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The Effect of Reciprocating Instrument and Root Canal Filling Techniques on Post-operative Pain in Retreatment: A Prospective Clinical Study

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ABSTRACT

Objective: The aim of this prospective clinical study was to assess the effect of different instruments and root canal filling techniques on post-operative pain in single visit of endodontic retreatment.

Methods: Forty five patients (18-65 yrs old) who needed non-surgical endodontic retreatment in mandibular premolar or molar teeth without any symptoms were included in this study. The teeth were randomly assigned into 3 groups of 15 teeth, according to the instrumentation and filling techniques: hand files with lateral compaction (group 1), Reciproc with lateral compaction (group 2), Reciproc with continuous wave compaction technique (group 3). Retreatments were performed in a single visit and post operative pain was assesed at 4 intervals; 24, 48,72 hours and 7 days. All data were analyzed using One way Anova, Chi-square and Fisher's Exact test and the significance level was set to ($p \leq 0.05$).

Results: No statistically significant difference was found among the groups in relation to post-operative pain ($p>0.05$). Although the intensity of post-operative pain was decreased over the time in all groups, significant difference was found only in Reciproc groups ($p<0.05$). However, no pain was found in any patient at the end of 7 day. Also, statistically significant difference was found between pain intense and periapical index in 24 and 72 hours ($p<0.05$).

Conclusion: In the present study, the intensity of post-operative pain was not found to be related to instrumentation or filling techniques in retreatment cases. The intensity of pain could be related to periapical index of the tooth.

Keywords: Continuos wave compaction, lateral compaction, post-operative pain, reciproc, retreatment

HIGHLIGHTS

- This study investigated the effect of instruments (reciprocating or hand files) and root canal filling techniques (lateral compaction or continuous wave compaction) on postoperative pain in participants undergoing single visit for retreatment.
- The study revealed that the type of the instrument or root canal filling technique did not effect postoperative pain in 24 h, 72 h and 7 days intervals.
- However, retreatment procedure might cause high incidence of postoperative pain in 24 hours regardless of the instrument or root canal filling technique were used.
- Periapical status of the teeth is important factor in post-operative pain.

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INTRODUCTION

The aims of root canal treatment are to debride the root canal system by removing microorganisms and necrotic tissues in teeth with pulp and periapical disease and to obturate the prepared space three-dimensionally. The creation of a hermetic apical seal improves the success rate for endodontic therapy (1-2).

Root canal treatment success rate has been shown to be 96% in teeth with correct diagnosis and biomechanical procedures, as well as appropriate canal filling and no periapial lesions, whereas only 86% of the cases with pulp necrosis and periapical radiolucency showed apical healing (3).

One of the most important reasons for failure of root canal treatment is the leakage of periapical tissue fluids into the incompletely filled canal (4).

The aim of root canal retreatment is to completely remove the old canal filling from the root canal, reach the apical foramen, disinfect the root canal system and fill the prepared cavity. Non surgical retreatment is considered the primary procedure option for overcoming failure, which involves removal of root canal filling material from the tooth followed by cleaning, shaping of the canal and filling it with a three-dimensional hermetic filling to establish healthy periapical tissue (4-6).

During the instrumentation procedure, necrotic dentine tissue, microorganisms, irrigants may extrude into the periapical tissues, and this may induce post operative pain, inflammation or flare-up (7-10). Post-operative pain is an undesirable reaction in endodontic treatment either for patient or the dentist, and is frequently encountered in 3-58% of cases (11). Apical extrusion of the infected debris is main aetological factor for post operative pain and resulted in periapical inflammation or delay of periapical healing (9).

The difference in the incidence of pain can be attributed to several factors such as the age and gender of the patient, type, pulpal and periradicular status and localization of the tooth, preoperative pain or procedural factors, the method of the instrumentation applied, the filling technique and the skill of the operator (11,12).

Although hand files has been widely used for removal filling materials, rotary instruments are also effective and time consuming.

Single file systems made of M-Wire nickel-titanium with reciprocating action have gained popularity in recent years and are generally designed to shape the root canal. However, it has been stated that they can be used for retreatment purposes due to their high cutting efficacy and the ability in advancing toward the apex (13).

