Policy Directive

Ministry of Health, NSW
73 Miller Street North Sydney NSW 2060
Locked Mail Bag 961 North Sydney NSW 2059
Telephone (02) 9391 9000 Fax (02) 9391 9101
http://www.health.nsw.gov.au/policies/

Pit and Fissure Sealants: Use of in Oral Health Services NSW

Document Number	PD2013_025
Publication date	12-Aug-2013
Functional Sub group	Clinical/ Patient Services - Dental/Oral
Summary	Describes recommended practice and criteria for placement of pit and fissure sealants in Public Oral Health Services, NSW.
Replaces Doc. No.	Pit and Fissure Sealants: Use of in Oral Health Services NSW [PD2008_028]
Author Branch	Centre for Oral Health Strategy
Branch contact	Tanya Schinkewitsch 02 88214314
Applies to	Local Health Districts, Board Governed Statutory Health Corporations, Chief Executive Governed Statutory Health Corporations, Specialty Network Governed Statutory Health Corporations, Affiliated Health Organisations, Community Health Centres, Dental Schools and Clinics, Public Hospitals
Audience	Oral Health Managers, Registered Oral Health Practitioners and Dental Assistants.
Distributed to	Public Health System, Ministry of Health
Review date	12-Aug-2018
Policy Manual	Patient Matters
File No.	03/10089
Status	Active

Director-General

POLICY STATEMENT

PIT AND FISSURE SEALANTS: USE OF IN ORAL HEALTH SERVICES NSW

PURPOSE

This policy directive is presented as a tool to assist oral health practitioners in their clinical decision-making process. As part of the evidence-based approach to care, this policy directive should be integrated with the oral health practitioner's professional judgment and the patient's needs and preferences. The evidence indicates that pit and fissure sealants can be used effectively to prevent the onset and progression of dental caries.

The *Pit and Fissure Sealants: Use of in Oral Health Services NSW – Procedures* reflects what is currently regarded as a best practice approach to the placement of pit and fissure sealants.

MANDATORY REQUIRMENTS

Pit and fissure sealants are safe and effective in preventing dental decay in permanent teeth. Placement of sealants in children and adolescents who have high caries risk following due clinical assessment is mandated for public oral health services.

IMPLEMENTATION

NSW Ministry of Health

- Provides the mandatory requirements, standards and tools to support evaluation of the implementation of this Policy

Chief Executives, Health Service Executives, Managers and Clinical Directors

- Assign responsibility and personnel to implement this Policy
- Provide adequate support to successfully implement this Policy within Local Health Districts.

Oral Health Practitioners

- Must comply with this Policy

REVISION HISTORY

Version	Approved by	Amendment notes
PD2013_025	Deputy Director General, Population and Public Health	PD has been revised to reflect current evidence on the placement of fissure sealants and definition of risk.
PD2008_028	Acting Deputy Director General, Population Health	Rescinded by PD2013_025
PD2007_008	Deputy Director General, Population Health	New Policy

ATTACHMENTS

1. Pit and Fissure sealants: Use of in Oral Health Services NSW - Procedures.

Pit and Fissure Sealants: Use of in Oral Health Services

NSW GOVERNMENT Health

PROCEDURES

Issue date: August 2013

PD2013_025

CONTENTS

1 INTRODUCTION

The oral health of children in NSW has improved substantially over the last thirty years. This has occurred largely as a result of water fluoridation and fluoride toothpaste.

Although dental caries is a multifactorial disease, research has consistently shown that past caries experience is the single most powerful predictor of future caries experience.

Exposure to fluorides preferentially reduces smooth surface and interproximal tooth decay. The anatomy of occlusal tooth surfaces (i.e. deep pits and fissures) means that they cannot be adequately brushed or protected by the presence of fluoride.

