

Endodontic Re-treatment: An Invitro Studies Performed to Evaluate The Amount of Residual Root Canal Filling Materials Done With the Help of Re-treatment Files Such as (M Two),(R- Endo) & New Fire Wire Technology Re-Treatment File Namely- (Edge Endo-(XR))

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Abstract

30 extracted human maxillary central and lateral incisors were instrumented with K-files and filled using lateral compaction of gutta-percha (GP) and SEAL APEX sealer. The teeth were randomly divided into three experimental groups of 10 specimens each. Removal of gutta-percha was performed with the following devices and techniques: (NEW RETREATMENT FILE: EDGE FILE XR), (R-Endo retreatment files), (M TWO retreatment files) Time to reach working length and to eliminate filling material was also recorded. The specimens were rendered transparent for evaluation of the area of the remaining gutta-percha/sealer under stereomicroscope at 6X magnification. it was concluded that although MTWO RETREATMENT FILES removed root canal filling materials faster than EDGE FILE XR AND R-ENDO, but EDGE FILE XR removed maximum amount of root canal filling materials from the canal.

Keywords: Edge file XR, M two and R-Endo Re-treatment files

Introduction

The key to successful endodontic treatment is to thoroughly debride the canal system of infected or necrotic pulp tissue and microorganisms, and to completely seal the canal space, thus preventing the persistence of infection and/or re-infection of the pulp cavity. Root canal therapy, despite having high degree of success, may not lead to desire response, and failure may occur. When root canal therapy fails, treatment options include conventional retreatment, periradicular surgery, or extraction. The non-surgical approach is the treatment of choice when access to the root canal is feasible and it is the most conservative method. The clinical success rate of endodontic-retreatment has been estimated to vary between 50-90%. The variability of the outcome in endodontic retreatment is related to patient's age and the type of teeth treated, presence of alteration in natural course of the root canals, the possibility of removing the coronal restoration to access the pulp chamber and possibility of repairing pathologic and iatrogenic defects. Preoperative perforations, apical periodontitis and quality of previous filling materials are the strong predictors for the outcome of endodontic retreatment.

Many techniques have been described for removal of gutta-percha. These include endodontic hand files combined with heat or chemical solvents, engine-driven rotary files, ultrasonic instruments, heat carrying instruments, paper points with chemicals and lasers. Most recently flexible rotary nickel-

titanium (NiTi) files have been introduced. Various nickel-titanium (NiTi) rotary endodontic instruments have been developed to facilitate cleaning and shaping of root canals.

Edge Endo File (XR)

Flexible Fire-Wire NiTi delivers two to eight times the strength of leading files, based on internal cyclic fatigue testing. And, our "Canal Contouring Technology" enhances the material's properties, making the files extremely flexible and reduces the shape memory and straightening effect seen in other NiTi files.

Step 1

Materials & Methods

Thirty maxillary central and lateral incisors with mature root apices and single canal extracted for periodontal reasons were used. Teeth with root caries, cracks on the root surface, curved roots and extremely calcified canals were excluded. Soft tissue and calculus were removed mechanically from the root surface.



Step 2

Root canal biomechanical preparation was done with NEOENDO FLEX ROTARY files

with DENTSPLY ENDOMOTOR paired with flexible cord hand piece. Seal-apex was used as sealer and irrigation protocols of saline and 3% sodium hypochlorite were effectively used for thorough debridgement of the debris.



Step 3

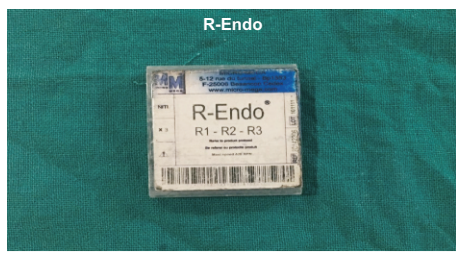
Three different systems of rotary files used for the endodontic retreatment were used for the in vitro study:

1. M two retreatment files

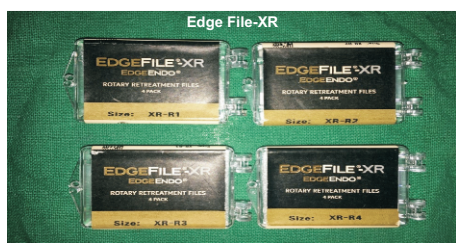


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2. R-endo retreatment files



3. Edge file XR retreatment files



Methodology

Thirty extracted anteriors were instrumented with K-files and filled using lateral compaction of gutta-percha (GP) and sealer. The teeth were randomly divided into three experimental groups of ten specimens each. Removal of gutta-percha was performed with the following devices and techniques: EdgeFile XR retreatment system, R-Endo retreatment files, Mtwo retreatment files.

