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Original Research

Evaluation of efficacy of different root canal sealers used during root canal therapy: A comparative study

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ABSTRACT:

Background: To assess the efficacy of different root canal sealers used during root canal therapy. **Materials & methods:** 60 freshly extracted mandibular premolars were enrolled. All the specimens were divided into three study groups on the basis of type of root canal sealer used as follows: Group A: AH Plus sealer, and Group B: Tubliseal EWT. Root canal therapy was performed in all the specimens followed by obturation with GP points. Different sealers were used in all the specimens according to their respective study group. This was followed by horizontal sectioning was carried out at 3 mm and 6 mm from the apex with a diamond disk. The two specimens thus obtained were examined for sealer distribution using a stereomicroscope and the percentage of sealer coating the perimeter (PSCP) was calculated using an imaging system. All the results were recorded in Microsoft excel sheet and were analyzed using SPSS software. **Results:** Mean PSCP at 3 mm was significantly higher among specimens of Group A (81.68%) in comparison to group B (89.41%).Mean PSCP at 3 mm was significantly higher among specimens of Group A (81.68%) in comparison to group B (89.41%).Mean PSCP at 6 mm was significantly higher among specimens of Group A (80.45%) in comparison to group B (88.69%). **Conclusion:** Significantly better results were seen among specimens in which Tubliseal EWT was used.

Key words: Root canal sealers, Root canal therapy

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INTRODUCTION

Currently, the rationale for use of an endodontic sealer is to attain a fluid-tight seal and barrier, apically, laterally, and coronally, between the dentin and gutta-percha. Endodontic sealer is currently regarded with such importance in root canal treatment that it is often considered to be more important than the core obturating material itself. The sealer performs several functions during the obturation of a root canal system with a gutta-percha cone. It acts as a lubricating agent and aids in the seating of the master gutta-percha cone.[1-3]

Endodontic sealers for non-surgical root canal treatment (NSRCT) span many compositions and attributes. Setting time, solubility, sealing ability, antimicrobial, biocompatibility, and cytotoxicity are all aspects key to the performance of endodontic sealers. Because sealing ability is so important to successful outcomes, the relative degree of microleakage among all the relevant sealers was calculated by way of a meta-analysis of relevant literature. Compared to AH Plus, tricalcium silicate sealers show the lowest relative microleakage among the sealers assessed, followed by silicone sealers and other non-AH Plus epoxy resin sealers. Tricalcium silicate sealers also exhibit the most favorable antimicrobial effect and excellent biocompatibility.[4-6] Hence; the present study was conducted for evaluating the efficacy of different root canal sealers used during root canal therapy.

MATERIALS & METHODS

The present study was conducted for evaluating the efficacy of different root canal sealers used during root canal therapy. A total of 60 freshly extracted mandibular premolars were enrolled. All the

specimens were divided into three study groups on the basis of type of root canal sealer used as follows:
Group A: AH Plus sealer, and
Group B: Tubliseal EWT
Root canal therapy was performed in all the specimens followed by obturation with GP points. Different sealers were used in all the specimens according to their respective study group. This was followed by horizontal sectioning was carried out at 3 mm and 6 mm from the apex with a diamond disk. The two specimens thus obtained were examined for sealer distribution using a stereomicroscope and the percentage of sealer coating the perimeter (PSCP) was calculated using an imaging system. All the results were recorded in Microsoft excel sheet and were analyzed using SPSS software.

RESULTS

Mean PSCP at 3 mm was significantly higher among specimens of Group A (81.68%) in comparison to group B (89.41%).Mean PSCP at 3 mm was significantly higher among specimens of Group A (81.68%) in comparison to group B (89.41%).Mean PSCP at 6 mm was significantly higher among specimens of Group A (80.45%) in comparison to group B (88.69%).

Table 1: Comparison of mean PSCP at 3 mm

Group	Mean PSCP	SD	p- value
Group A	81.68	8.4	0.00*
Group B	89.41	9.6	

*: Significant

Table 2: Comparison of mean PSCP at 6 mm

Group	Mean PSCP	SD	p- value
Group A	80.45	8.9	0.00*
Group B	88.69	9.5	

*: Significant

DISCUSSION

The predictable outcomes of endodontic treatment rely on mechanical instrumentation and cleaning of the root canal system, elimination of the microorganisms and organic debris, as well as filling the entire root canal. It is commonly accepted that microleakage between the root canal walls and root canal filling might adversely affect the outcome of the endodontic treatment. Consequently, sealing the entire root canal system after cleaning and shaping is of utmost importance to prevent oral pathogens from colonizing and re-infecting the root and periapical tissues.[7]In endodontic treatment, sealers are principally used to fill the irregularities of the root canal system, to provide lubricating or to attach the gutta-percha to the root canal walls. Endodontic sealers should meet some requirements, such as biocompatibility, dimensional stability, insolubility in oral fluids, radiopacity, ease of application, antibacterial properties, adaptability to the root canal walls, as well as the ability to produce a hermetic seal. However, none of the sealers currently available have all characteristics of the ideal sealer.[8- 10]Hence; the present study was conducted for evaluating the efficacy of different root canal sealers used during root canal therapy.

Mean PSCP at 3 mm was significantly higher among specimens of Group A (81.68%) in comparison to group B (89.41%).Mean PSCP at 3 mm was significantly higher among specimens of Group A (81.68%) in comparison to group B (89.41%).Mean PSCP at 6 mm was significantly higher among specimens of Group A (80.45%) in comparison to group B (88.69%). Horning TG et al, in a previous study compared the efficacy of three different root canal sealers when used to obturate a moisture-contaminated root canal system. A total of 120 single-rooted extracted teeth were divided into three groups. The groups were obturated with either Procosol, Sealapex, or Ketac-Endo using saline as a moisture contaminant in all cases. Half (20 teeth) of each group was placed in a saline storage medium for 9 months. The remainder of the samples were placed in India ink, under a vacuum, cleared, and the amount of dye penetration measured under magnification. The stored samples were similarly treated after the 9-month storage period. In a moisture-contaminated canal, Procosol exhibited the least amount of apical leakage, followed by Sealapex, then Ketac-Endo. There was no significant difference in the amount of dye penetration after 9 months of storage over that found initially, which indicates that the deleterious effects of moisture contamination occur during the initial placement and setting reaction.[10]

Huang Y et al, in another study analyzed the ability of multiple compounds to seal the dental tubules using scanning electron microscopy (SEM) and micro-computed tomogra-phy (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). 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.[11]

CONCLUSION

Significantly better results were seen among specimens in which Tubliseal EWT was used.

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