

Comparative Evaluation of Compare the Efficacy of D-Race Files, Protaper Retreatment Files and M two Retreatment Files in Removing Filling Material from the Root Canals: An In-Vitro Study

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ABSTRACT

Background: Success is the predictable outcome following endodontic therapy, regardless of the clinical implications. The present study was undertaken for comparing the efficacy of D-RaCe files, ProTaper Retreatment files and Mtwo retreatment files in removing filling material from the root canals.

Materials & methods: A total of 60 freshly extracted maxillary second premolars were included in the present study. All the specimens were divided into three study groups with 20 specimens in each group as follows: Group A: D-RaCe files, Group B: ProTaper Retreatment files, and Group C: M two Retreatment files. All samples of all groups were rendered transparent. Decalcification of all the specimens was done using nitric acid. The samples were imaged on a black background using a stereomicroscope, under 8X magnification. The area of remaining root canal filling material was measured using image analyzer software.

Results: Mean area of remaining filling material among specimens of group A, group B and Group C was found to be 7.992 mm², 7.1181 mm², and 10.331 mm² respectively. Non-significant results were obtained while comparing the mean area of remaining filling material among Group A and group B. However; while comparing the mean remaining filling material between Group A and group C and in between group B and group C, significant results were obtained.

Conclusion: D-RaCe files and ProTaper Retreatment files were significantly better in comparison to M two Retreatment files.

Keywords: Retreatment, Root canal, Filling materials.

INTRODUCTION

Success is the predictable outcome following endodontic therapy, regardless of the clinical implications. However, estimating success normally needs implementing a referential parameter, and presupposes that the patient is

fit. The dentist's skills are important for interpreting correctly the radiographic parameters and establishment of a diagnostic hypothesis. For the patient, the value of symptom (no pain) is essential. Underfilling and

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overfilling of a root canal obturation will also compromise the success rate of RCT. In addition, other iatrogenic errors such as instrument fracture, ledge formation, and apical perforations can cause failure of nonsurgical RCT.¹⁻³ Complete removal of gutta-percha from root canal walls, re-establishing working length, promoting disinfection and re-obturing the root canal are the main goals of non-surgical retreatment to re-establish healthy periapical tissues and obtain predictable success.^{4,5}

Several techniques have been proposed to remove filling materials from root canal system, including the use of endodontic hand files, Nickel Titanium rotary instruments, Gates Glidden burs, heated instrument, ultrasonic instruments, laser, and use of adjunctive solvents. Conventionally, the removal of gutta percha using hand files with or without solvent can be a tedious, time consuming process especially when the root filling material is well compacted.⁶⁻⁸ Hence; the present study was undertaken for comparing the efficacy of D-RaCe files, ProTaper Retreatment files and Mtwo retreatment files in removing filling material from the root canals.

MATERIALS & METHODS

The present study was undertaken with the aim of comparing the efficacy of D-RaCe files, ProTaper Retreatment files and Mtwo retreatment files in removing filling material from the root canals. A total of 60 freshly extracted maxillary second premolars were included in the present study. Specimens with presence of structural anomaly, crack or any evidence of dental caries were excluded. During the initial examination of the specimens, decoronation was done to a point of 16 mm from the root apex using a diamond disc. Determination of the patency was done using a 10 number K-file. Establishment of working length was done by reducing the root length by 1 mm. Root canal therapy was performed in all the specimens followed by sealing the occlusal cavity with Cavit. Afterwards; all the specimens were divided into three study groups with 20 specimens in each group as follows:

Group A: D-RaCe files

Group B: ProTaper Retreatment files

Group C: M two Retreatment files

All samples of all groups were rendered transparent. Decalcification of all the specimens was done using nitric acid. The samples were imaged on a black background using a stereomicroscope, under 8X magnification. The area of remaining root canal filling material was measured using image analyzer software. All the results were analyzed by SPSS software. Chi-square test and student t test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

The present study was undertaken with the aim of comparing the efficacy of D-RaCe files, ProTaper Retreatment files and Mtwo retreatment files in removing filling material from the root canals. A total of 60 freshly extracted maxillary second premolars were included in the present study. Mean area of remaining filling material among specimens of group A, group B and Group C was found to be 7.992 mm², 7.1181 mm², and 10.331 mm² respectively. Non-significant results were obtained while comparing the mean area of remaining filling material among Group A and group B. However; while comparing the mean remaining filling material between Group A and group C and in between group B and group C, significant results were obtained.

Table 1: Mean area of remaining filling material

Group	N	Mean	SD
Group A	20	7.992	3.226
Group B	20	7.118	4.122
Group C	20	10.331	5.384

Table 2: Comparison of Mean area of remaining filling material

Group Vs Group	N	p- value
Group A Vs Group B	40	0.996
Group B Vs Group C	40	0.001*
Group C Vs Group A	40	0.000*

*: Significant

The failure to localize and treat all of the canals of the root canal systems on the part of the operator is considered as one of the major causes of the root canal treatment failures. It has been shown that in majority of cases the general dental practitioners were responsible for the endodontic failures. Failure may occur due to several causes including- iatrogenic procedural errors such as poor access cavity design, untreated canals, canals that are poorly cleaned and obturated, complications of instrumentation (ledges, perforations, or separated instruments) and overextension of root filling materials or due to factors such as coronal leakage, persistent infection and radicular cysts. Retreatment is the treatment of choice for management of endodontic failures when access to the root canal is feasible. Whenever possible, retreatment is preferred as it is the most conservative method to solve the problem, while surgical treatment results in postoperative discomfort.^{6- 9} Hence; the present study was undertaken for comparing the efficacy of D-RaCe files, ProTaper Retreatment files and Mtwo retreatment files in removing filling material from the root canals

A total of 60 freshly extracted maxillary second premolars were included in the present study. All the specimens were divided into three study groups with 20 specimens in each group as follows: Group A: D-RaCe files, Group B: ProTaper Retreatment files, and Group C: M two Retreatment files. Mean area of remaining filling material among specimens of group A, group B and Group C was found to be 7.992 mm², 7.1181 mm², and 10.331 mm² respectively. In a previous study conducted by Rossi-Fedele G et al, authors discussed the effectiveness of different instrumentation procedures in removing root-canal filling materials assessed by micro-computed tomography. Reciprocating and rotary systems exhibited similar abilities in removing root filling material. Retreatment files performed similarly to conventional ones. Solvents enhanced penetration of files but hindered cleaning of the root canal.¹⁰

In the present study, non-significant results were obtained while comparing the mean area

of remaining filling material among Group A and group B. Kesim B et al, in another study compared the efficacy of manual and mechanical instrumentation techniques, including ProTaper Universal retreatment system, Mtwo retreatment system, Reciproc system, and Hedström files, regarding removal of overextended root canal filling material. Their study demonstrated that all tested systems had similar efficacy in removing overextended root canal filling material.¹¹

In the present study, while comparing the mean remaining filling material between Group A and group C and in between group B and group C, significant results were obtained. In a previous study conducted by Bilgi IK et al, authors compared the amount of apically extruded debris and of remaining filling material during the removal of root canal filling material using three rotary NiTi retreatment instruments or Hedström files. The area of residual filling material in the coronal, middle and apical root level was assessed using digital analysis. They concluded that all retreatment systems were associated with apical extrusion of debris, but H-files extruded significantly more material than Reciproc.¹²

CONCLUSION

From the above results, the authors concluded that D-RaCe files and ProTaper Retreatment files were significantly better in comparison to M two Retreatment files.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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