A systematic review of in vivo retrograde obturation materials

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CRD summary
This review evaluated retrograde obturation materials in patients requiring apicoectomy. The authors concluded that further research is required, which seems appropriate given the evidence presented.

Authors' objectives
To determine which retrograde obturation material is the most effective in patients requiring apicoectomy.

Searching
MEDLINE (January 1966 and October 2002) and the Cochrane Library were searched for English, German and French language papers. The search strategy for MEDLINE was reported.

Study selection
Study designs of evaluations included in the review
Studies with an experimental and control group were eligible for inclusion.

Specific interventions included in the review
Studies of retrograde obturation material were eligible for inclusion. The included studies compared glass ionomer cement, gold leaf, composite with Gluma, gutta-percha, or reinforced zinc-oxide-eugenol cement (EBA cement and IRM) with amalgam. One study of Retroplast with ytterbium trifluoride and Gluma, compared with Retroplast with silver and Gluma, was also included.

Participants included in the review
Studies of people requiring apicoectomy or retrograde obturation were eligible for inclusion. No further details of the population were given.

Outcomes assessed in the review
The inclusion criteria for the outcomes were non-specific, with studies reporting quantitative results being eligible for inclusion. The included studies reported on the presence or absence of clinical symptoms, and the radiographic evaluation of bone reformation and lamina dura around the apical area of the root of the tooth. The results were reported as success, failure, or uncertain or no improvement in the number or percentage of teeth treated. Failure was defined as the existence of clinical signs or symptoms, or the enlargement of bone radiolucency during the follow-up period, which ranged from 0.5 to 8 years.

How were decisions on the relevance of primary studies made?
Two reviewers independently evaluated the relevance of the primary studies. It was not reported how consensus was reached if any disagreements occurred.

Assessment of study quality
Papers were assessed in relation to the following: randomisation, allocation concealment, the duration of follow-up, intention-to-treat analysis, blinding of the patients and clinicians, similarity of care given to patients, and similarity in the baseline characteristics of participants between treatment groups. The authors did not state how the papers were assessed for validity, or how many reviewers performed the validity assessment.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data
extraction. The number-needed-to-treat (NNT) and 95% confidence intervals (95% CIs) were calculated for each study.

**Methods of synthesis**

**How were the studies combined?**
The studies were combined in a narrative, ordered by study design.

**How were differences between studies investigated?**
Study details and outcomes were tabulated, with studies grouped by study design and then by intervention.

**Results of the review**

Fourteen studies (n=4,508) were included in the review: 2 randomised controlled trials (RCTs; n=187), 6 non-randomised clinical controlled trials (CCTs; n=2,197) and 6 case-controlled studies (CCSs; n=2,124).

Glass ionomer was more effective than amalgam in the 2 RCTs (NNT 46, 95% CI: +/- 0.12; NNT 8, 95% CI: +/- 0.12) and 1 CCS (NNT 5, 95% CI: not reported). Amalgam was more effective than glass ionomer in 1 CCT (NNT -6, 95% CI: +/- 0.39).

EBA cement was more effective than amalgam in 1 CCT (NNT 13, 95% CI: +/- 0.16) and 1 CCS (NNT 5, 95% CI: +/- 0.16). However, it was less effective than amalgam in 1 CCS (NNT -25, 95% CI: +/- 0.132).

Gold leaf was more effective than amalgam in 1 CCT (NNT 16, 95% CI: +/- 0.12).

Composite plus Gluma was more effective than amalgam in 1 CCT (NNT 7, 95% CI: +/- 0.098).

Gutta-percha, as a retrograde filling, was less effective than amalgam in 1 CCT (NNT -9, 95% CI: +/- 0.35). However, as an orthograde filling, it was more effective than retrograde amalgam in 1 CCT (NNT 4, 95% CI: +/- 0.073) and 2 CCSs (NNT 4, 95% CI: +/- 0.088; after one year, NNT 8, 95% CI: +/- 0.06).

Retroplast with ytterbium trifluoride plus Gluma was more effective than Retroplast with silver and Gluma in 1 CCT (NNT 25, 95% CI: +/- 0.057).

IRM was more effective than amalgam in 1 CCS (NNT 5, 95% CI: +/- 0.094), but was less effective in another CCS (NNT -100, 95% CI: +/- 0.20).

Chloro-percha plus gutta-percha was more effective than amalgam in 1 CCS (NNT 7, 95% CI: +/- 0.10).

**Authors’ conclusions**
The results suggest that additional validating CCTs and RCTs are required.

**CRD commentary**
The review question was clearly reported. The inclusion criteria were also defined but were not reported clearly. The search was limited to two electronic databases, which may have resulted in publication bias and some studies being missed. The included studies were restricted to three languages, thus showing attempts to reduce language bias, but language bias cannot be ruled out. There was some attempt to reduce error and bias by carrying out the study selection process in duplicate, although it was not indicated whether the validity assessment and data extraction were carried out similarly. Although validity was assessed, the results of the assessment were not reported and, therefore, the quality of the evidence cannot be evaluated. The narrative synthesis was appropriate given the clinical heterogeneity of the included studies. The authors’ conclusion, that further research is required, seems appropriate.

**Implications of the review for practice and research**

Practice: The authors did not state any implications for practice.
Research: The authors stated that RCTs into the use of EBA cement, composite of Gluma and gold leaf, and orthograde gutta-percha are required.

Bibliographic details

PubMedID
12950570

Indexing Status
Subject indexing assigned by NLM

MeSH
Apicoectomy; Case-Control Studies; Cohort Studies; Controlled Clinical Trials as Topic; Humans; Randomized Controlled Trials as Topic; Retrograde Obturation; Retrospective Studies; Root Canal Filling Materials / classification / therapeutic use

AccessionNumber
12003002062

Date bibliographic record published
31/07/2005

Date abstract record published
31/07/2005

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.