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ORIGINAL RESEARCH

Assessment of effectiveness of efficacy of resin based and Mineral trioxide aggregate based sealer against E. faecalis

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ABSTRACT:

Background: The present study was undertaken for assessing the effectiveness of efficacy of resin based and Mineral trioxide aggregate based sealer against E. faecalis. **Materials & Methods:** The present study was conducted with the aim of assessing the efficacy of AH plus (resin based sealer) and Fillapex (MTA based sealer) against E. faecalis. For testing antibacterial potential of sealers by Agar diffusion test (ADT), E faecalis was used. Two study groups were formed as follows: Resin group: Resin based sealer (AH plus), and MTA group: MTA based Sealer. The diameter of the growth inhibition zones was measured. **Results:** Mean area of zone of inhibition among resin group at 24 hours, 48 hours and 72 hours was found to be 9.7, 7.8 and 7.5 respectively. Mean area of zone of inhibition among MTA group at 24 hours, 48 hours and 72 hours was found to be 9.1, 8.3 and 6.9 respectively. In the present study, non-significant results were obtained while making intergroup and intragroup comparison.

Conclusion: Non-significant difference exists while comparing the effectiveness of AH plus and resin based sealer against E. Faecalis.

Key words: E. faecalis, Mineral trioxide aggregate.

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INTRODUCTION

Endodontic treatment aims to eliminate infection of the root canal and to completely fill the root canal space in three-dimension, in order to prevent apical and coronal penetration of liquids and microorganisms. Most root canals are filled with gutta-percha points in combination with an endodontic sealer which are essential components of root canal obturation to establish a fluid-tight seal.¹⁻³ The main function of a sealer is to fill the spaces between the core material and the walls of root canal and between the gutta-percha

cones, in an attempt to form a coherent mass of obturating material without voids. The sealer is expected to fill irregularities and minor discrepancies between the filling and canal walls, accessory canals, and multiple foramina. Mineral trioxide aggregate (MTA) has several desirable properties such as high biocompatibility and low cytotoxicity, release of calcium hydroxide (Ca(OH)²), sealing ability against the bacteria and saliva, antibacterial features, ability of setting in the presence of bleeding or serum, adequate compressive strength, and acceptable hardness.⁴⁻⁶

Hence; the present study was planned for assessing the effectiveness of efficacy of resin based and Mineral trioxide aggregate based sealer against E. faecalis

MATERIALS & METHODS

The present study was conducted with the aim of assessing the efficacy of AH plus (resin based sealer) and Fillapex (MTA based sealer) against E. faecalis. For testing antibacterial potential of sealers by Agar diffusion test (ADT), E faecalis was used. ADT was conducted by inserting patches of the sealers on a well of 4x6mm diameter on agar plates. Inoculation of these plates was done with standard suspension of E. faecalis and assessment of the zone of inhibition was done at 24 hours, 48 hours and 72 hours. Two study groups were formed as follows:

Resin group: Resin based sealer (AH plus), and MTA group: MTA based Sealer.

Preparation of all the sealers was done in accordance with the manufacturer's recommendations. The diameter of the growth inhibition zones was measured. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Student t test was used for evaluation of level of significance.

RESULTS

In the present study, two study groups were formed as follows: Resin group: Resin based sealer (AH plus), and MTA group: MTA based Sealer. Mean area of zone of inhibition among resin group at 24 hours, 48 hours and 72 hours was found to be 9.7, 7.8 and 7.5 respectively. Mean area of zone of inhibition among MTA group at 24 hours, 48 hours and 72 hours was found to be 9.1, 8.3 and 6.9 respectively. In the present study, non-significant results were obtained while making intergroup and intragroup comparison.