2 KEY DEFINITIONS

2.1 "A fissure sealant is a material that is placed in the pits and fissures of teeth in order to prevent or arrest the development of caries". Welbury et al 2006

2.2 Children and adolescents who have high caries risk are defined by:

- Children and young people with impairments
- Children and young people with caries in their primary teeth (dmfs=2 or more) (IAPD and BSPD 2000)
- Demineralised enamel lesions (white spots)
- Radiographic lesions (both enamel and dentine)
- Any site with plaque index = 3 (Procedures page 8) in cases where dmft/DMFT = 0
- DMFT = 0 but molars are hypomineralised or hypoplastic

2.3 Children and adolescents who have low caries risk are defined as:

- dmft/DMFT = 0
- *No* demineralised enamel lesions (white spots)
- *No* radiographic lesions
- *No* sites with plaque index = 3
- *No* molars are hypomineralised or hypoplastic

It should be remembered that none of the definitions for risk are totally accurate and that risk profiles may change over time. Clinical assessment will take into account medical and social history, past caries experience, current risk status and tooth surface anatomy. However, the most significant risk predictors for dental caries are:

- Previous caries history in the primary and permanent dentition; and
- Current level of caries activity.

3 PRINCIPLES AND EVIDENCE

- Occlusal caries accounts for between 80 and 90 percent of caries in children (Weintraub, 2001). The teeth at highest risk for carious lesions are the first and second permanent molars.

- Extensive research indicates that sealants are effective and reliable (Ahovuo-Saloranta et al 2006). They work by keeping food and bacteria out of pits, grooves and fissures on the teeth.

- Sealants are a non-invasive preventive treatment that can be applied by dentists, dental therapists, dental hygienists and oral health therapists.

- Placing sealants in children who have high caries risk is a cost effective option for public oral health services (Weintraub, 2001; Locker and Jokovic 2003).

- Current studies support sealing with resin based sealants rather than using GIC sealants to prevent occlusal caries (Ahovuo-Saloranta et al 2006). However, further research is needed to confirm this.

4 CRITERIA FOR PLACING PIT AND FISSURE SEALANTS

There are two main types of materials used in preventing pit and fissure caries in permanent teeth. These are:

- **Resin based sealants** (filled and unfilled), and
- **Glass ionomer cement (GIC) fissure sealants**

A number of considerations govern the appropriateness of resin based or GIC fissure sealants:

- Ideally, sealants should be placed very soon after eruption of the molar teeth in children who have high caries risk / caries activity. However, the occlusal surfaces of permanent molars remain susceptible throughout childhood and adolescence. Placement of sealants should not be limited to just after eruption, but considered in the light of the current caries risk of both the individual and the tooth surface.

- Before placing (or replacing) a sealant on an apparently sound surface, it is important to exclude the presence of dentine lesions (Procedures pg 3). This should be confirmed through mandatory bitewing radiography and meticulous visual examination. Where caries extends into dentine the tooth should be restored.

- Retention of the sealant is of prime importance in maintaining the preventive action. Therefore the ability to control moisture adequately will influence the

choice of sealant material. Resin based sealants require a dry field and will not adhere if moisture control is compromised. GIC sealants are less vulnerable to moisture, so can be used on patients who do not cooperate well with intra oral procedures. A four-handed technique should be used for the placement of both resin-based and GIC sealants (Beauchamp et al, 2008).

- Isolation by rubber dam or cotton rolls are equally effective and result in similar retention rates (Locker & Jokovic, 2003; Muller-Bolla et al, 2006).

- Where pit or fissure caries is evident as either:
  - demineralised enamel with no evident loss of enamel, or
  - a break in the enamel surface with no extension into dentine.

  Sealants can prevent further caries progression by the creation of an anaerobic environment. A resin based sealant must be used.

- Where a completely dry field cannot be maintained a GIC fissure sealant can be used. However, the GIC is a temporary fissure sealant.

