

# Utilization of Pit and Fissure Sealants by Parental Education: A Systemic Review

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## Abstract

This article discusses the oral health status of children in the United States, including sealant prevalence, and reasons why sealants are underutilized, including current reimbursement levels. The article also explains similarities and differences between sealant use in private practice versus public health settings, as well as the effectiveness and economic aspects of school-based sealant programs. Finally, the article briefly discusses factors related to parents' inclination to obtain sealants for their children. Development of a health communication message, to address the concerns of parents can greatly influence the utilization of sealants and reduce the overall untreated cavities in children.

**Key words:** Children, Decay, Parental education, Pit and fissure sealants, Prevention, Sealants

## INTRODUCTION

In the United States, nearly one-fourth of children and one-half of adolescents experienced dental decay in their permanent teeth as per the data collected by National Health and Nutrition Examination Survey 2011–2012. When compared with many other nations, Americans have good oral health as well as general health because of access to modern technologies.<sup>[1]</sup> However, when we see the oral health of Americans dental cavities is most prevalent oral disease in children.<sup>[1]</sup>

According to the center of disease control, 1 of 5 (20%) children aged 5–11 years have at least one untreated decayed tooth.<sup>[2]</sup> Pit and fissure sealants are still underused despite their documented efficacy in preventing dental caries in children.

Treatment of tooth decay is essential in children because pain and infection caused due to untreated tooth decay may cause discomfort to children with addition of problems with eating, speaking, playing, and learning in school.<sup>[2]</sup>

Thorough brushing and flossing helps remove food particles and plaque from the smooth surfaces of teeth, but toothbrushes cannot reach all the way into the depressions and grooves to extract all food and plaque. While fluoride helps prevent decay and helps protect all the surfaces of the teeth, dental sealants add extra protection for the grooved and pitted areas.<sup>[3]</sup>

## Objective

Raise awareness of dental caries and needs for prevention among parents of young children. Influence perceptions, beliefs, and attitudes that may change social norms related to prevention of dental caries.

## LITERATURE REVIEW

Dental caries is the localized destruction of susceptible dental hard tissues by acidic by-products from bacterial

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fermentation of dietary carbohydrates. Acid-producing bacteria, known as *Mutans Streptococci*, live in the tissues of the mouth and metabolize sugars.<sup>[4]</sup> With time progress, the acid produced demineralizes the tooth structure causing caries, but the disease process is initiated within the bacterial biofilm (dental plaque) that covers a tooth surface. Dental caries is a multifactorial disease that starts with microbiological shifts within the complex biofilm and is affected by salivary flow and composition, exposure to fluoride, consumption of dietary sugars, and by preventive behaviors (cleaning teeth).<sup>[5]</sup>

Risk factors for caries vary by person, even they are changeable. Physical and biological risk factors for caries include quantity and composition of saliva, numbers of cariogenic bacteria in the oral cavity, and fluoride exposure.<sup>[6]</sup> Lifestyle and behavioral factors include oral hygiene state, consumption and frequency of sugar, inappropriate brushing, and faulty techniques of feeding child and infants. Poverty, inappropriate dental fillings are other factors affecting caries.<sup>[6]</sup>

As stated by centers for disease control and prevention (CDC) website, at least one untreated decayed tooth is present in children aged 5–11 years about 1 of 5 (20%), whereas 1 of 7 (13%) has the untreated decayed tooth in adolescents aged 12–19 years.<sup>[2,7]</sup> Pit and fissure sealants have been used for five decades to prevent and control carious lesions on primary and permanent teeth. According to one CDC statistics, sealants have been shown to reduce the risk of decay by nearly 80% in molars. In October 2016, the centers for disease control released a report on the importance of sealants for school-aged children, of which only 43% of children ages 6–11 have dental sealants. Due to this reason, addressing this issue in children is necessary. Sealants are cost-effective as it saves the direct costs such as costs of materials, administrative time, procedure time, and the indirect costs such as the patient's travel time and time off work. In return, it gives benefits, reduction in caries, reduction in number of dental visits, and procedures.<sup>[3]</sup>

