Dental liners and reducing post operative sensitivity
The evidence summary is based on the original summary published in the BDJ¹ (June 2011). It evaluates the available evidence for the effectiveness of different dental liners placed under amalgam restorations. It does not include detailed descriptions of the studies cited nor does it include information that was not presented in the literature. A grant to investigate this question was awarded in 2011.

The Curious about website encourages dental professionals to raise issues where a review of the available evidence would provide a useful resource for other dental professionals. Where there is a lack of evidence, the topic is considered for research and an award is made available.

These activities are sponsored by the Shirley Glasstone Hughes Fund, a restricted fund within the BDA Trust Fund.
Key finding

- Current evidence does not allow identification of which dental liners under amalgam restorations are more effective in reducing postoperative sensitivity.

Review question

This evidence summary was prepared in response to the following question: Which dental liners under amalgam restorations are more effective in reducing postoperative sensitivity?

Key terms

**Microleakage:** The seepage of fluids, debris, and microorganisms along the interface between a restoration and the walls of a cavity preparation.\(^1\)

**Postoperative sensitivity:** An outcome measure in a number of studies for which the definition and measurement methods varies, but which includes pain and thermal sensitivity (sensitivity to cold or hot stimulus).

The case for action

One of the most widely used dental materials is amalgam. This material is an alloy of mercury, silver and other metals such as tin and copper.\(^3\) Recognised limitations of dental amalgam, compared to other dental materials such as composites, are that they cannot bond to the dental tissue or provide a complete seal.\(^4\)

These factors contribute to microleakage - a potential contributing factor towards some problematic symptoms, for example postoperative sensitivity, experienced by some patients.\(^5,6\) Due to this some dentists recommend using liners, such as zinc phosphate, polycarbonate cement, copal varnish, resin composite adhesives and ionomer cements\(^4\) between the amalgam and dental tissue as a preventative measure.

The evidence

One identified systematic review\(^7\) and eight randomised controlled trials (RCT)\(^6,8-14\) were located for this question. The systematic review compares bonded amalgam with non-bonded amalgam and the RCTs compare a range of liners against each other, against a control group or against bonded amalgam. A summary of the findings is provided below.

**Comparing bonded amalgam with non-bonded amalgam**\(^7\)

The evidence did not allow a conclusive judgement to be made on whether bonded amalgam is more effective in reducing postoperative sensitivity than non-bonded amalgam. Postoperative sensitivity measurements were taken at baseline and after a two year follow up.

**Comparing amalgam restorations with liners and bases with amalgam restorations with no liners**\(^8-10\)

Amalgam restorations with copal varnish have less postoperative sensitivity compared to amalgam restorations with no liners. Other available comparisons were:

- copal varnish versus no liner
- calcium hydroxide versus no liner
- modified glass ionomer liner versus no liner
- fluoridated desensitising agent versus no liner.

**Comparing amalgam restorations with different liners and bases against each other**\(^6,8-10\)

Overall data limitations prevented any conclusions being made on which dental liners are more effective in reducing postoperative sensitivity. Data for the following comparisons were available:
• glass ionomer liner versus copal varnish
• copal varnish versus fluoridated desensitising agent
• glass ionomer and calcium hydroxide (Dycal') versus zinc phosphate and calcium hydroxide (Dycal')
• copal varnish versus calcium hydroxide
• glass ionomer versus calcium hydroxide.

Comparing amalgam restorations with liners and bases with bonded amalgam (amalgam with adhesives)\(^{8-11,13,14}\)

The current evidence cannot demonstrate whether lining the dental cavity is more effective than using bonded amalgam in reducing postoperative sensitivity. Data for the following comparisons were available:

• copal varnish, glass ionomer and calcium hydroxide (Dycal') versus bonded amalgam
• copal varnish, zinc phosphate cement and calcium hydroxide (Dycal') versus bonded amalgam and calcium hydroxide (Dycal')
• copal varnish versus bonded amalgam
• fluoridated desensitising agent versus bonded amalgam
• glass ionomer liner versus bonded amalgam
• calcium hydroxide versus bonded amalgam.

Methods

Search strategy

The following databases were searched for systematic reviews:

- PubMed
- Cochrane Library.

Search terms included: Dental Amalgam; Dental cavity lining.

The following databases were searched for randomised controlled trials:

- MEDLINE (OVID) - Limited to English language publications
- Cochrane Central Register of Controlled Trials (CENTRAL).

Search terms included *Dental Cavity Lining; Dental Amalgam; Treatment Outcome. Studies were excluded if were conducted on extracted or primary teeth.

Searches were originally carried out in January and February 2011 and repeated in February 2015.

Results

No directly relevant systematic reviews were found. One systematic review that was partially relevant and eight randomised controlled trials were located.

References


