Pits and fissure sealant guidelines

Beauchamp J, Caufield PW, Crall JJ, *et al*.
Evidence-based clinical recommendations for the use of pit-and-fissure sealants: a report of the American Dental Association Council on Scientific Affairs. J Am Dent Assoc 2008; 139:257–268

Scope and purpose The guideline aims to address four clinical questions relating to the use of pit and fissure sealants:

- Under what circumstances should sealants be placed to prevent caries?
- Does placing sealants over early (noncavitated) lesions prevent progression of the lesions?
- Are there conditions that favour the placement of resin-based versus glass ionomer cement sealants in terms of retention or caries prevention?
- Are there any techniques that could improve sealants' retention and effectiveness in caries prevention?

Methodology Medline was searched for all systematic reviews on pit and fissure sealants, and the reference lists of identified reviews were searched for additional references. A second search was carried out to identify clinical studies published after the systematic review were completed. Publications were included that addressed one or more of the identified clinical questions, had a documented search strategy, and were written in English. An expert panel was convened to evaluate the evidence and develop recommendations. The draft recommendations were submitted to a wide range of scientific experts and organisations for review, following which appropriate changes were made. The evidence was classified and clinical recommendations made using a system modified from the approach taken by Shekell *et al.*[1] The final clinical recommendations were approved by the American Dental Association Council on Scientific Affairs.

Review and updating Plans were not specified for future review and updating of this guideline.

Recommendations Using the evidence grading and recommendation systems described by Shekelle[1] (table 1 and 2) a number of clinical recommendations were made (see summary in table 3).

Research recommendations A number of topics for additional research to improve the evidence base regarding the use of fissure sealants were identified by the expert panels. These are shown in Table 2.

Commentary

This guideline was developed by a panel of the American Dental Association Council on Scientific Affairs. The evidence used to formulate the guideline and a top-up search for new studies was drawn from trials identified in existing systematic reviews rather than on an independent literature review. Given the number of high-quality systematic reviews in existence on the subject of pit and fissure sealants, this appears a very reasonable and cost-effective approach.

The guideline makes recommendations for the use of sealants in all age groups, from the preschool child through to adulthood, and is therefore of value to all dental professionals. As would be hoped with an evidence-based guideline, there are no recommendations with which someone up-to-date with the literature could take exception. Where they overlap, this guideline (although obviously more up-to-date) generally agrees with existing UK guidance,[2] but it is also more comprehensive and wide-ranging in terms of clinical recommendations. Like the UK guidelines, it recommends sealant placement after a full caries risk assessment.[2–4].

It must be remembered that all recommendations are relevant and they should be taken as a whole: the strength of evidence behind a recommendation does not dictate its importance. Having said this, attention should be drawn to the use of sealants in the primary dentition and in adult permanent teeth, situations where sealants are not routinely utilised in the UK.

There is a very thorough discussion, supported by clinical photographs, of the use of sealants therapeutically to prevent the progression of caries. This covers the clinical examination and the use of existing radiographs to confirm the diagnosis. This recommendation can be summarised as, "if in doubt, seal, don't cut". With regard to technique, the guideline is clear that, at present, self-etching bonding techniques may provide less retention when compared to conventional acid etching. Finally, there is a long list of suggested areas for further research. We have here another guideline recommending the use of sealants for the prevention and management of caries. It is to be hoped that this will lead to an increase in the provision of this effective technique from the current relatively low levels.[5] This guideline presents the most up-to-date evidence-based recommendations on the use of sealants and is therefore to be recommended.

Table 1. System used for grading evidence

Grade	Category of evidence
Ia	Evidence from systematic reviews of RCT
Ib	Evidence from at least one RCT
IIa	Evidence from at least one controlled study without randomisation
IIb	Evidence from at least one other type of quasi-experimental study
III	Evidence from nonexperimental descriptive studies, such as comparative studies, correlation studies, cohort studies and case–control studies
IV	Evidence from expert committee reports or opinions or clinical experience of respected authorities

RCT, Randomised controlled trial.

