



## Contaminated Dental Posts and Methods of Disinfection: A Systematic Review

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### ABSTRACT

**Purpose:** The aim of this study is to review the literature for the effect of contaminated posts on the outcome of endodontic therapy and to review the current recommendations available for posts disinfection protocols. **Methods:** An electronic MEDLINE and PubMed search was conducted using MeSH terms, and the references of the resulted articles were further reviewed for additional articles, eligibility criteria included any published article in a peer-reviewed journal assessing posts for signs of contamination or reviewing protocols for posts disinfection prior to cementation. **Findings:** No articles met the eligibility criteria to be included in this review. **Conclusion:** There is a lack of evidence regarding the effect of contaminated posts on the success of endodontic treatments, and no protocols were found for disinfecting the posts prior to cementation.

**Keywords:** Post and core technique, Contamination, Disinfection, Endodontics, Microbiology

### INTRODUCTION

For decades, it has been known that bacteria are the main cause of primary pulpal and periapical diseases [1], hence, the main objective of endodontic therapy is to eliminate bacteria from the root canal system [2]. To achieve this goal, aseptic measures are used during the course of treatment, an example would be the use of the rubber dam during treatment; it has been shown that endodontic treatment success rates are higher when the rubber dam is used compared to cases treated without the use of them [3], also, different irrigation protocols have been suggested in order to ensure that the root canals are adequately disinfected [4].

Endodontic failure has been attributed to several causes, however, the main reasons for failure were missed untreated anatomy, coronal leakage, and inadequate endodontic treatment [5], looking deep into these causes, bacteria remains the main cause of endodontic failure. Moreover, efforts have been made to disinfect gutta-percha right before obturation just to ensure that the canals do not get recontaminated after adequate disinfection [6,7].

Many teeth requiring endodontic treatment are restored with posts and cores, and since disinfecting the canals and providing an adequate coronal seal after endodontic treatment are both essential factors for success [8], it is important to ensure that the cleanliness of the root canal system is not jeopardized during any further treatment. Therefore, the aim of this study is to review the literature for the effect of contaminated posts on the outcome of endodontic therapy and to review the current recommendations available for posts disinfection protocols.

### MATERIALS AND METHODS

The guidelines of the Preferred Reporting Items for Systemic Reviews and Meta-Analysis (PRISMA) were followed [9]. In June 2018, an electronic search was performed on both Ovid MEDLINE and PubMed. To standardize the search terms, medical subject headings (MeSH) terms were used instead of keywords, the MeSH terms were chosen from the MeSH browser provided by the National Library of Medicine (NLM) (<https://www.nlm.nih.gov/mesh/meshhome.html>). The MeSH terms were used in different combinations, the terms included in the search were: (post and core technique), (equipment contamination), (decontamination), (endodontics), (microbiology), (disinfection),

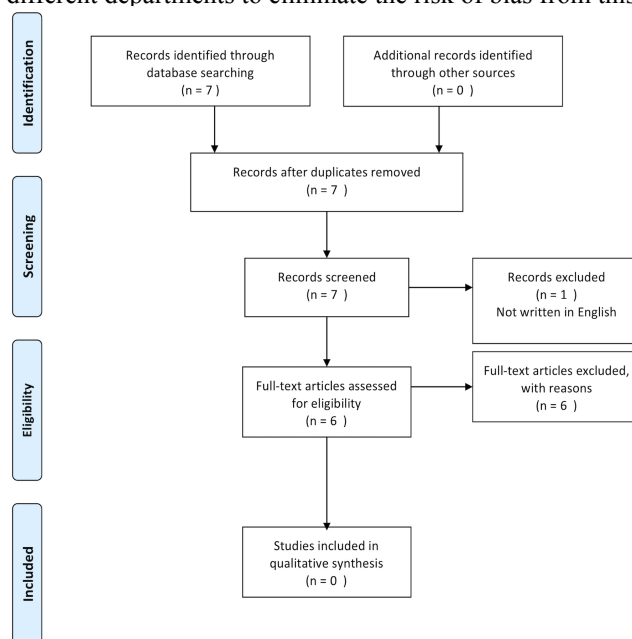
and (prosthesis-related infections). The references listed in the articles that appeared in the results of the search were then screened for further potential studies to be included.

