

No evidence favouring one irrigant versus another in root canal treatments

Abstracted from

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Question: What are the effects of irrigants used in the non-surgical root canal treatment of mature permanent teeth?

Data sources The Cochrane Oral Health Group's Trials Register, CENTRAL, Medline, Embase, and LILACS databases were searched with no restrictions.

Study selection Randomised controlled trials (RCTs) involving single or multi-rooted permanent teeth requiring root canal treatment (RoCT) which compared irrigants against each other or against inactive irrigant or placebo were included. Combinations of irrigants were allowed and if used in conjunction with EDTA (ethylenediaminetetra-acetic acid) or similar chelating agents.

Data extraction and synthesis Two review authors independently assessed risk of bias of included trials and extracted data.

Results Eleven trials (851 participants, 879 teeth) were included. Six trials were assessed at high risk of bias, three unclear and two low. Four compared sodium hypochlorite versus chlorhexidine, the other trials compared different interventions and only two of these trials included useable data on the primary outcomes of swelling and pain. Meta-analysis of sodium hypochlorite versus chlorhexidine indicated no strong evidence of a difference in the existence of bacterial growth between the interventions (risk ratio 0.73; 95% confidence interval 0.34 to 1.56; $P = 0.41$). None of the included trials reported any data on adverse effects nor radiological changes in periapical radiolucency.

Conclusions Although root canal irrigants such as sodium hypochlorite and chlorhexidine appear to be effective at reducing bacterial cultures when compared to saline, most of the studies included in this review failed to adequately report these clinically important and potentially patient-relevant outcomes. There is currently insufficient reliable evidence showing the superiority of any one individual irrigant. The strength and reliability of the supporting evidence was variable, and clinicians should be aware that changes in bacterial counts or pain in the early postoperative period may not be accurate indicators of long-term success. Future trials should report both clinician-relevant and patient-preferred outcomes at clearly defined perioperative, as well as long-term, time points.

Commentary

Mechanical preparation and irrigation are key steps during RoCT as they play an important role in the success of treatment. Irrigation must be effective in cleaning and disinfecting the root canal system and is therefore crucial to its success. The material used must be compatible, non-toxic, have the ability of disinfecting and penetrating the dentin tubules, dissolve pulp tissue, inactivate endotoxins and have long-term anti-bacterial effects (http://www.aae.org/uploadedfiles/publications_and_research/endodontics_colleagues_for_excellence_newsletter/rootcanalirrigantsdisinfectants.pdf).

The aim of the review was to resolve an important issue in terms of assessing the effects of the different irrigants used during endodontic treatment and evaluating the type of irrigants and the concentrations needed.

The review followed standard Cochrane approaches with a good range of databases being searched. Study quality was assessed and considered to be limited. There was considerable variability in the selected studies which precluded a meta-analysis of all the included studies.

One meta-analysis was done for two studies to compare sodium hypochlorite versus chlorhexidine with a surrogate outcome as bacterial growth in 48 hrs which showed no statistically significant results.

The final discussion expressed that due to the variability in materials, concentrations and outcomes the results showed no compelling evidence towards any kind of treatment or concentration to favour one technique over another with regard to pain reduction, swelling or quality of life.

A combination of irrigants seems to be a common practice. The irrigants are individually known to be effective during the canal preparation. However the combinations observed in in-vitro studies seem to warrant observation in order to avoid possible chemical reaction with unwanted effects.¹

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1. Rossi-Fedele G, Dogramaci EJ, Guastalli AR, Steier L, Figueiredo JA. Antagonistic interactions between sodium hypochlorite, chlorhexidine, EDTA, and Citric Acid. *J. Endod* 2012; **38**: 426-431.

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This paper is based on a Cochrane Review published in the Cochrane Library 2012, issue 9 (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.