Dental sealants are thin, plastic coatings painted on the chewing surfaces of the back teeth, which have deep grooves and fissures on chewing surfaces.<sup>[3]</sup> Research studies conducted by CDC concludes that dental sealants are the safe and effective procedure that reduces tooth decay, helps to shield grooved areas of the tooth where fluoride toothpaste is not protective. Sealants are painted on as a liquid and quickly harden to form a shield over the tooth, which act as a physical barrier that stops or inhibits the ingress of bacteria and nutrients.<sup>[8]</sup>

Many states in the United States of America are running school-based dental sealant program. One of the programs is “Seal,” which is running in Michigan. A programmatic

framework such as “Seal” is recommended because they are cost-effective, feasible in terms of time and money. In addition, it tries to cover the risk population in majority group as children have more time at school than any other place. State and local governments can easily connect with school. Parents see schools as a trustworthy place so they will accept the service more commonly. They can be modified to work with the less human resource in far distant place. However, Seal program is not experienced so it provides non-continuous and episodic access to care has not developed full trust in the community.<sup>[9]</sup> Hence, programmers should make a list of enrolling school advance in 1 year, try to get recognition in the community. There is lack of effective collaboration in partners to address the issue. They do not have any data software, which can help them to secure the data and access to past data to evaluate the program efficacy.<sup>[9]</sup> Provision of incentives to any staff member, children, and dental care providers is not present, so the provision of incentives can facilitate the procedure.

## THEORETICAL FRAMEWORK

Social cognitive theory (SCT) would be used to explain how people regulate their behavior through control and reinforcement to achieve goal-directed behavior that can be maintained over time. The cognitive formulation of social learning theory that has been best articulated by Bandura, explains human behavior in terms of a three-way, dynamic, reciprocal model in which personal factors, environmental influences, and behavior continually.<sup>[10]</sup> SCT synthesizes concepts and processes from cognitive, behavioristic, and emotional models of behavior change, so it can be readily applied to counseling interventions for disease prevention and management. SCT can promote behavior change in the individual as self-control, reinforcement, and self-efficacy constructs are helpful in goal-setting, self-monitoring, and behavioral contracting. Goal-setting and self-monitoring seem to be particularly useful components of effective interventions.<sup>[11]</sup>

In addition, positive strengths of using SCT are that it puts emphasis on social influence, external and internal social reinforcement. SCT considers the unique way in which individuals acquire and maintain behavior, while also considering the social environment in which individuals perform the behavior.<sup>[12]</sup>

### Why sealants are underutilized?

The factors backing to the adoption of pit and fissure sealants by the oral health provider are multifaceted, which include following: (1) Poor or inconsistent results reported from early scientific studies.<sup>[13,14]</sup> Clinical experience of first-generation sealants with poor results may have

**Table 1: Social cognitive theory application**

Concept	Definition	Application
Reciprocal determinism	Behavioral changes result from interaction between the person and the environment	Make aware parent/community about dental sealants, encourage dental care providers to take a part in school dental sealants program
Behavioral capability	Knowledge and skills to influence behavior	Impart knowledge about dental sealant it is simple harmless procedure; provide essential training to dental care providers to work efficiently and faster, enroll in program
Expectations	Beliefs about likely results of action	It is cost-effective procedure, helps to provide good oral hygiene that is essential for basic physical, social health, and individual empowerment.
Self-efficacy	Confidence in ability to act and to persist in action	Build confidence in parents that socioeconomic status will not interfere in procedure it is basic right of child, dental care providers have ability to do correct, positive procedure.
Observational learning	Beliefs based on observing other like oneself and/or visible physical results	Provide information from authentic sources such as ADA, CDC, WHO, and educational video of past procedures done on child.
Reinforcement	Responses to a person's behavior that increase or decrease the chances of recurrence	Give extra credit to enrolling children, incentives to children/dental care providers, provide necessary tools for procedure.

