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[Intervention Review]

Dental cavity liners for Class I and Class II resin-based composite restorations

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ABSTRACT

Background

Resin-based composite (RBC) is currently accepted as a viable material for the restoration of caries for posterior permanent teeth requiring surgical treatment. Despite the fact that the thermal conductivity of the RBC restorative material closely approximates that of natural tooth structure, postoperative hypersensitivity is sometimes still an issue. Dental cavity liners have historically been used to protect the pulp from the toxic effects of some dental restorative materials and to prevent the pain of thermal conductivity by placing an insulating layer between restorative material and the remaining tooth structure.

Objectives

The objective of this review was to assess the effects of using dental cavity liners in the placement of Class I and Class II resin-based composite posterior restorations in permanent teeth in children and adults.

Search methods

Cochrane Oral Health's Information Specialist searched the following databases: Cochrane Oral Health's Trials Register (to 25 May 2016), the Cochrane Central Register of Controlled Trials (CENTRAL; 2016, Issue 4) in the Cochrane Library (searched 25 May 2016), MEDLINE Ovid (1946 to 25 May 2016), Embase Ovid (1980 to 25 May 2016) and LILACS BIREME Virtual Health Library (Latin American and Caribbean Health Science Information database; 1982 to 25 May 2016). We searched ClinicalTrials.gov and the [World Health Organization International Clinical Trials Registry Platform](http://www.who.int/clinicaltrialsregistryplatform) for ongoing trials. No restrictions were placed on the language or date of publication when searching the electronic databases.

Selection criteria

We included randomized controlled trials assessing the effects of the use of liners under Class I and Class II posterior resin-based composite restorations in permanent teeth (in both adults and children). We included both parallel and split-mouth designs.

Data collection and analysis

We utilized standard methodological procedures prescribed by Cochrane for data collection and analysis. Two review authors screened the search results and assessed the eligibility of studies for inclusion against the review inclusion criteria. We conducted risk of bias assessments and data extraction independently and in duplicate. Where information was unclear we contacted study authors for clarification.

Main results

Eight studies, recruiting over 700 participants, compared the use of dental cavity liners to no liners for Class I and Class II resin-based composite restorations.

Seven studies evaluated postoperative hypersensitivity measured by various methods. All studies were at unclear or high risk of bias. There was inconsistent evidence regarding postoperative hypersensitivity (either measured using cold response or patient-reported), with a benefit shown at some, but not all, time points (low-quality evidence).

Four trials measured restoration longevity. Two of the studies were judged to be at high risk and two at unclear risk of bias. No difference in restoration failure rates were shown at one year follow-up, with no failures reported in either group for three of the four studies; the fourth study had a risk ratio (RR) 1.00 (95% confidence interval (CI) 0.07 to 15.00) (low-quality evidence). Three studies evaluated restoration longevity at two years follow-up and, again, no failures were shown in either group.

No adverse events were reported in any of the included studies.

Authors' conclusions

There is inconsistent, low-quality evidence regarding the difference in postoperative hypersensitivity subsequent to placing a dental cavity liner under Class I and Class II posterior resin-based composite restorations in permanent posterior teeth in adults or children 15 years or older. Furthermore, no evidence was found to demonstrate a difference in the longevity of restorations placed with or without dental cavity liners.

PLAIN LANGUAGE SUMMARY

Dental cavity liners under tooth-colored resin fillings placed into permanent teeth in the back of the mouth

Review question

This review was conducted to assess the effects of using liners under tooth-colored resin fillings in cavities on the biting surface (Class I) and the biting surface and side(s) (Class II) of permanent teeth in the back of the mouth in children and adults.

Background

Tooth decay is the most common disease affecting children and adults worldwide. If left untreated, acid produced by bacteria in the dental plaque or biofilm forms cavities or holes in the teeth. A number of techniques and a variety of materials can be used to restore or fill teeth affected by decay. One of these materials is tooth-colored, resin-based composite or RBC. This material is increasingly used as an alternative to amalgam (a mixture of mercury and metal alloy particles).

Since the 19th century liners have often been placed in cavities in the teeth under the filling material. The liners are thought to protect the living pulp of the tooth from filling materials themselves and also from their potential to allow more heat or cold through than the natural tooth would. Although RBC filling materials are thought to be similar to the natural material of teeth in terms of how they conduct heat, sensitivity to temperature change is sometimes still an issue for people after treatment.

Study characteristics

The evidence in this review, carried out by authors from Cochrane Oral Health, is up to date as of 25th May 2016.

Eight studies, with over 700 participants, were included. Two studies were conducted in the USA, two in Thailand, two in Germany and one each in Saudi Arabia and Turkey. The studies compared the use of liners under tooth-colored resin fillings (RBC) in permanent teeth at the back of the mouth to no liners for Class I and Class II fillings. One of the two studies in the USA took place in dental practices, the others in university-based dental schools. All participants were over 15 years of age.

Key results

Very little evidence was found to show that a liner under Class I and II RBC fillings in permanent teeth in the back of the mouth reduced sensitivity in adults or children 15 years or older. No evidence was found to show that there was any difference in the length of time fillings lasted when placed with or without a cavity liner.

Quality of evidence

The body of evidence identified in this review does not allow for robust conclusions about the effects of dental cavity liners. The quality of the evidence identified in this review is low and there is a lack of confidence in the effect estimates. Furthermore, no evidence was found to demonstrate a difference in how long restorations last when placed with or without dental cavity liners.