MWB, et al. Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: A report from the American Dental Association. *J Am Dent Assoc*. 2018;149(10):837–849.e19. doi:10.1016/j.adaj.2018.07.002.
13. Fontana M, Platt JA, Eckert GJ, et al. Monitoring of sound and carious surfaces under sealants over 44 months. *J Dent Res*. 2014;93(11):1070–1075. doi:10.1177/0022034514551753.
14. Beltrán-Aguilar ED, Barker LK, Canto MT, et al. Surveillance for dental caries, dental sealants, tooth retention, edentulism, and enamel fluorosis--United States, 1988-1994 and 1999-2002. *MMWR Surveill Summ*. 2005;54(3):1–43.
15. Llodra JC, Bravo M, Delgado-Rodriguez M, Baca P, Galvez R. Factors influencing the effectiveness of sealants--a meta-analysis. *Community Dent Oral Epidemiol*. 1993;21(5):261–268. doi:10.1111/j.1600-0528.1993.tb00771.x.
16. Griffin SO, Wei L, Gooch BF, Weno K, Espinoza L. Vital Signs: Dental Sealant Use and Untreated Tooth Decay Among U.S. School-Aged Children. *MMWR Morb Mortal Wkly Rep*. 2016;65(41):1141–1145. Published 2016 Oct 21. doi:10.15585/mmwr.mm6541e1.
17. Koppelman J, Cohen RS, Maas W. States Stalled on Dental Sealant Programs, A 50-State Report. 2019 Apr 23. Accessed February 17, 2020.

Additional Resources

- No Additional Resources Available.

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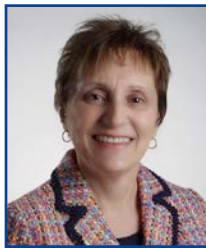


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