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Original Research

Comparative evaluation of efficacy of two different root canal sealers

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Abstract
Background: This study was conducted to assess the efficacy of two different root canal sealers
Material and methods: This study was conducted to assess the efficacy of two different root canal sealers. The subjects had been informed about the procedure and were asked for written informed consent for the study. The subjects who provided consent were included in the study while those who did not give consent had been excluded from the trial. There were total 100 subjects who gave consent for the study and hence they had been included. Two sealers had been used: MTA Fillapex and AH Plus. The subjects had been divided into 2 groups of 50 subjects each. The subjects of the first group were treated with MTA Fillapex while the subjects of the 2nd group had been treated with AH Plus sealer. The efficacy of these sealers had been assessed and the findings had been tabulated. Statistical analysis had been conducted using SPSS software.
Results: In this study, there were 50 subjects in group 1 and 50 subjects in group 2. The teeth of the subjects of group 1 had been treated with MTA Fillapex sealer and the teeth of the subjects of the 2nd group had been managed with AH Plus sealer. The apical leakage in the MTA Fillapex group at 24 hours and after 180 days was 0.054±0.011 μL min^{-1} and 0.052±0.010 μL min^{-1}, respectively. The apical leakage in the AH Plus group at 24 hours and after 180 days was 0.062±0.012 μL min^{-1} and 0.039±0.005 μL min^{-1}, respectively.
Conclusion: From the findings of this study, it can be declared that the AH Plus sealer was more effective as compared to MTA Fillapex root canal sealer.
Keywords: Root canal, Sealers, Efficacy

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Introduction

The successful outcomes of endodontic therapy are contingent upon the effective mechanical instrumentation and thorough cleaning of the root canal system, the eradication of microorganisms and organic debris, and the complete filling of the root canal.[1] It is widely recognized that microleakage occurring between the root canal walls and the filling material can negatively influence the results of endodontic procedures.[2] Therefore, it is critical to ensure that the entire root canal system is adequately sealed following the cleaning and shaping process to prevent the colonization and reinfection of the root and periapical tissues by oral pathogens.[3]

In the context of endodontic therapy, sealers play a vital role in filling the irregularities present within the root canal system, providing lubrication, and securing the gutta-percha to the walls of the root canal. Endodontic sealers must fulfill several essential criteria, including biocompatibility, dimensional stability, insolubility in oral fluids, radiopacity, ease of application, antibacterial properties, adaptability to the root canal walls, and the capacity to create a hermetic seal.[4] Nevertheless, none of the currently available sealers possess all the attributes of an ideal sealer.[5-7]

This study was conducted to assess the efficacy of two different root canal sealers.

Material and methods

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while those who did not give consent had been excluded from the trial. There were total 100 subjects who gave consent for the study and hence they had been included. Two sealers had been used: MTA Fillapex and AH Plus. The subjects had been divided into 2 groups of 50 subjects each. The subjects of the first group were treated with MTA Fillapex while the subjects of the 2nd group had been treated with AH Plus sealer. The efficacy of these sealers had been assessed and the findings had been tabulated. Statistical analysis had been conducted using SPSS software.

Results

Table 1: Group-wise distribution of subjects

Groups	Number of subjects	Percentage
Group 1 (MTA Fillapex)	50	50
Group 2 (AH Plus)	50	50
Total	100	100

In this study, there were 50 subjects in group 1 and 50 subjects in group 2. The teeth of the subjects of group 1 had been treated with MTA Fillapex sealer and the teeth of the subjects of the 2nd group had been managed with AH Plus sealer.

Table 2: Apical leakage of the sealers at 24 hours and 180 days post treatment.

Groups	24 hours (μL min^{-1})	180 days (μL min^{-1})
Group 1 (MTA Fillapex)	0.054±0.011	0.052±0.010
Group 2 (AH Plus)	0.062±0.012	0.039±0.005

The apical leakage in the MTA Fillapex group at 24 hours and after 180 days was 0.054±0.011 μL min^{-1} and 0.052±0.010 μL min^{-1}, respectively. The apical leakage in the AH Plus group at 24 hours and after 180 days was 0.062±0.012 μL min^{-1} and 0.039±0.005 μL min^{-1}, respectively.