Beside instrumentation, the technique used for root canal filling might have an influence on post operative pain (14,15). However, a few studies were published related to the effect of different root canal filling techniques on post-operative pain. Kandemir Demirci & Çalışkan et al. (14) compared the effect of Thermafil with lateral compaction technique on postoperative pain and demonstrated more discomfort with Thermafil obturation at 48 hours. Also, Alonso-Ezpeleta et al. (15), found Thermafil caused more post-operative pain than lateral compaction technique in vital cases. However, Yu et al. (16) compared warm vertical compaction technique with single cone technique and found no significant difference regarding to post-operative pain. However, no randomized clinical trials have been conducted to evaluate filling techniques on post-operative pain in tretreatment in literature.

Thus, the aim of this prospective clinical study is to compare the post-operative pain after single visit non-surgical root canal retreatment using two different instuments (reciproc or hand files) and different filling techniques (continuous wave or cold lateral compaction). The null hypothesis was that there was not significant difference in postoperative pain reported by patients amoung the groups.

MATERIALS AND METHODS

This clinical study was approved by the Marmara University Clinical Research Ethics Committee on 29 November 2018 with the protocol number 446/2018 and the approval number 237/2018, and the research was started after it was approved by the Ministry of Health Medical Devices Organisation. Also, this study was registed at http://clinicaltrial.gov/ct2/show/NCT04789343.

The study was performed on 45 patients in the age of 18-65 years old who referred to Department of Endodontics of Marmara University with diagnosis of failed root canal treatment in mandibular premolar or molar teeth which were examined clinically and radiographically. Patients were given adequate information regarding the required treatment. A written consent was signed by each patient after explaining the treatment procedure.

Patient Selection

All the participants were healthy with no systemic disease and not taken any medication such as antibiotics, corticosteroids or analgesics lately in 14 days. Clinically asymptomatic, pretreatment root canal filling was greater than 2 mm from the radiographic apex, teeth with periapical index 0-4 were selected. Exclusion criteria were as follows; patients with allergies to local anesthetic agents and non-steroidal anti-inflammatory drugs, teeth with endodontic post, periodontal pockets deeper than 4 mm, overfilling or broken instrument.

The patients were randomly divided into 3 groups (15 of each) according to the instruments used for retreatment and filling methods. Patients were asked to say a number from 1 to 3 and groups were determined accordingly. So they were unware of the type of the instrument or technique used for root canal treatment.

Retreatment Protocol

Retreatments were performed in a single visit by a single endodontic specialist (G.N). Root canal treatment was applied to all patients under as aseptic conditions as possible. All patients were anesthetized using a local anaesthetic solution containing 1.5 mL 4% articaine HCl with 1: 100 000 epinephrine bitartrate (Maxicaine Fort, VEM, Istanbul, Turkey). Digital periapical radiographs were taken with parallel technique and canal length determination was made in each patient before the treatment. After rubber-dam application, caries and coronal restorations were removed with high and low speed high sterile burs under water cooling until the old root canal filling

was visible. Then the tooth was retreated using one of the following techniques:

1.Hand file and lateral compaction

2.Reciproc and lateral compaction

3.Reciproc and continuous wave compaction technique

In all groups, the sonic system EndoActivator (Dentsply Tulsa Dental Specialties, Tulsa, OK) was used to activate the irrigation solutions in the canal. There are 3 different sizes of polymer tips that can be attached to the device. The tip suitable for the canal size was selected and placed 3-4 mm shorter than the working length and used for 30-60 s in the final irrigation.

Group 1: Teeth obturated with lateral compaction technique after removal of canal filling with Hedstrom hand files (n=15).

Retreatment procedure: After the access cavity was opened, 5.25% NaOCl was injected into the access cavity. The previous gutta-percha root fillings material was removed from the coronal 1/3 using Gates Glidden burs #3 and #2, and care was taken not to over-expand the cervical part of the canal. Then Hedström files (VDW, Munich, Germany) were used in the order of #30, #25 and #20 sizes for removal gutta-percha from the middle 1/3 of the canal. Finally #15 K file (VDW, Munich, Germany) was used to reach working length and root canal lenght was determined using apex locator Propex pixi (Dentsply Maillefer, Ballaigues, Switzerland). Then a periapical radiographic view was taken to confirm the canal length.