Time to reach working length and to eliminate filling material was also recorded. The specimens were rendered transparent for evaluation of the area of the remaining gutta-percha/sealer under stereomicroscope at 6X magnification. Photographs were taken for further analysis using computer image analysis program. The results were statistically analyzed using ANOVA and Bonferroni test.

All instruments left filling material inside the root canal. The specimens retreated with the EdgeFile XR removed the most amount of filling material inside the root canals than other groups.

The comparison of GP/Sealer remnants at different levels among the groups using Bonferroni Method test showed that difference in different levels was found to be maximum between coronal and apical levels while it was minimum between coronal and middle levels.

Stereo-microscopic Analysis

The GP/sealer remnants on the canal walls were imaged on a black background in mesio-distal(M-D) direction using a stereomicroscope at 6X magnification.

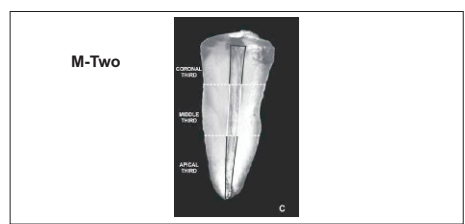
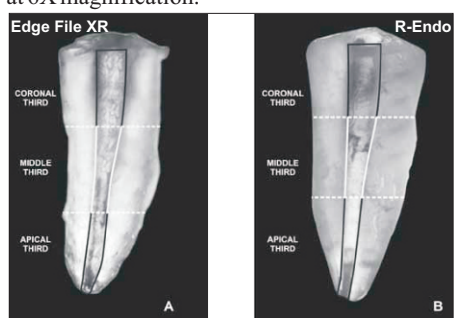


Table I - Area fraction of root canal wall covered by GP/sealer remnants after retreatment M-D direction: (coronal and middle)

S. No.	Group	Coronal		Middle	
		Mean	SD	Mean	SD
1.	A (Edgefile-XR)	3.24	1.29	5.17	1.81
2.	B (R-Endo)	3.46	1.06	5.15	1.58
3.	C (M-Two)	4.42	1.19	6.60	1.34
"F"		8.054		6.732	
"p"		<0.001		0.001	

(apical)

Apical	
Mean	SD
7.51	2.51
7.54	2.04
11.01	2.33
10.651	
<0.001	

(SD - Standard Deviation)
(F - Analysis of Variance (ANOVA)
(p - Level of significance)

The mean time taken for complete procedure was found to be minimum in Group C (5.08±0.64 min)

The efficacy of groups in terms of mean time taken to complete the procedure was: (M-Two > Edge File XR ~ R-Endo)

Table II-Time taken for complete procedure in different groups:

S.No.	Group	No. of samples	Mean time taken	Range	
				SD	Min
1.	A (Edgefile-XR)	10	6.10	1.00	3.58
2.	B (R-Endo)	10	6.41	1.21	4.07
3.	C (M-Two)	10	5.08	0.64	3.49

Max	"F"	"p"
7.45	21.350	<0.001
8.81		
5.72		

(SD - Standard Deviation)
(F - Analysis of Variance (ANOVA)
(p - Level of significance)

Discussion

Complete removal of pre-existing filling material from canals is a prerequisite for successful nonsurgical root canal retreatment. This procedure can uncover residual necrotic tissues or bacteria that may be responsible for persistent periapical inflammation, and allow further cleaning and refilling of the root canal system. In the present study, the teeth were decoronated to ensure standardization of specimens.

Conventionally, the removal of gutta-percha using hand files with or without solvent can be a tedious and time consuming process, especially when the root filling material is well condensed. Therefore the use of rotary Ni-Ti instruments in root canal retreatment might decrease patient and operator fatigue.

Conclusion

Within the parameters of this study, the following conclusions may be drawn: None of the techniques removed all filling materials from root canal walls. EdgeFile-XR retreatment files and R-Endo retreatment files removed significantly more gutta-percha and sealer compared to M-two system files. Retreatment with M-two system Ni-Ti rotary systems was significantly faster compared to other two file systems in the removal of gutta-percha sealer.

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