Fissure seal or fluoride varnish?

Abstracted from

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Question: What is the effectiveness of fissure sealants compared with fluoride varnishes, or fissure sealants together with fluoride varnishes compared with fluoride varnishes alone, for preventing dental caries?

Data sources Cochrane Oral Health Group Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL), Medline, Embase, the US National Institutes of Health Trials Register and the World Health Organization (WHO) Clinical Trials Registry Platform

Study selection Randomised controlled trials (RCTs) with at least 12 months follow-up, in which fissure sealants, or fissure sealants together with fluoride varnishes, were compared with fluoride varnishes alone for preventing caries in occlusal surfaces of permanent teeth of children and adolescents.

Data extraction and synthesis Two reviewers independently screened search results, extracted data and assessed risk of bias of included studies. Studies were grouped and analysed on the basis of sealant material type (resin-based sealant and glass ionomer-based sealant, glass ionomer and resin-modified glass ionomer) and different follow-up periods. Odds ratio were calculated for caries or no caries on occlusal surfaces of permanent molar teeth. Mean differences were calculated for continuous outcomes and data. Evidence quality was assessed using GRADE (Grades of Recommendation, Assessment, Development and Evaluation) methods.

Results Eight RCTs involving a total of 1747 children aged five to ten years of age were included. Three trials compared resin-based fissure sealant versus fluoride varnish. Results from two studies (358 children) after two years were combined. Sealants prevented more caries, pooled odds ratio (OR) = 0.69 (95%CI; 0.50 to 0.94). One trial with follow-up at four and nine years found that the caries-preventive benefit for sealants was maintained, with 26% of sealed teeth and 55.8% of varnished teeth having developed caries at nine years. Evidence for glass-ionomer sealants was of low quality. One split-mouth trial analysing 92 children at two-year follow-up found a significant difference in favour of resin-based fissure sealant together with fluoride varnish compared with fluoride varnish only (OR 0.30, 95% CI 0.17 to 0.55). The evidence was assessed as low quality. Three studies assessed but did not report any adverse effects.

Conclusions Currently, scarce and clinically diverse data are available on the comparison of sealants and fluoride varnish applications; therefore it is not possible to draw clear conclusions about possible differences in effectiveness for preventing or controlling dental caries on occlusal surfaces of permanent molars. The conclusions of this updated review remain the same as those of the last update (in 2010). We found some low quality evidence suggesting the superiority of resin-based fissure sealants over fluoride varnish applications for preventing occlusal caries in permanent molars, and other low-quality evidence for benefits of resin-based sealant and fluoride varnish over fluoride varnish alone. Regarding glass ionomer sealant versus fluoride varnish comparisons, we assessed the quality of the evidence as very low and could draw no conclusions.

This paper is based on a Cochrane Review published in the Cochrane Library 2016, issue 1 (see www.thecochranelibrary.com for information). Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and the Cochrane Library should be consulted for the most recent version of the review.

Commentary

Pit and fissure sealants (sealants) and fluoride varnish are the two most commonly used professional interventions recommended to prevent caries in the occlusal surfaces of permanent molar teeth [1,2] the occlusal surfaces of which are the most caries prone sites. This Cochrane Systematic Review therefore addresses a very important clinical and public health question: which one of these interventions is the most effective at preventing caries.

As this is a Cochrane Review the methodology is rigorous, with only eight trials meeting the inclusion criteria. One major problem is that the methodologies used in this small number of trials vary so much. For example in one relatively old study surfaces with enamel caries were mechanically prepared before sealant placement, a practice that would now not be advocated.[3,4]

The four studies looking at resin sealant were more conclusive than the three comparing glass ionomer materials with fluoride varnish alone. However, overall, sealants were more effective at preventing occlusal caries than fluoride resin. For example resin sealants were found to be superior to fluoride varnish at two years and for as long as nine years.

The most interesting question is do you get added protection by using fluoride varnish and sealants together, compared to their use alone? Only one trial partly addressed this question by comparing resin sealant plus fluoride varnish with varnish alone, again the sealant arm was found to be superior.[5] This and the other

trials focused on occlusal surfaces alone. Of course fluoride varnish protects adjacent teeth and surfaces and no study examined this. No trial has looked at sealant alone vs sealant plus resin. Although I understand why this latter trial is difficult to justify funding as it would be very unlikely that the sealant alone arm could possibly be superior to the sealant plus fluoride resin arm. On the contrary when the effect of fluoride at adjacent and distant sites is considered the reverse would be anticipated.

So as a clinician are these findings going to alter my practice, the simple answer is no. I am going to continue to apply sealants to protect pits and the occlusal surface and fluoride varnish to protect all surfaces of the tooth.

The results of this review are perhaps therefore of more relevance at a public health level where those considering population interventions may wish to decide whether to opt for a sealant or a varnish programme. Based on the results of this review the choice would be sealant but sealant programmes are much more expensive than varnish ones. Unfortunately no economic analyses were reported in any of the included studies to inform this decision.

A trial which could not have been included in this review because the results are not published has just finished.[6] This trial in S. Wales examined the application of sealant or varnish to the first molars of children in schools. It has a superior methodology to any of the studies included in this review, such as including an economic analysis. When reported the results of this new trial will form a very interesting addition to the next update of this review.

Finally this commentary cannot finish without pointing out that we have two proven interventions but the real problem is dentists do not use them. For example only 10% of dentists in Scotland reported always applying fluoride varnish to their child patients.[7]

Practice points

- Sealants should be applied to protect occlusal surfaces.
- However, fluoride varnish is also effective and should be used as per national guidance.

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