5 PLACEMENT TECHNIQUE FOR PIT AND FISSURE SEALANTS

The first and most important step prior to applying fissure sealants is to exclude the presence of dentine caries. A dentine lesion is diagnosed through:

- Mandatory bitewing radiographs that reveal a dentine radiolucency beneath a pit or fissure; and
- Meticulous visual examination where a cavity that extends into dentine is evident.

These lesions should be restored.

5.1 Material Selection

Current evidence available on the retention rates of different types of sealants indicates the following:

- Autopolymerising (chemically cured) sealants and visible light curing sealants have similar retention rates.
- The addition of filler particles to the sealant appears to have little effect on clinical results. Filled and unfilled sealants penetrate the fissures equally well (Feldens, Feldens, de Araujo, et al, 1994), demonstrate no difference in micro-leakage (Park, Georgescu, Scherer, Schulman, 1993) and have similar retention rates.
- Fluoride-containing visible light cured sealants have only been evaluated in short term studies but have retention rates similar to autopolymerising and light cured sealants for the equivalent follow-up periods (Locker, Jokovic and Kay, 2003). It is still to be determined whether or not the incorporation of fluoride leads to further reductions in caries incidence or enhances the inhibition of incipient or inadvertently sealed caries.
- Unfilled resins are available as clear or opaque. Cameron and Widmer (2003) advise the use of opaque sealants so that they can be detected by other clinicians who may treat the patient. Clear sealants show stains in the fissures that are most likely inactive caries. Upon seeing these stains, other clinicians may decide to investigate the stains, therefore defeating the initial purpose of the sealant.
- Retention rates for glass ionomer cements are not as favourable as those for resin-based sealants (Locker, Jokovic and Kay, 2003) however; these materials contain fluoride and therefore, have a caries preventive effect. They are ideal for partially erupted teeth where resin-based sealants are unable to be placed due to the inability to create a moisture-free environment (it must be remembered that without this treatment these teeth may become carious by the time they have become accessible enough to place a resin-based sealant).

5.2 Sealant Application

Each sealant material requires specific techniques for their designed adhesion onto enamel.

- Resin-based sealants rely on a micromechanical bond made possible by use of an acid-etch technique which creates micro pores in the enamel that interlock the resin and enamel (Slough, 2006).
- Glass ionomer sealants bond chemically to the enamel without the use of the acid-etch technique, which makes them less vulnerable to moisture. They can also

interact with enamel and release calcium, strontium and fluoride ions, which may have cariostatic actions and reduce the likelihood of primary caries development on a sealed surface (Walsh, 2006).

To ensure successful placement it is essential that the following placement techniques described for each material are adhered to:

5.3 Unfilled Resin

- Consult a recent bitewing radiograph (within 12 months) to exclude the presence of any dentinal caries.
- Isolate the tooth using rubber dam. If rubber dam placement is unsuccessful, alternative isolation methods must be employed (cotton rolls, dry guards, suction, and the utilisation of a dental assistant).
- If a moisture free environment cannot be assured, consider the use of Glass Ionomer Cement.

> *Adequate isolation is the most critical aspect of fissure sealant application (Harris and Garcia-Godoy, 1999). If the enamel porosity created by the etching procedure is filled by any type of liquid, the formation of resin tags in the enamel is either blocked or reduced, resulting in poor retention of the sealant. In the event of moisture contamination re-etching of the surface is indicated.*

- Remove gross debris if present with a prophy brush using oil-free pumice and water.

> *It is important to make sure that the tooth surfaces and fissure areas are free of gross plaque and debris that might interfere with the etching process or sealant penetration.*

- Apply acid etch to the surfaces to be sealed.

> *The most frequently used etchant material is 37 percent orthophosphoric acid. The etchant should be applied onto all the susceptible pits and fissures of the tooth and extended up the cuspal inclines well beyond (at least 2 millimetres) the anticipated margin of the sealant. Etching for 20-30 seconds is now fairly standard (refer to manufacturer's recommendations for product being used.*

- Thoroughly rinse and dry the tooth.

