

Limited evidence on best material for retrograde root fillings

Abstracted from

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Materials for retrograde filling in root canal therapy.

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Question: In teeth requiring retrograde root filling which material is the most effective?

Data sources Cochrane Oral Health's Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL), Medline Ovid, Embase Ovid, LILACS, BIREME Virtual Health Library, OpenSIGLE, ClinicalTrials.gov, the World Health Organization International Clinical Trials Registry Platform, Chinese BioMedical Literature Database, VIP (in Chinese), China National Knowledge Infrastructure and Sciencepaper Online. No restrictions on language or date of publication were placed.

Study selection Randomised controlled trials (RCTs) that compared different retrograde filling materials, with clinical or radiological assessment for success over a minimum follow-up period of 12 months.

Data extraction and synthesis Two review authors extracted data independently and in duplicate, and subsequently carried out risk of bias assessment for each eligible study following Cochrane methodological guidelines. Original trial authors were contacted for any missing information.

Results Six randomised controlled trials were included, with 916 participants involving 988 teeth. All these studies had a high risk of bias. Comparisons of five different retrograde filling materials were undertaken, including MTA versus intermediate restorative material (IRM), MTA versus super ethoxybenzoic acid cement (Super-EBA), Super-EBA versus IRM, dentine-bonded resin composite versus glass ionomer cement and glass ionomer cement versus amalgam.

Grouping of data from different studies was minimal and provided limited evidence for each comparison. All studies showed a risk ratio of approximately one, indicating that there is weak or little evidence that any of the materials are superior. All of the studies displayed very low quality of evidence. None of these studies reported adverse events.

Conclusions Currently there is insufficient evidence to determine which material is preferable for retrograde filling. Further high-quality RCTs are required for this.

Commentary

This Cochrane review addresses a clearly focused question and uses a thorough search to include all relevant papers in English, Chinese and other non-English languages. The authors contacted experts in the area to enquire as to current on-going studies and contacted manufacturers of different materials to assess availability of unpublished trials.

Currently, research into the differences between materials used for retrograde filling materials is limited. Furthermore, the clinical validity of studies that are available is questionable. *In-vitro* studies have reported significant differences in effectiveness of the different materials. Studies in the clinical setting (*in vivo*) however, make it more difficult to show differences in effectiveness because of variations in clinical techniques.

The outcome of peri-radicular surgery is influenced by a number of factors.¹ In this review, the studies included patients with teeth that had clear periapical lesions and required retrograde filling. The patient's age, gender, previous dental history, the tooth's periodontal condition and follow-up period were assessed in all the studies. A number of the papers that were reviewed by the authors did not include a clear history of the tooth, for example previous root canal treatment and history of retreatments. Unfortunately, not all studies include the periodontal condition of the tooth.

The clinical apical preparation prior to sealing varies between studies and this may contribute to the clinical outcome. In order to assess the different factors for success, the authors looked at the clinical preparation of the apical tip prior to sealing, the sealing technique, setting time after sealing and whether magnification was used. There were a number of different options in the apical preparation of a tooth surface. However, within this review the authors did not undertake an in-depth analysis of these. Although magnification is considered an important factor in determining the success of apical surgery,² only three studies included some form of magnification, making comparison with the other studies difficult.

Blinding is important to ensure reduction in bias and should be used in all clinical trials.³ Blinding for both participants and statistical assessors were applied in all the reviewed studies. Christiansen 2009 was the only study who blinded outcome assessor.⁴ Blinding the outcome assessor should be a requirement in further studies in an effort to improve the quality of evidence.

The European Society of Endodontology⁵ recommends a follow-up period of one year and subsequent reviews up to four years for research investigating post-surgery outcomes. In this review, Jesslen 1995 is the only paper that reviews at the one-year and

This paper is based on a Cochrane Review published in the Cochrane Library 2016, issue 12 (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.

five-year period.⁶ Chong 2003 followed up at the one-year and two-year period.⁷ The other four papers reviewed at a minimum of one year only. It is unclear why the authors of this Cochrane review chose a one-year period as the minimum period of study. Further studies should incorporate a longer follow-up period to improve the assessment of the different materials.

In conclusion, there are a number of factors other than the material used that can influence the success of the peri-radicular surgery. Future research will need to include appropriate detailed information on the history of the tooth, the details on method of apical root preparation prior to sealing and sufficient follow-up period as recommended to assess the superiority of the materials available.

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