The remaining canal filling material was removed with #30–15 Hedström and K-files with a circumferential, quarter turn, push-pull, filing motion at working length. Between the files, irrigation was performed with 2 ml of 5.25% sodium hypochlorite (Promida, Eskishehir, Turkey) for each canal. For the irrigation process, a 30 gauge needle with a closed tip (Endo-top, Cerkamed Medical Company, Poland) was used and placed in the canal 3-4 mm shorter than the working length and moved up and down during irrigation. Root canal preparation was continued until no gutta-percha remained on the file.

No solvent was used to remove old root canal filling in this study. For the final irrigation, first 5 ml of 5.25% NaOCl, then 5 ml of 17% ethylene diamine tetra acetic acid (EDTA) (Cerkamed Medical Company, Poland) for 1 minute along and then for each root canal 5 ml of 5.25% NaOCl and 5 ml saline was used. The EndoActivator device was used to activate each solution in the final irrigation prosedure. The canals were dried with paper point and filled with lateral compaction technique using AH Plus root canal sealer (Dentsply DeTrey, Konstanz, Germany) and gutta-percha (Diadent, Chongju, Korea). Lateral compaction technique procedure. The canals were dried with paper points, and appropriate master cones (Diadent, Chongju, Korea) were checked clinically and radiographically. Coated master cone with AH Plus root canal sealer (Dentsply DeTrey, Konstanz, Germany) was inserted into the canal and then, lateral compaction was performed using a size 30 spreader with a size 25 auxiliary cones and obturate the root canal until no space was left. After root canal filling, a cotton pellet was placed in the pulp chamber, and the access cavity was closed with a temporary filling to avoid coronal leakage. The patient was referred to the restorative department.

Group 2: Teeth obturated with lateral compaction technique after removal of canal filling with Reciproc files (n=15).

Retreatment procedure: after the access cavity was opened, 5.25% NaOCl was injected into the access cavity. Gutta-percha root canal fillings were removed using R25 (VDW, Munich, Germany) with a slow in and out pecking motion. Amplitude of this movement was not exceeded 3mm. The tool was pulled out of the canal and the threads were cleaned after three in-and-out movements or when more pressure was required to move the tool through the canal or when resistance was felt. Care was taken to apply very little apical pressure to the files.

Reciproc files were used with a brushing action to remove residual filling materials from the canal walls. Frequent irrigation was performed with 5.25% sodium hypochlorite. The working length was determined with the #10 hand file as in group 1. The R25 file was used until the working length was reached, and the retreatment procedure was completed until gutta-percha were no longer visible on the instrument and on the radiograph. After removal all remnants, the canals were prepared using R40 for premolars, R25 mesial canals and R40 for distal canals in molars. Wide canals were prepared using R50. Each instrument was used in one tooth and discarded.

The sequence of the final irrigation and lateral compaction procedure was carried out in the same way as in the first group.

Group 3: Teeth obturated with continuous wave root canal filling technique after removal of canal filling with Reciproc files (n=15).

Retreatment procedure: Reciproc file (VDW, Munich, Germany) was used to remove the previously root canal filling material in the teeth included in this group and the whole procedure was done as in group 2. The irrigation protocol was carried out as in the previous two groups. Root canals were filled with the gutta-percha cones (Reciproc, VDW, Munich, Germany) and Ah Plus sealer (Dentsply DeTrey, Konstanz, Germany) using continuous wave compaction technique (Diadent Dia-Duo, Chongju, Korea).

For root canal filling, matching size gutta-percha cone R25, R40 or R50 (Reciproc, VDW) coated with the sealer was inserted. The heating condenser with a size 50-%4 was placed in the canal for 4-6 mm shorter than the working length and the excess gutta-percha was cut off. Buchanan hand plugger (SybronEndo, Orange, CA) was used to condense the gutta-percha. Then the thermoplastic gutta-percha inside the obturator (Diadent, Chongju, Korea) was heated up to 140°C and inserted into the canal in 2-3 steps. Finally, vertical compaction was performed with Buchanan hand pluggers.