Discussion

It is generally believed that the technical quality of root canal filling may have an impact on the treatment outcome because of the sealing capability that the fixing material provides against bacteria, microbial byproducts and tissue fluid.[8] Gutta-percha has been used as root canal filling material for almost 150 years, in addition to the use of sealer, essential for obtaining a fluid-tight seal between the dentinal wall and the gutta-percha.[9] Resin-based sealers such as AH Plus® are very commonly used as they do not release formaldehyde after setting, have long-term dimensional stability and expansion properties and are considered as the 'gold standard' root canal sealer.[10] However, it has been demonstrated that these sealers are undesirable due to their biological activity and cytotoxicity in cultures.[11] Tricalcium silicate-based cements, universally referred to as mineral trioxide aggregate (MTA) cements have revealed interesting biological properties, both in the laboratoryand in in vitro tests, and are more biocompatible than common endodontic sealer.[12]

This study was conducted to assess the efficacy of two different root canal sealers.

Altan H et al[13] compared the short term and long-term apical sealing ability of different root canal sealers. Fifty-five extracted human anterior single-root teeth were used. The coronal part of each tooth was removed and the root canals were prepared with NiTi rotary instruments. Teeth were divided into 5 study groups; Group I: MTA Fillapex (Angelus, Brazil); Group II: Sealapex (Sybron-Kerr, Romulus, MI, USA) and Group III: AH Plus (Dentsply, Konstanz, Germany) (n=15) and negative and positive control groups (n=5). The quality of root canal sealing was assessed by a fluid filtration method performed at 24 h and 180-day time intervals. Kruskal Wallis and Mann Whitney U tests were used to compare the groups.At 24 h evaluation, MTA Fillapex presented significantly less microleakage than the Sealapex and AH Plus ($p<0.05$). At long term interval (180-day), Sealapex and AH Plus presented significantly less microleakage than the MTA Fillapex ($p<0.05$).Sealapex and AH Plus showed significantly better sealing abilities than MTA Fillapex in the long term.

The aim of the study carried out by Asawaworarit W et al[14] was to evaluate the apical sealing ability of tricalcium silicate-based (MTA Fillapex®) and resin-based (AH Plus®) sealers at 24 h, 7 days and 4 weeks. Thirty-four extracted human upper anterior teeth were used. All the teeth were sectioned to leave the root 15 mm long, and then all the roots were instrumented using a set of ProTaper® rotary instruments. Four roots were selected randomly as controls, and the remaining 30 were randomly divided into 2 groups of 15 each: MTA Fillapex and gutta-percha (group 1) and AH Plus and gutta-percha (group 2) using a warm vertical compaction technique. The apical sealing ability of the filled root canal was measured using the fluid-filtration method with 200 mm Hg (26.67 KPa) above atmospheric pressure at 24 h, 7 days and 4 weeks. The apical microleakage of the 2 groups was compared using Student's t test. $p < 0.05$ was considered statistically significant. The mean apical microleakage in group 1 at 24 h, 7 days and 4 weeks was 1.01 ± 0.24, 0.43 ± 0.07 and 0.24 ± 0.08 nl/s. The corresponding values in group 2 were 1.15 ± 0.40, 0.32 ± 0.09, and 0.38 ± 0.10 nl/s. MTA Fillapex had significantly more leakage than AH Plus at 7 days, but at 4 weeks, MTA Fillapex showed a significantly better sealing ability than AH Plus ($p < 0.05$). In this

study, the tricalcium silicate-based sealer promoted proper sealing when used for filling the root canals.

Conclusion

From the findings of this study, it can be declared that the AH Plus sealer was more effective as compared to MTA Fillapex root canal sealer.

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