

In vitro Test of Sealing of Root Filled Canals

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INTRODUCTION

Endodontic therapy is performed to save a tooth by preventing or eliminating root canal infection^{6,7}. Root fillings that have been exposed for a length of time to the oral flora can show a penetration of bacteria between the root filling and canal walls^{4,5,8,9}. So the sealing ability of the restoration of a tooth is important and to obtain a good outcome following endodontic therapy both the root filling and the restoration must be of good quality³. In addition, it has been shown that temporary fillings that are place to keep oral cavity microorganisms out, can leak¹.

Therefore, it would be beneficial to have a material that can be placed at the orifice of a root filled canal to prevent bacterial exposure.

Combinations of nitrocellulose and alcohol-acetates have been shown to seal even when used in small volumes.

Objective: Testing the potential of nitrocellulose-butyl acetate gel as a coronal root canal filling protection on prepared teeth in a pilot study

METHODS

- 20 extracted teeth with 42 root canals were used for the study.
- The teeth were extracted for periodontal or orthodontic reasons and were collected from the OMFS clinic.
- Before preparation, all teeth were placed for 24 hours in 5% sodium hypochlorite to remove surface soft tissue and concretions.
- Access cavities were prepared, and the most coronal millimeters of the root canals were widened with a #2 round bur in a slow speed hand piece.
- Pieces of cotton pellets were placed between the coronally widened and the untouched parts of the root canal.
- The nitrocellulose-butyl acetate gel was placed in the coronal small cavities with microbrushes.
- After the setting of the nitrocellulose-butyl acetate gel the access cavities were filled with India ink (Higgins, Chartpak Inc, Leeds, MA).
- The teeth were then kept in 100% humidity for three days.
- After that the teeth were placed in a 4% nitric acid solution for two days followed by one day in water.
- The teeth were then immersed in ascending grades of alcohol (70-96%) before being placed in methyl salicylate to make them transparent.
- The teeth were examined using a Zeiss clinical microscope.

RESULTS

- Under the present in vitro conditions the nitrocellulose-butyl acetate gel sealed all canals from leakage.

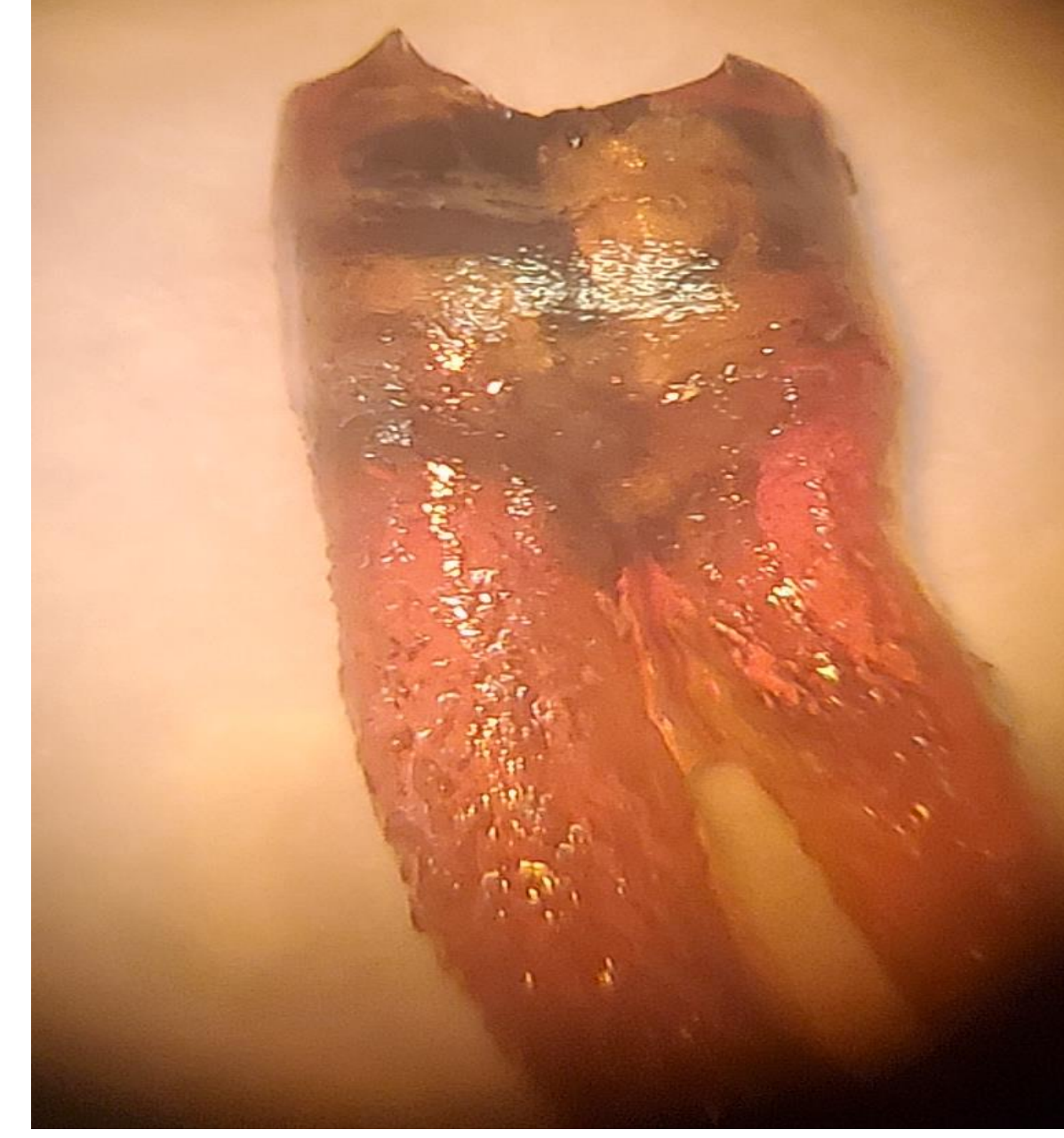


Figure 1. Inspection using a clinical microscope (Zeiss Pico) showed the nitrocellulose-butyl acetate gel successfully sealed the three canals from leakage in this molar.

DISCUSSION

Leakage studies are a way to evaluate if a material will seal. The studies can be performed in different ways and there is no gold standard for evaluation of sealing ability^{2,10}.

The present method was chosen as it is simple and gives the possibility of evaluating the leakage in three dimensions.

It is not uncommon that patients don't get an appointment for restoration immediately after finished root canal treatment. This may be due to financial concerns, lack of time or sometimes not understanding the importance of finishing treatment even if the tooth is free from symptoms. At a dental school there may often be a waiting period before the restoration is placed due to scheduling issues. In all these instances a good seal in the access cavity would be beneficial for the future of the tooth.

CONCLUSIONS

The nitrocellulose-butyl acetate gel shows promise as an agent to protect root fillings from the oral flora.

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