TABLE 1. Descriptive and statistical analysis of demographic data of each group

	Hand files+LC		Reciproc+LC		Reciproc +CWO		p
	n	%	n	%	n	%	
Age, (mean±SD)	37.8±12.1		30.4±7.6		33.3±9.4		0.130
Female	10	66.7	12	80	8	53.3	0.301
Male	5	33.3	3	20	7	46.7	
Periapical index							
Score							
1	5	33.3	7	46.7	3	20	
2	2	13.3	1	6.7	3	13.3	0.804
3	4	26.7	5	33.3	6	40	
4	4	26.7	2	13.3	4	26.7	

Significant (p< 0,05). LC: Lateral condensation, CWO: Continuous wave obturation, n: Number of patients, SD: Standart deviaton

After the completion of the root canal retreatment procedure, post-operative instructions were given to patients to take analgesics (ibuprufen or paracetamol) in case of needed for severe pain.

All patients received a questionnaire to rate the intensity of pain 24, 48, 72h, 7 days after retreatment was completed. The patients filled out the verbal rating scale (VRS) as follows: 0, no pain or discomfort; 1, slight pain (need no medication), 2, moderate pain (oral analgesics required); 3, severe pain, (no longer able perform activity, analgesics have little or no effect on pain relief).

Statistical Analysis

Data were analyzed using SPSS 23 (Statistical Package for Social Science) version 23 (SPSS Inc, Chicago, IL, USA). Data were expored for normality using the Kolmogorov-Smirnov test. Data were analyzed using One-Way ANOVA, chi-square test and Fisher's Exact test ($p<0.05$).

RESULTS

Distrubution of tooth type according to the groups was as follows; Group1. (15 premolar 0 molar), Group2.(12 premolar,3 molar), Group 3. (14 premolar, 1molar teeth).

The demographic data showed no significant difference in all groups ($p>0.05$) (Table 1).

Post-operative pain prevalance related to each instrumentation and filling technique used at the different time internals are shown in Table 2 and Figure 1. According to this data, there was no statistically significant difference between hand files and reciproc groups which were obturated by lateral compaction technique ($p>0.05$). Also, no significant difference was found between lateral compaction and contiuous wave filling techniques in teeth instrumented by Reciproc instrument at any time of 4 points assessed ($p>0.05$).

When the pain level was evaluated, the highest post operative scored were found 24 hours after treatment and declined over the time. In each group, pain decreased from 24 hours to 48 hours and 72 hours, but statistically only difference was found in Reciproc groups in all intervals (group 2 and 3) ($p<0.05$). No pain was recorded 7 days after treatment in any groups.

Although the pain incidence was higher in women than man, the difference was not significant in all time intervals ($p>0.05$).

When total pain incidence was calculated, 60% of the patients has disconfort or pain (slight, moderate or mild) after 24 hours retreatment. This incidence was decreased in time (24.4% in 48 hours and 17.8% at 72 hours) and statistically difference was found between all intervals ($p<0.001$).

Post operative pain prevalance related to periapical index is shown in Table 3.

According to this data, significant correlation between the severity of pain and the periapical index was found in the first 24 h and in 72 h ($p<0.05$). No statistically significant difference was found amoung the groups ($p>0.05$). Meanwhile, 5 out of 6 patients with severe pain had score # 4 periapical index. Also, 50% patients who had missing canals had severe pain and the others (50%) had mild to moderate pain in 24 hours after root canal treatment completed.

DISCUSSION

The aim of this prospective randomized clinical study was to compare the density of post-operative pain after using reciprocating or hand files and different root filling techniques in retreated cases.

Post-operative pain is an undesirable situation in endodontic treatment, and it is frequently encountered at the rate of 3-58% (11). Since no statistically significant difference was seen between groups, it seems that instrumentation or root canal filling techniques had no effect on post-operative pain in retreated teeth. However, post-operative pain incidence was found to be high, i.e. 46,7% of hand files group and 66,7% of Recipoc group and totally 60% of patients had disconfort or pain (slightly, moderate or mild) in 24 hours. The intensity of post-operative pain was decreased gradually over the study period in all groups and at the end of 7 days no pain was decleared. However literature shows different results with regards to pain incidence. Most of the studies are conducted as primary root canal therapy. However, it is claimed that necrotic,