All articles were then screened for eligibility fulfillment according to the following criteria:

Any published article in a peer-reviewed journal assessing posts for signs of contamination

Any published article in a peer-reviewed journal reviewing protocols for posts disinfection prior to cementation

The results of the search, as well as the decision of inclusion or exclusion of articles from the study, were discussed with faculty members from different departments to eliminate the risk of bias from this review (Figure 1).



**Figure 1 showing the methodology adopted for this systematic review**

### RESULTS

The initial search resulted in 7 articles. One article was not published in English language and was therefore excluded [10], the remaining 6 articles [11-16] were retrieved to further assess the cited references, and no additional articles related to the topic were found. The articles were then screened to assess their eligibility fulfillment of the inclusion criteria, none of them was within the scope of the current review, a PRISMA diagram explaining the flow of information through different phases of this systematic review is provided in Figure 1. Reasons for excluding the resulted articles are presented in Table 1.

**Table 1 Explanation for the exclusion of the articles identified in the screening phase**

Authors, Year of Publication	Article Title	Reason for Exclusion
Winstanley, et al., 1997 [11]	The quality of impressions for crowns and bridges received at commercial dental laboratories	The study not related to posts
Heling, et al., 2002 [12]	Endodontic failure caused by inadequate restorative procedures: Review and treatment recommendations	Findings did not assess the potential contamination of posts
Ferrari, et al., 2004 [13]	Collagen degradation in endodontically treated teeth	Investigates collagen degradation in dentin as a potential cause of microleakage
Ertas, et al., 2014 [14]	Effects of different irrigating solutions and disinfection methods on push-out bond strengths of fiber posts	Investigates retention of posts
Katalinić, et al., 2014 [15]	Influence of several root canal disinfection methods on pushout bond strength of self-etch post and core systems	Investigates retention of posts
Reyhani, et al., 2015 [16]	Apical microleakage of AH Plus and MTA Fillapex® sealers in association with immediate and delayed post space preparation: a bacterial leakage study	Findings did not assess the potential contamination of posts

## DISCUSSION

The negative findings of this review show a lack of evidence in the literature regarding the contamination status of posts being cemented in root canals and their effect on the success of the endodontic treatment. This missing information is of utmost importance as the main objective of endodontic treatment is eliminating the cause of pathosis as well as preventing recontamination [1,2]. Therefore, any restorative procedure following an endodontic treatment should be following the same goal, which is avoiding recontamination of the root canal system. To further stress on the importance of maintaining the cleanliness of the root canal system, a recent study has shown that the gloves worn during the procedure exhibited an increase in the microbial load when examined halfway through treatment and as the procedure continued [17], because of these findings, the authors suggested that gloves should be changed after gaining access to the root canal system, and after complete disinfection just before obturation, all these efforts are made just to reduce the chances recontamination.

The completion of endodontic treatment cannot be achieved until an adequate coronal seal is provided [12] with a suitable permanent restoration [18]. Although the aim is to provide an adequate endodontic treatment coupled with an adequate coronal seal, a study has shown that even with a good endodontic treatment, if the coronal seal is substandard, the treatment will eventually fail [19], furthermore, the findings of the study suggest that the coronal seal is more important than the quality of the endodontic treatment itself.

Success rates have been known to be higher for initial endodontic treatments compared to non-surgical endodontic retreatment [20], these findings have been also confirmed in recent studies using a systematic approach and with a long-term follow up [21,22]. Never the less, removing posts during retreatments may be difficult and time-consuming depending on the type of post used [23], moreover, post-removal are associated with greater risks of complications such as cracking or propagating a previous crack [24], and generating heat that may affect the periradicular area [24]. Therefore, such cases should be handled with caution, and preferably by an endodontist, to avoid further complication. For these reasons, the restoring dentist should take all possible measures to ensure that the disinfected root canal system is not recontaminated by further restorative procedures.

Based on the findings of this review, and lack of evidence in the literature, further investigations should be made to either rule out that contaminated posts are a potential cause of endodontic treatment failure, or to confirm that posts need to be disinfected prior to cementation, and if so, a protocol for disinfection should be proposed.

## CONCLUSION

There is a lack of evidence regarding the effect of contaminated posts on the success of endodontic treatments, and no protocols were found for disinfecting the posts prior to cementation.

## DECLARATIONS

### Conflict of Interest

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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