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[Intervention Review]

Single crowns versus conventional fillings for the restoration of root-filled teeth

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ABSTRACT

Background

Endodontic treatment involves removal of the dental pulp and its replacement by a root canal filling. Restoration of root filled teeth can be challenging due to structural differences between vital and non-vital root-filled teeth. Direct restoration involves placement of a restorative material e.g. amalgam or composite, directly into the tooth. Indirect restorations consist of cast metal or ceramic (porcelain) crowns. The choice of restoration depends on the amount of remaining tooth, and may influence durability and cost. The decision to use a post and core in addition to the crown is clinician driven. The comparative clinical performance of crowns or conventional fillings used to restore root-filled teeth is unknown. This review updates the original, which was published in 2012.

Objectives

To assess the effects of restoration of endodontically treated teeth (with or without post and core) by crowns versus conventional filling materials.

Search methods

We searched the following databases: the Cochrane Oral Health Group's Trials Register, CENTRAL, MEDLINE via OVID, EMBASE via OVID, CINAHL via EBSCO, LILACS via BIREME. We also searched the reference lists of articles and ongoing trials registries. There were no restrictions regarding language or date of publication. The search is up-to-date as of 26 March 2015.

Selection criteria

Randomised controlled trials (RCTs) or quasi-randomised controlled trials in participants with permanent teeth that have undergone endodontic treatment. Single full coverage crowns compared with any type of filling materials for direct restoration or indirect partial restorations (e.g. inlays and onlays). Comparisons considered the type of post and core used (cast or prefabricated post), if any.

Data collection and analysis

Two review authors independently extracted data from the included trial and assessed its risk of bias. We carried out data analysis using the 'treatment as allocated' patient population, expressing estimates of intervention effect for dichotomous data as risk ratios, with 95% confidence intervals (CI).

Main results

We included one trial, which was judged to be at high risk of performance, detection and attrition bias. The 117 participants with a root-filled, premolar tooth restored with a carbon fibre post, were randomised to either a full coverage metal-ceramic crown or direct adhesive composite restoration. None experienced a catastrophic failure (i.e. when the restoration cannot be repaired), although only 104 teeth were included in the final, three-year assessment. There was no clear difference between the crown and composite group and the composite only group for non-catastrophic failures of the restoration (1/54 versus 3/53; RR 0.33; 95% CI 0.04 to 3.05) or failures of the post (2/54 versus 1/53; RR 1.96; 95% CI 0.18 to 21.01) at three years. The quality of the evidence for these outcomes is very low. There was no evidence available for any of our secondary outcomes: patient satisfaction and quality of life, incidence or recurrence of caries, periodontal health status, and costs.

Authors' conclusions

There is insufficient evidence to assess the effects of crowns compared to conventional fillings for the restoration of root-filled teeth. Until more evidence becomes available, clinicians should continue to base decisions about how to restore root-filled teeth on their own clinical experience, whilst taking into consideration the individual circumstances and preferences of their patients.

PLAIN LANGUAGE SUMMARY

Single crowns or routine fillings for the restoration of root-filled teeth

Review question

This review (an update of the original published in 2012) has been conducted to assess whether there is a difference in the effects of restoration of root-filled teeth (with or without post and core) by indirect restorations (commonly crowns, inlays, or onlays) compared to conventional filling materials placed directly into the tooth.

Background

Root filling is a fairly routine dental procedure in which the injured or dead nerve of a tooth is removed and replaced by a root canal filling. However, the restoration of root-filled teeth can be quite challenging as these teeth tend to be weaker than healthy ones. A dentist may use crowns (restorations made outside of the mouth and then cemented into place) or conventional fillings (direct filling with materials such as amalgam or composite/plastic resin). Although crowns may help to protect root-filled teeth by covering them, conventional fillings demand less in terms of time, costs and removal of tooth structure.

Study characteristics

We searched the medical literature until 26 March 2015. This review includes one study with 117 participants in which a tooth (117 premolars) received a carbon fibre post, and was restored with either a fused porcelain to metal crown or a routine white filling. The study was of short duration (three years), included a relatively small number of participants, and was assessed to be at a high risk of bias due to missing results for people who dropped out of the study.

Key results

The evidence produced from one study concluded that none of the 117 root-filled premolars experienced a catastrophic failure (i.e. one that cannot be repaired) after three years, although only 104 teeth were included in the final, three-year assessment. The study concluded there was no difference between treatments for the risk of non-catastrophic failure. There was no evidence available for any of our secondary outcomes: patient satisfaction and quality of life, incidence or recurrence of decay, periodontal health status, and costs.

Quality of the evidence

The quality of the evidence is very low. As there is only a single study, which is at high risk of bias, there is insufficient reliable evidence to determine whether single crowns are better than routine fillings. Future research should aim to provide more reliable information that

can help clinicians to decide on appropriate treatment whilst taking into consideration the individual circumstances and preferences of their patients.