TABLE 2. Number and percentage of intensity of pain in all groups

Pain quality	Groups p						Total p	Group 1-2 p	Group 1-3	Group 2-3 p
	Group 1 Hand file+LC		Group 2 Reciproc+ LC		Group 3 Reciproc+ CWO					
	n	%	n	%	n	%				
24 hours										
0	8	53.3	5	33.3	5	33.3	0.399	0.402	0.246	0.770
1	3	20	8	53.3	7	46.7				
2	2	13.3	1	6.7	0	0				
3	2	13.3	1	6.7	3	20				
48 hours										
0	11	73.3	12	80	11	73.3	0.800	0.791	0.686	1.000
1	1	6.7	2	13.3	2	13.3				
2	1	6.7	1	6.7	2	13.3				
3	2	13.3	0	0	0	0				
72 hours										
0	12	80	12	80	13	86.7	0.903	1.000	1.000	0.598
1	2	13.3	3	20	1	6.7				
2	1	6.7	0	0	1	6.7				
3	0	0	0	0	0	0				
7 days										
0	15	100	15	100	15	100	-	-	-	-
p (for time)	0.160		**0.001***		**0.0001***		**0.0001****	0.175	0.816	0.729

LC: Lateral condensation, CWO: Continuous wave obturation

TABLE 3. Distribution of pain intensity according to the periapical index

Pain score	Periapical İndex										p
	1		2		3		4		Total		
	n	%	n	%	n	%	n	%	n	%	
24 h											
0	7	38.9	3	16.7	7	38.9	1	5.6	18	100	
1	5	27.8	2	11.1	8	44.4	3	16.7	18	100	0.027
2	2	66.7	0	0	0	0	1	33.3	3	100	
3	1	16.7	0	0	0	0	5	83.3	6	100	
48 h											
0	10	29.4	5	14.7	14	41.2	5	14.7	34	100	
1	3	60	0	0	1	20	1	20	5	100	0.136
2	2	50	0	0	0	0	2	50	4	100	
3	0	0	0	0	0	0	2	100	2	100	
72 h											
0	11	29.7	5	13.5	15	40.5	6	16.2	37	100	
1	4	66.7	0	0	0	0	2	33.3	6	100	0.029
2	0	0	0	0	0	0	2	100	2	100	
3	0	0	0	0	0	0	0	0	0	100	

Significant (p<0.05)

previously initiated or previously treated teeth are more susceptible to post-operative pain and flare-up compared to teeth performed primary root canal therapy (17). Also, such teeth demand more aggressive instrumentation and cleaning due to failure of primary treatment which conceivably induce more pain. On the other hand, Mattscheck et al. (18) found no significant difference in post-operative pain between the retreatment and the primary root canal treatment in their studies. Comparin et al. (19) found 38% of patients had post operative pain in 24 hours after retreated root canals.

Almost all study results have shown that post-operative pain is apparent during the 24 and 48 hours after root canal treatment and released in time depending on preoperative con-

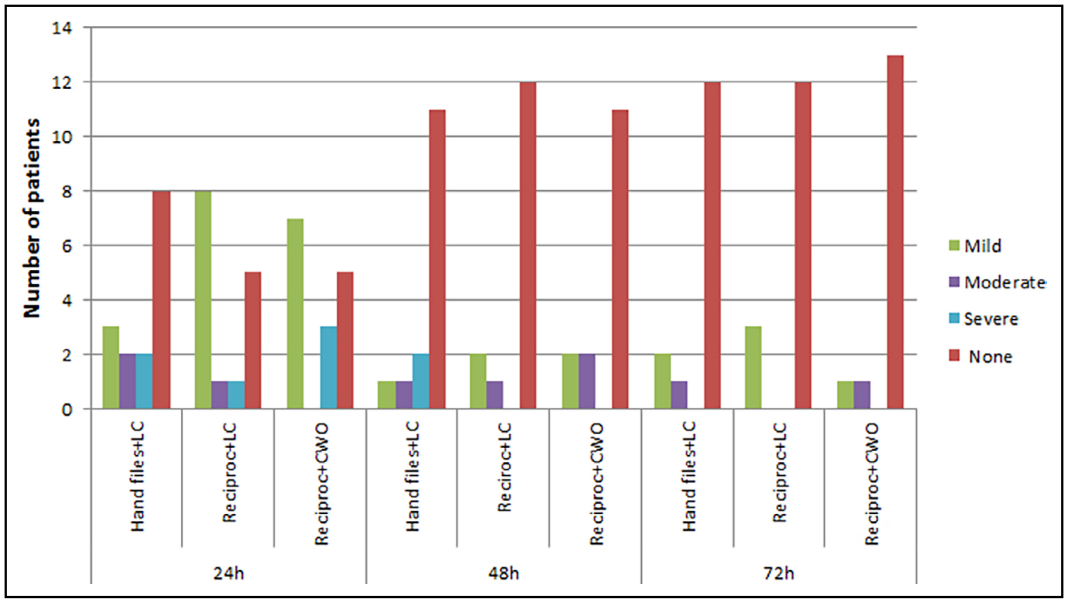

Figure 1. Post-operative pain scores of all groups

dition of the tooth (20,21). Meantime, it has been reported that mostly the presence of preoperative pain affected the intensity of pain after treatment (22,23). El-Mubarak et al. (23) demonstrated post-operative pain in 15.9% of the patients with a history of preoperative pain, while only 7.1% of the patients with asymptomatic teeth had pain after the procedure. In this study,patients without pain were included in the study.

Studies have shown that, multifacturial factors may effect postoperative pain, so it is difficult to measure the pain level and to control the various confounding factors. In the present study, postoperative pain severity was measured numerically grading the pain into none, slight, moderate and severe by using VRS scale in order to simplify the pain rating. It is reported as one of the most adequate methods for reporting the pain experienced by the patient (24).

It is shown that, beside pre-operative pain, age, gender, tooth type and localization, periapical status of tooth, number of treatment visit may effect the intensity of post operative pain.

Related to tooth type and localization, Ali et al. (25) found higher incidence of pain in mandibular teeth, while Arias et al (10) reported for maxillary teeth. On the other hand, Genet et al. (26) found more pain in molars with 3 or more canals. In this study, root canal treatment was applied to mostly mandibular premolars and molars to eliminate the localization factor.

Literature shows conflict results about the incidence of pain in relation to sex. While Genet et al. (26), Torabinejad et al. (12), Arias et al. (10) found higher incidence of pain in women than in men, Abbott et al. (27), Balaban et al. (28) did not find any difference. The difference among these studies may be attributed to the population and culture difference and attitude to pain and also using different treatment and filling materials and techniques. In this study, although women reported more post operative pain (63,3%) than men (53,3%) in the first 24 hours, the difference was not statistically significant.

Steroid and non-steroidal anti-inflammatory drugs and antibiotics used by the patient before and during treatment are known to reduce or eliminate post-operative pain (29). In order to eliminate the effect of this factor, the patients included in our study were required not to take antibiotics in the last 2 weeks before the treatment and not take analgesics in the last 1 week.

Most study results have shown that the number of sessions also affects the incidence of pain. The issue of whether one session or multiple sessions in endodontic treatment is controversial, and a definite decision has not been reached on this issue since both have advantages and shortcomings. Although more than one session is generally preferred in the retreatment process, the reason for retreatment is important. Infection is an important factor among these, and intracanal medicament used in more than one session is expected to have an antibacterial effect. In addition to the loss of time for the patient and the operator, a single session may be preferred due to the temporary filling falling or leaking, inability to fully comply with asepsis, and reinfections that occur during treatment. Also, Sathorn et al. (30) stated in their review on pain that a single-visit root canal treatment in teeth with apical periodontitis is more effective than multiple sessions and provides a higher rate of improvement.

A number of studies have been conducted investigating the relationship between the shape of the canal file and its movement and pain. Caviedes-Bucheli et al. (31) indicated that the amount of neuropeptide expression was high in teeth which instrumented with a reciprocating motion rather than rotary file system in their systemic review. Nekoofar et al. (32) examined the postoperative pain status by using the Protaper Universal and the WaveOne canal instrument, and reported that the rotary instrument caused less pain than the reciprocal motion. Gambarini et al. (33) reported that the reciprocating WaveOne file causes more pain than rotary instruments related to the reciprocating motion. Gencoglu et al. (34), in their