> *Waggoner and Siegal (1996) consider that exact washing and drying times are not as important as ensuring that both washing and drying are thorough enough to remove all etchant from the surface of the tooth to give a chalky, frosted appearance. If, after several seconds of air drying, the tooth does not become frosted, it will need to be re-etched.*

- Apply a thin coat of the sealant material to pits and fissures making sure to include the buccal extension on lower molars and the palatal groove in upper molar teeth.

Care should be taken not to extend the sealant beyond the etched area as this will place the margins at risk of leaking and / or staining. During application of the sealant material small bubbles may form in the material. These should be removed with a small brush or the tip of the probe prior to polymerisation.

- Apply the white polymerisation light.

The tip of the light should be held as closely as possible to the sealant. The manufacturer's recommendations for polymerisation times should be adhered to. If light activation time is insufficient, poor bonding and subsequent failure of the sealant may result.

- Check sealant with a probe to ensure the integrity of the sealant and that the margins are sealed.
- Remove the rubber dam and check the occlusion with articulating paper.
- If necessary adjust with composite finishing bur.
- Monitor sealants through annual recall. If monitoring is not possible GIC sealants provide an alternative treatment.

5.4 Glass Ionomer Cement

- Consult a recent bitewing radiograph (within 12 months) to exclude the presence of dentinal caries.

- Isolate the tooth using cotton roll isolation, dry guards, suction and the use of a dental assistant. Where possible the use of rubber dam is indicated; it is a positive behaviour management tool for some children (eg. those who object to the taste of the materials being used).

One of the main clinical advantages of GIC is its ability to bond chemically to dentine and enamel without the use of the acid-etch technique, which makes it less vulnerable to moisture. The other clinical advantage of GIC is the active fluoride release into the surrounding enamel.

- Remove gross plaque if present.

- Apply conditioner for 10-20 seconds (adhere to manufacturer's instructions for individual products).

This step will remove plaque and pellicle and reduce the surface energy of the enamel to allow the cement to adapt readily and develop a good adhesion.

- Wash the tooth thoroughly and dry lightly.
- Apply the glass ionomer material to all pits and fissures.

- Place a thin layer of a recommended protective agent over the surface of the GIC (adhere to manufacturer's instructions for individual products).

The placement of a protective agent over the GIC will protect the material from moisture contamination during the first 24 hours after placement.

- Check the occlusion with articulating paper.
- If necessary, adjust using standard finishing techniques.
- If adjustment is required, reapply another layer of the protective agent.

6 ADDITONAL INFORMATION

- Application of sealants should be part of a complete prevention program, not an isolated procedure. Hence, diet advice, oral hygiene instructions and topical fluoride applications should be included in the treatment plan.

- Although occlusal tooth surfaces on permanent molar teeth are particularly susceptible to caries development, in a child who has high caries risk sealants may also be indicated for the following teeth/surfaces:
  - Hypoplastic teeth and teeth with developmental defects or weaknesses;
  - Upper palatal pits of maxillary lateral incisors;
  - Deep cingulum in permanent upper anterior teeth; and
  - Permanent premolars with deep pits and fissures.

- Resin based sealants require regular monitoring (i.e. annual recall and radiographic assessment). A monitoring program should be built into the treatment planning for patients who receive resin based fissure sealants.

- GIC fissure sealants are useful for children who have a high caries risk and/or limited cooperation as an interim preventive material for occlusal surfaces before molar teeth are sufficiently erupted to allow conventional resin based fissure sealing (Feigal, 2006). Waiting until it is possible to place a resin based sealant increases the child's risk of developing carious lesions.

- Replacement of lost or failed fissure sealants should be considered after clinical assessment of:
  - The likely reasons for the loss or failure;
  - The possibility of dentine caries being present;
  - The current caries risk status of the child; and
  - The likelihood of successful replacement or repair

References

Ahovuo-Saloranta A, Hiiri A, Nordblad A, Wothington H, Makela M. Pit and fissure sealants for preventing dental decay in the permanent teeth of children and adolescents (Review). The Cochrane Database of Systematic Reviews. 2006. Published by John Wiley & Sons Ltd.