Table 1: Mean zone of inhibition

Group	24 hours	48 hours	72 hours	p-value
Resin group	9.7	7.8	7.5	0.12
MTA	9.1	8.3	6.9	0.75
p-value	0.69	0.71	0.37	-

DISCUSSION

The final stage of endodontic treatment is the three-dimensional obturation of the root canal system. To achieve this, root canal filling must seal the canal walls both apically and laterally in order to prevent ingress of microorganisms or tissue fluids into the root canal space. Many filling materials have been used in root canal treatment in an attempt to achieve this objective.¹⁻³ The methods most frequently used to obturate root canals employ either a semisolid, solid, or rigid core material. The most commonly used core material is gutta-percha, but this material does not seal the canal

when used alone. Therefore, a root canal sealer or cement is required to adhere to the dentin and fill the irregularities and minor discrepancies between the core filling material and canal walls. The sealer also acts as a lubricant during the obturation procedure and fills any patent accessory canals. Hence; the present study was undertaken for evaluating the efficacy of resin based and Mineral trioxide aggregate based sealer against E. faecalis.⁴⁻⁶ Hence; the present study was planned for assessing the effectiveness of efficacy of resin based and Mineral trioxide aggregate based sealer against E. faecalis.

In the present study, two study groups were formed as follows: Resin group: Resin based sealer (AH plus), and MTA group: MTA based Sealer. Mean area of zone of inhibition among resin group at 24 hours, 48 hours and 72 hours was found to be 9.7, 7.8 and 7.5 respectively. Mean area of zone of inhibition among MTA group at 24 hours, 48 hours and 72 hours was found to be 9.1, 8.3 and 6.9 respectively. Kumar RV et al evaluated the apical seal of root canals obturated with resin cement as a root canal sealer and compared with that of the glass ionomer and zinc oxide eugenol sealers using a cold lateral condensation gutta-percha technique. The prepared teeth were randomly divided into three groups of 15 each to be obturated using three different sealers. Group I: zinc oxide eugenol (Tubliseal), Group II: Glass ionomer (Ketac Endo), and Group III: resin cement (C & B Superbond). All the specimens were stored in 100% relative humidity at 37° for 24 h. The specimens were placed in 2% methylene blue dye for 48 h and sectioned. The dye penetration was evaluated under a stereomicroscope. All the specimens showed dye leakage, and there was a statistically significant difference (P < 0.0001) among the groups. The specimens in Group III showed a minimal leakage and the specimens in Group I showed a maximum leakage. Resin cement sealed the root canals significantly better when compared with zinc oxide eugenol and glass ionomer sealers.¹¹

In the present study, non-significant results were obtained while making intergroup and intragroup comparison. The main functions of root canal sealers are (i) sealing off of voids, patent accessory canals, and multiple foramina, (ii) forming a bond between the core of the filling material and the root canal wall, and (iii) acting as a lubricant while facilitating the placement of the filling core and entombing any remaining bacteria. Due to the relative biological and technical importance of sealers, their chemical and physical properties have been the subject of considerable attention since their initial development in the early twentieth century. Sealers are categorised according to their main chemical constituents: zinc oxide eugenol, calcium hydroxide, glass ionomer, silicone, resin, and bioceramic-based sealers. Root canal sealers have been

reviewed across a number of studies, either collectively or based on their composition, including zinc oxide eugenol, calcium hydroxide, glass ionomer, and resin-based sealers. However, no extensive review of bioceramic-based sealers has been conducted.^{8- 11} Huang Y et al analyzed the ability of multiple compounds to seal the dental tubules using scanning electron microscopy (SEM) and micro-computed tomography (micro-CT). Twenty-four single-root human mandibular premolars were selected and instrumented with nickel-titanium rotary file and the final file size was #40/06. They were then randomly allocated into 2 groups, and all samples were filled with single cone gutta-percha (#40/06) and one of the tested sealers (AH Plus and EndoSequence BC sealers). All specimens were scanned using micro-CT and then three from each group were randomly selected for SEM analysis. According to SEM, both root canal sealers showed sufficient adaptation to dentin along the whole length of the root canal, though the coronal sections presented superior sealing than the apical sections. Micro porosity analyses revealed that the volume of closed pores and the surface of closed pores had the largest values in the coronal sections, followed by the middle and the apical sections for both sealants ($p < 0.05$). However, no significant difference was observed for those two parameters between AH Plus and EndoSequence BC sealers in any of the three sections ($p > 0.05$), whereas they were larger in the apical section when the AH Plus sealer was used. By using the single cone technique, neither EndoSequence or AH Plus provides a porosity-free root canal filling.¹²

CONCLUSION

From the above results, the authors concluded that non-significant difference exists while comparing the effectiveness of AH plus and resin based sealer against *E. Faecalis*.

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