Table 2. System used for classifying strength of recommendations

Classification	Strength of recommendations
A	Directly based on category I evidence
B	Directly based on category II evidence or extrapolated recommendation from category I evidence
C	Directly based on category III evidence or extrapolated recommendation from category I or II evidence
D	Directly based on category IV evidence or extrapolated recommendation from category I, II or III evidence

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Table 3. American Dental Association evidence-based clinical recommendations regarding pit and fissure sealants

Topic	Recommendation	Grade of evidence	Strength of recommendation
Caries prevention	Sealants should be placed in pits and fissures of children's primary teeth when it is determined that the tooth, or the patient, is at risk of developing caries*†	III	D
	Sealants should be placed on pits and fissures of children's and adolescents' permanent teeth when it is determined that the tooth, or the patient, is at risk of developing caries*†	Ia	B
	Sealants should be placed on pits and fissures of adults' permanent teeth when it is determined that the tooth, or the patient, is at risk of developing caries*†	Ia	D
Noncavitated carious lesions‡	Pit and fissure sealants should be placed on early (noncavitated) carious lesions, as defined in this document, in children, adolescents and young adults to reduce the percentage of lesions that progress†	Ia	B
	Pit and fissure sealants should be placed on early (noncavitated) carious lesions, as defined in this document, in adults to reduce the percentage of lesions that progress†	Ia	D
Resin-based versus glass ionomers cement	Resin-based sealants are the first choice of material for dental sealants	Ia	A
	Glass ionomer cement may be used as an interim preventive agent when there are indications for placement of a resin-based sealant but concerns about moisture control may compromise such placement§	IV	D
Placement techniques	A compatible¶ one-bottle bonding agent, which contains both an adhesive and a primer, may be used between the previously acid-etched enamel surface and the sealant material when, in the opinion of the dental professional, the bonding agent would enhance sealant retention in the clinical situation§	Ib	B
	Use of available self-etching bonding agents, which do not involve a separate etching step, may provide less retention than the standard acid-etching technique and is not recommended	Ib	B
	Routine mechanical preparation of enamel before acid etching is not recommended	IIb	B
	When possible, a four-handed technique should be used for placement of resin-based sealants	III	C
	When possible, a four-handed technique should be used for placement of glass ionomer cement sealants	IV	D
	The oral health care professional should monitor and reapply sealants as needed to maximize effectiveness	IV	D

*Change in caries susceptibility can occur. It is important to consider that the risk of developing dental caries exists on a continuum and changes across time as risk factors change. Therefore, clinicians should re-evaluate each patient's caries risk status periodically.
†Clinicians should use recent radiographs, if available, in the decision-making process, but should not obtain radiographs for the sole purpose of placing sealants. Clinicians should consult the American Dental Association/U.S. Food and Drug Administration86 guidelines regarding selection criteria for dental radiographs.
‡"Noncavitated carious lesion" refers to pits and fissures in fully erupted teeth that may display discoloration not due to extrinsic staining, developmental opacities or fluorosis. The discoloration may be confined to the size of a pit or fissure or may extend to the cusp inclines surrounding a pit or fissure. The tooth surface should have no evidence of a shadow indicating dentinal caries, and, if radiographs are available, they should be evaluated to determine that neither the occlusal nor the proximal surfaces have signs of dentinal caries.
§These clinical recommendations offer two options for situations in which moisture control, such as with a newly erupted tooth at risk of developing caries, patient compliance or both are a concern. These options include use of a glass ionomer cement material or use of a compatible one-bottle bonding agent, which contains both an adhesive and a primer. Clinicians should use their expertise to determine which technique is most appropriate for an individual patient.
¶Clinicians should consult with the manufacturer of the adhesive and/ or sealant to determine material compatibility.

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4. Department of Health/British Association for the Study of Community Dentistry. Delivering Better Oral Health: an Evidence-based Toolkit for Prevention. Department of Health London. Sept; 2007.
5. Pitts NB, Chestnutt IG, Evans D, White D, Chadwick B, Steele JG. The dentinal caries experience of children in the United Kingdom, 2003. Br Dent J 2006; 2000:313-320.

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