prospective study, investigated the amount of post-operative pain after using Hyflex EDM and Reciproc Blue canal instruments and found that Reciproc instruments caused more pain than rotary Hyflex EDM in single visit root canal treatment. Topçuoğlu and Topçuoğlu (35) used hand files, ProTaper Universal Retreatment and Reciproc file systems in tretreatment cases and reported that hand files caused more post-operative pain. However, Comparin et al. (19) did not find significant difference with Mtwo and Reciproc files in retreatment of root canal regarding to postoperative pain. Beside that, one systematic review analyzed studies related to post operative pain after rotary and reciprocating instrumentation, and found no difference regarding to post-operative pain in treatment or retreatment of root canals in 12, 24 and 48 hours (36).

It is important to eliminate microorganisms to disinfect the root canal dentine especially in retreated cases. Mostly, these teeth are failed due to bacterial colonies, missed, uninstrumented or unfilled canals. Therefore, the irrigation procedure takes important role to disinfect these root canals. In the present study, EndoActivator was used to increase the effect of irrigation solution in reteatment procedure. Ramamoorthi et al. (37) used EndoActivator during biomechanical preparation of root canals, and resulted a low incidence of postoperative pain.

Flare-up usually refers to severe pain or swelling after root canal treatment. Previous literature reported a precentage of 1.4-16% for the occasion of flare ups (38). This study reported 6 patients who had severe pain but no swelling was seen in any of these cases. Also, 4 cases with missed canals showed severe pain after treatment for 24 hours, most probably due to existence of microorganisms.

PAI sytem was introduced for the radiographic assessment of periapical status (39), and found to be associated with postoperative pain. In this study, periapical index was determined by the periapical radiographs taken with the parallel technique before the treatment and they were classified from 1 to 4, and teeth with lesions larger than 5 mm were not preferred because of single visit treatment planning. It was found that there was a statistically significant relationship between the severity of pain and the periapical index in the first 24 hours 72h. Also, 9 out of 10 patients with a periapical index of 4 developed post-operative pain in different level and among of these patients, 5 of them had severe pain in the first 24 hours. In literature, Genet et al. (26) reported more post-operative pain in teeth with periapical lesions larger than 5 mm and Olivera Alves (40) found more post-operative pain in teeth with periapical radiolucency. However, further studies with more sample size are needed to give more detailed information.

The effect of root canal filling techniques on postoperative pain was also invesigated by a few authors. Kandemir-Demirci & Çalışkan (14) investigated the effect of core technique and lateral compaction technique on postoperative pain, and found more pain complain with Thermafil filling in teeth with periapical lesions. Peng et al. (41) compared warmed and lateral compaction techniques and found no difference regarding to post-operative pain. Also Yu et al. (16) compared warm vertical compaction technique with single cone technique and found no significant difference in both technique. In another study, Alonso-Ezpeleta et al. (15) resulted that Thermafil caused more postoperative pain than lateral compaction technique in vital cases. According to Yaser et al. (42)'s findings, instumentation caused more postoperative pain than filling by lateral compaction technique probably due to extruding of dentine debris or microorganisms beyond the root apex. However, all these studies were performed on teeth scheduled for primary root canal treatment , and to the best of knowledge, no studies have examined the effect of root canal filling techniques on post-operative pain in retreated cases.

In this study, 3 patients in Group 3 (Reciproc and continuous wave filling technique) and 1 patient in Group 2 (Reciproc and lateral compaction filling technique) showed severe pain, however, no difference was found between two filling techniques. No extrusion was detected by radiographic examination after root canal filling.

According to the present study's tresults, the null hypothesis was accepted as the intensity of post-operative pain was not found to be related to instrumentation or filling techniques in retreatment cases.This study has limitations including the small number of patients and the diversity of periapical tooth status.

CONCLUSION

This study showed that the removal of root canal filling materials using hand files or reciproc files did not affect postoperative pain in 24, 48,72 hours intervals. However, preoperative condition of the tooth such as periapical status found to be important factor in postoperative pain. The presence of undedected and uninstrumented canals may increase the post-operative pain level. Further randomized clinical studies evaluating the effect of different variables (tooth type, and preoperative pain or different periapical status) on postoperative pain during retreatment of root canal are required.

Disclosures

Conflict of interest: The authors deny any conflict of interest.

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