ADA: American dental association, CDC: Centers for disease control and prevention

dejected them from using new generation of sealants that showed improved results, (2) some of the obstacles against the use of sealants start in dental schools, some continue to be deep-rooted in older private practitioners, and some are due to lack of acquaintance about sealants among parents of young children, and (3) some insurance companies may not offer compensation for sealants.<sup>[12]</sup> As sealants are not unveiled by dental radiographs, insurance companies may be concerned about the likelihood of fraud. In contrast, placements of Class I amalgam restorations are compensated, even within a 2-year period. Representatives of dental insurance companies also have claimed that the core purpose for not providing sealant treatment is that there is “no demand” for such coverage.<sup>[12]</sup>

### Role of Parents in Utilization of Pit and Fissure Sealants

One of the strategies to upsurge sealant utilization is to rise demand for sealants from parents. A resolution to consider these strategies when developing sealant promotion activities of the association was approved by the 2009 CDA House of Delegates.<sup>[15]</sup> Therefore, to raise awareness about pit and fissure sealants, factors related to parents' inclination to obtain sealants for their children should be considered. According to study conducted by North Carolina Department of Human Resources, parents were more likely to obtain sealants for their children if dentist recommended them, if the parents were more highly educated, and if the parents had dental insurance coverage.<sup>[12]</sup>

### Theory based Health Promotion

Info-graphic (Attachment 1) developed using constructs of SCT [Table 1] can increase awareness of preventive measure of decay.<sup>[16]</sup>

This sample of infographic can be useful in addressing concerns of parents regarding rationale of pit and fissure sealants. Health communication message is prepared in simple language, which includes information from American Dental Association.<sup>[17]</sup>

## DISCUSSION

To achieve positive outcome in reducing cavities among children, efforts to augment the utilization of pit and fissure sealants should comprise approaches to encourage dentists to educate parents of young children about the benefits of dental sealants.<sup>[13]</sup> Sealants can be used as a preventive measure for total caries prevention program along with the optimum use of fluoride, reduced frequency of sucrose intake and maintenance of good oral hygiene.<sup>[18]</sup>

Factors such as the effectiveness of sealants on pit and fissure surfaces, the effectiveness of selected placement techniques, and a risk of developing caries in sealed teeth, follow-up rates should be considered in planning process.<sup>[19]</sup> Interpersonal communication strategy can show positive results for the program, as it involves multiple stakeholders to address this issue.<sup>[20]</sup>

## CONCLUSION

The main principle underlying the use of sealants is that “prevention is better than cure.” Non-diseased teeth even though sealed with pit and fissure sealant are more valuable than properly restored teeth. However, the indiscriminate

use of sealants is not appropriate. Maximizing the cost-effectiveness of this preventive approach is the key in success of pit and fissure sealants.

## RECOMMENDATIONS

School authorities may send a flyer of dental sealants including the basic information about dental sealants; it reduces the caries rate, benefits from the procedure. Following this step, parents can be called for a short meeting with one dental care provider along with staff members of the school and children. In the meeting, informative and educating communication using flyers/posters can be carried out. Dental care provider can also show general video of dental sealant procedure done on a child and demonstrates that it is very simple, painless, and effective method for caries prevention. Discussion can be done about the potential benefits gained from the procedure in terms of saving money on a further hectic dental procedure. One of the most important parts of interpersonal communication is the message. It can be conveyed in many ways: speech, body language, tone of voice, gestures and other indicators. Non-verbal messages provide additional information that may not be readily apparent through words. There is a chance to raise questions and get an answer so that the concept is accepted by parents in an easy way and for the long term.

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## ATTACHMENT

**HAPPY TOOTH=HAPPY CHILD**

About 1 of 5 (20%) children aged 5 to 11 years have at least one untreated decayed tooth.

Untreated tooth decay can cause pain and infections that may lead to problems with eating, speaking, playing, and learning.

Applying dental sealants to the chewing surfaces of the back teeth is a way to prevent tooth decay.

Studies in children show that sealants reduce decay in the permanent molars by 81%

school-age children without sealants have almost 3 times more cavities than children with sealants

Sealants can save time, money, and the discomfort sometimes associated with dental fillings.

Getting sealants on teeth are simple and painless procedure.

**HAPPY CHILD=HAPPY PARENT**

REFERENCE: AMERICAN DENTAL ASSOCIATION DR RADHIKA THAKKAR

Attachment 1: Pit and fissure infographic