Beauchamp et al. Evidence Based Clinical Recommendations for the Use of Pit-and-Fissure Sealants. The Journal of the American Dental Association. 2008 Vol 139 (3) 257 - 268

British Society of Paediatric Dentistry: a policy document on fissure sealants in paediatric dentistry. International Journal of Paediatric Dentistry 2000; 10: 174-177

Cameron, A. & Widmer, R. (2008).3rd Edition, Handbook of Paediatric Dentistry. London: Mosby.

Feigal, RJ & Donly KJ. Conference Paper: The use of pit and fissure sealants. Paediatric Dentistry 28:2 2006

Feldens, E.G., Feldens, C.A., & de Araujo, F.B et al. (1994). Invasive technique of pit and fissure sealants in primary molars: an SEM study. J Clin Pediatr Dent, 18 (3), 187-190.

Harris, N.O, & Garcia-Godoy, F. (1999). Primary Preventive Dentistry. (5th Ed). London: Asimon and Schuster Company, cited in Welbury, R., Raadal, M., & N.A. Lygidakis. (2004). EAPD guidelines for the use of pit and fissure sealants. European Journal of Paediatric Dentistry, 3, 179-184.

Locker, D., Jokovic, A., & Kay, E.J. (2003). Prevention. Part 8: The use of pit and fissure sealants in preventing caries in the permanent dentition of children. British Dental Journal, 195 (7), 375-378.

Mulla-Bolla et al Retention of resin-based pit and fissure sealants: a systemic review. Community Dentistry an Oral Epidemiology, 2006 Vol 34(5): 321-336

Park, K., Georgescu, M., Scherer, W., & Schulman, A. (1993). Comparison of shear strength, fracture patterns and microleakage amonf unfilled, filled and fluoride-releasing sealants. Paediatr Dent, 15, 418-420.

Slough, T. (2006). Auxiliary Education Programme. Module 19 – Fissure Sealants. Auxiliary, Sep/Oct, 18-20.

Walsh, L.J. (2006). Pit and fissure sealants: current evidence and concepts. Dental_Practice, Nov/Dec, 122-124.

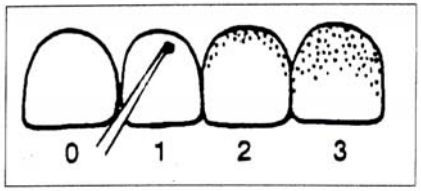
Waggoner, W.F., & Siegal, M. (1996). Pit and Fissure Sealant Application: Updating the Technique. JADA, 127, 351-361.

Weintraub JA. Pit and fissure sealants in high-caries risk individuals. Journal of dental education, 2001 Vol 65, No 10.

Welbury R, Raadal M, Lygidakis N. Guidelines on the use of pit and fissure sealants in paediatric dentistry: a European Academy of Paediatric Dentistry (EAPD) policy document 2006

7 PLAQUE INDEX SCORES

Plaque Index (Silness & Loe)



3 = ***thick*** plaque is clearly visible along gingival margin of wet teeth

2 = plaque is ***visible*** along gingival margin, with or without air drying (no need to probe)

1 = following air drying, plaque is ***not visible***, but ***can be picked up*** with an explorer

0 = following air drying, plaque is ***not visible*** and ***cannot*** be picked up with an explorer

Notes: (1) If an index tooth is missing, score the nearest tooth in that sextant. If there are no teeth in the sextant, enter X.

(2) If the plaque thickness varies along the gingival margin of a surface, score according to the worst situation.

(3) The overall score is the sum of the 12 surface scores (minimum of 0 and maximum of 36)

Date _____

	16	11	26
Buccal Surfaces			
	46	41	36

	16	11	26
Lingual Surfaces			
	46	41	36

Score _____

Source: