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ORIGINAL ARTICLE

The Effect of Two Different Root Canal Sealers on Post Obturation Pain

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ABSTRACT

Objective: The purpose of this research was to evaluate the effectiveness of various root canal sealers in reducing postoperative pain and the need for analgesics.

Methods: The asymptomatic necrosis and apical periodontitis of 60 single-rooted teeth were studied by randomly assigning them to 2experimental groups (n=30) according to the root canal sealer: AH Plus and MTA Fillapex. Two appointments were needed to complete the endodontic treatment, and calcium hydroxide was employed as the intracanal dressing. The patients were asked to assess the severity of their discomfort as no pain, slight and moderate pain. After 24 hours, 48 hours, and 7 days, patients rated their discomfort on a scale from 1 to 4. The use of pain relievers was also documented. Postoperative pain and the requirement for analgesia were compared using the t-test.

Results: The Mean±S.D of the participants age in AH plus and MTA Fillapex group was 39.1±9.4 and 43±9.2 years. Overall, 62% were female and 38% were males were included in the present research. Overall, 37% of the cases (22 patients) had postoperative discomfort after 24 hours, with the number decreasing to 18% (11 patients) after 48 hours. After 7 days, no one in either of the groups had any discomfort. There were no statistically significant differences between groups in the occurrence or severity of postoperative pain or in the use of analgesics at any of the assessment points.

Conclusion: Similar rates of postoperative discomfort and the requirement for analgesics were seen with the use of either AH Plus or MTA Fillapex for root canal filling.

Keywords: Pain, Postoperative; Root Canal Obturation; Clinical Study

INTRODUCTION

The term "endodontic postoperative pain" refers to the discomfort felt by the patient after undergoing root canal therapy (1). One study found that anywhere from 3% to 58% of patients experiencing postoperative discomfort following endodontic operations. Damage to the periradicular tissues, either by surgery or by chemicals or bacteria, is a frequent cause of postoperative discomfort (2-4). There are a variety of variables that might influence the length and severity of pain after surgery. In instance, the level of discomfort experienced prior to surgery may be broken down by patient demographics (such as age, gender, and medical history) and by factors like tooth type (5). Intraoperative factors include the likes of the physical properties of the endodontic instrument used in the initial treatment, features of the irrigation protocol like chemical solutions and concentrations, microbiological stability and resistance, histopathological state of the tissues surrounding the tooth, etc (5-7). During the obturation phase of root canal therapy, the endodontic sealer makes direct and local contact with the reshaped periapical tissues through the apical foramen and any supplementary lateral canals. By understanding the factors that contribute to postoperative pain, medical professionals may better choose procedures and supplies that have been shown to reduce the occurrence of this symptom (8). Gutta-percha combined with an endodontic sealer is the conventional filling material for infected root canal systems (9). These sealers are intended for use inside the root canal during endodontic therapy, however they may come into intimate contact with the periapical tissues through lateral canals, apical foramina, or leaching. Because of this, it is reasonable to assume that root canal sealers may cause an inflammatory response and activate sensory neurons (10, 11). Therefore, root canal sealers may have a role in the discomfort felt after having a root canal. Pain sensations and flare-ups may be triggered by root canal sealers due to the stimulation of trigeminal nociceptors in vitro and the accompanying immunologic response, as proposed by Ruparel et al (10). Previous research on the effects of various root canal sealers on postoperative pain has shown conflicting findings. When comparing a resin-based and a calcium silicate-based root canal sealer, Ates et al. (12) observed no differences in postoperative discomfort. Similarly, when comparing AH Plus with Total Fill BC Sealer, Graunaite et al. (13) found similar outcome. Comparing two resin-based root canal sealers, AH Plus and ResinoSeal, to two calcium-hydroxide root canal sealers, Sealapex and Apexit Plus, Shashirekha et al. (14) found a statistically significant difference. Given the conflicting findings and lack of data in the endodontic literature on this issue, we decided to investigate the connection between endodontic sealers and postoperative discomfort. The purpose of this randomied, controlled, prospective clinical trial was to evaluate the effectiveness of two root canal sealers—AH Plus, and MTA Fillapex—in reducing postoperative pain and the need for analgesics following root canal treatment.

METHODOLOGY

After the ethical approval from the institution review board, this randomized control trial was conducted at Rawal Institute of Health and Sciences from September 2022 to November 2022. Patients over the age of 18 who have been referred for endodontic treatment after being diagnosed with pulp necrosis in the front teeth or premolars were included in the study. Patients who have experienced difficulties after past endodontic procedures, teeth that have undergone endodontic treatment before or had a positive reaction to a pulpal sensitivity test, teeth with root fractures, teeth that could not be isolated with a rubber dam, and teeth with long root lengths. Patients under the age of 18, those with cognitive impairments, those who were expecting, and those who had unmanaged systemic disorders were excluded from the study. 60 patients who fulfilled the inclusion criteria were included in the study and were randomly divided into two groups depending upon the type of sealer used, AH Plus (n=30) and MTA Fillapex (n=30). Pulpal necrosis was diagnosed when there was no reaction to the cold test and no bleeding upon entry to the pulp chamber. An access cavity was created under local anaesthetic using a spherical high-speed diamond bur. There was a rubber dam set up once we got to the pulp chamber, and the whole area was sterilised before any work could be done. Root canals were first thoroughly irrigated with 5 ml of 5.25% NaOCl before being examined with a #10 K-file. An apex finder was used to establish the length of each root canal, and Wave-one Gold files were used to shape the canals in accordance with the recommendations of

the manufacturer. The root canal's structure informed the choice of files utilised in conjunction with a mild in-and-out pecking action at 2-3 mm amplitude. After making three insertion and withdrawal motions, the device was taken out of the canal. These actions were carried out repeatedly until the desired working length was achieved. After using 5 mL of 5.25% NaOCl to irrigate the canals, a size #10 K-file was used to create apical patency in the canals. The instruments were then removed and 5 mL17% EDTA was pumped into the root canals for 3 minutes. Then, 5 mL of 5.25% NaOCl was used as a final rinse. For the procedure, a 40-milliliter aliquot of NaOCl was taken. After that, a calcium hydroxide-based dressing was placed within the root canals, and the composite resin was used to seal them up. After 7 days, the intracanal dressing was removed with manual files and irrigated with 5 mL 5.25% NaOCl. This procedure included infiltrative anaesthetic and rubber dam isolation. The endodontic sealers, AH Plus and MTA Fillapex, were used to fill the root canals. Procedures for working with endodontic sealers were carried out in accordance with the manufacturers' guidelines. We radiographed the teeth to check the gutta-percha cone and establish whether or not the whole canal needed to be filled. The pulp chamber was cleansed with alcohol until all traces of the endodontic sealer were gone. The obturation technique used was cold lateral compaction and the obturation material was removed using a heated instrument, and a composite resin repair was fabricated. Radiographs were collected when the rubber dam was taken away. Patients were not given any prescription medications but were given instructions to take ibuprofen (600 mg every 8 hours) if they experienced any discomfort. During the first 24 hours, 48 hours, and 7 days following obturation, patients reported how much pain they were experiencing. Patients were asked to assess their pain levels from 0 to 10 on a scale from no pain to extreme discomfort. Each pain intensity was given a score between 0 and 4 (1 = no pain, 2 = mild, 3 = moderate, and 4 = severe) at each checkpoint. Patients were contacted via phone at mutually agreeable intervals. A list of painkillers taken was kept. After 24 and 48 hours, the t-test was used to compare the two groups on the prevalence of postoperative pain and the use of analgesics. The ordinal t-test was used to compare the groups at 24- and 48-hours post-treatment, when there was a noticeable difference in pain levels. Since no postoperative pain or analgesic consumption was recorded for any of the groups, no statistical analysis was undertaken to investigate differences in incidence, intensity, or consumption across the groups 7 days after therapy.

RESULTS

Table 1 represent the demographic and clinical parameters of the study participants in both groups. Overall Mean±S.D of the participants age was 41.05±9.5 years. The Mean±S.D of the participants age in AH plus and MTA Fillapex group was 39.1±9.4 and 43±9.2 years. No significant difference (0.130) in the mean age of the participants in both study groups was observed. Most of the participants in both groups were within 30-50 years age group. Overall, 62% were female and 38% were males were included in the present research. No significant difference (0.375) in the mean age of the participants in both study groups was observed. Equal percentage of anterior and premolar teeth were root canaled in both groups. Overall, 37% of the cases (22 patients) had postoperative discomfort after 24 hours, with the number decreasing to 18% (11 patients) after 48 hours. Table 2 displays the number (n) of patients in each group as well as their incidence and severity of postoperative pain at 24- and 48-hours post-treatment. After 7 days, no one in either of the groups had any discomfort. There were no statistically significant differences between groups in the occurrence or severity of postoperative pain or in the use of analgesics at any of the assessment points.

Table 1: Clinical and Demographic characteristics of the participants in the study groups

Parameters	Over all (n=60)	AH Plus (n=30	MTA Fillapex (n=30)	P Value
Gender				
Male	23 (38%)	13 (43%)	10 (23 %)	0.375
Female	37 (62%)	17 (57%)	20 (67%)	
Age	41.05±9.5	39.1±9.4	43±9.2	
<30	9 (15%)	6 (20%)	3 (10%)	0.130
30-50	42 (70%)	19 (63%)	23 (77%)	
>50	9 (15%)	5 (16%)	4 (13%)	
Teeth				
Anterior	30 (50%)	15 (50%)	15 (50%)	
Premolar	30 (50%)	15 (50%)	15 (50%)	
Arch				
Upper teeth	38 (63%)	18 (60%)	20 (67%)	0.625
Lower Teeth	22 (37%)	12 (40%)	10 (33%)	

Table 2: Intensity and Incidence of postoperative pain in each group 24h and 48h after treatment

Sealer	24h			P value	48h			P value
	No pain	Slight	Moderate		No pain	Slight	Moderate	
AH plus	18	8	4	0.83	25	3	2	0.83
MTA Filapex	20	7	3		24	2	4	

DISCUSSION

This randomized, controlled, prospective clinical trial's primary objective was to compare the effectiveness of two root canal sealers commonly used for filling root canals—AH Plus and MTA Fillapex—in reducing postoperative pain and the number of analgesics required to alleviate it. The current study's findings imply that the root canal sealers used in endodontic treatment procedures did not affect postoperative discomfort or the need for analgesics. Consequently, short-term postoperative pain follow-up is predicted with any of the three root canal sealers tested in this research. Root canal sealers varied in their cytotoxicity and inflammatory response, according to in vitro research (15-18).Root canal sealers may cause pain and neurogenic inflammation since they have been shown in prior research to directly activate trigeminal nociceptors, which results in a strong release of calcitonin gene-related peptide. 10 In this research, however, the various sealers examined did not affect postoperative pain, therefore these distinctions and conclusions may not have therapeutic significance. This confirms the results of other research that compared the effects of using various sealers to fill root canals and found no difference in postoperative discomfort. Postoperative discomfort was uncommon in this randomized clinical study, occurring in just 37% of patients within 24 hours and 18% within 48 hours. There is a wide range of reported postoperative pain outcomes in the literature, from 3% to 58% (19). These vast disparities may be traced back to substantial variations in postoperative assessment techniques, pulp and periradicular health, and treatment protocols used throughout the studies. The study by Graunaite et al. (13) (2018), a split-mouth randomized clinical trial in patients with asymptomatic apical periodontitis in previously endodontically treated single-rooted teeth, indicated that 35% of patients reported discomfort after surgery when compared to 0% in the control group. A randomized controlled clinical investigation by Ates et al.(12) including both vital and non-vital mandibular premolars and molars found a 68% and 59% prevalence of patients experiencing discomfort in teeth filled with AH Plus and iRoot, respectively. The postoperative discomfort experienced by patients after apically extruded sealer placement on vital and non-vital teeth was not reported by Shashirekha et al. (14) After getting a root canal, you might anticipate some pain, including a little ache called sensitivity, due to the insertion of the clamp or the physical stress induced by the instruments and

chemical solutions (20). To prevent unnecessary procedures like over instrumentation and overfilling, an electronic apex finder was employed in the current investigation to accurately locate the apical constriction. In no instance was sealer extruded on purpose. Only two of these patients had this happen on accident, but even those instances wouldn't have changed how much pain they had after surgery (21, 22). However, the root canal filling method employed in this research was unique, and this distinction may explain why so few patients had discomfort after the procedure. The root canal filling method, rather than the root canal sealer, is therefore the most probable culprit in the occurrence of post-obturation discomfort. At the same time, the existence of systemic disorders was seen as an ethical exclusion criterion, thus efforts were made to reduce immune responses that could be associated to postoperative reactions to sealers. Notable reductions in postoperative pain were also seen in the current investigation. No one complained of discomfort after the first week, and nobody who had the intervention sought a follow-up appointment. Both of these results are typical of research into pain after surgery. Factors unique to individual individuals and their teeth all contribute to post-endodontic discomfort (8, 23, 24). It was decided not to include molars in this research since it is well established that this set of teeth is associated with a greater risk of postoperative discomfort (5, 8, 24). Since preoperative pain is a major predictor of postoperative pain, only asymptomatic individuals were included in the current investigation (8, 21, 24). In addition, we used stratified randomization to ensure that the number of front and premolar teeth across all groups was comparable. Additionally, demographic characteristics were distributed uniformly between root canal sealer groups thanks to the use of randomization. This consistency, together with the study's sufficient sample size, contributed to its excellent levels of internal and external validity.

CONCLUSION

In conclusion, after root canal treatment with either AH Plus or MTA Fillapex, patients had the same frequency and severity of pain, and required the same quantity of pain medication.

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