

Original Research

Assessment of removal efficiency of root canal fillings and residue using Mtwo retreatment file in adjunct with H-file and self-adjusting file in warm vertical compaction obturated teeth: A comparative study

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ABSTRACT:

Background: Endodontic treatment is fairly predictable in nature with reported success rates up to 86–98%. The removal of gutta-percha using rotary instruments in the retreatment process have decreased the chair-side clinical time. Hence; under the light of above mentioned data, the present study was undertaken for comparing the removal efficiency of root canal fillings and residue using Mtwo retreatment file in adjunct with H-file and self-adjusting file in warm vertical compaction obturated teeth. **Materials & methods:** A total of 20 extracted non-carious mandibular first premolars were included in the present study. 20 extracted single rooted mandibular first premolars having straight canal with fully formed apices were obtained and access cavity was prepared. Estimation of working length was done. The root canals were prepared with NiTi endodontic rotary instruments Protaper Universal. The teeth were obturated with warm vertical compaction. The quality and apical extent of the root fillings confirmed radio graphically. The teeth were divided randomly into Group 1 and Group 2 with 10 specimens each (n=10). Group 1 included specimens retreated with MTwo file initially followed by finishing with H-file; while Group 2 included specimens retreated with MTwo file initially, followed by finishing with Self adjusting file. After the removal procedure, each root was scanned. The percentage volume of the remaining filling material in the canal walls was calculated. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. **Results:** Mean volume percentage of remaining filling materials present in dentin walls after retreatment among group 1 and group 2 specimens was found to be 8.19 mm³ and 5.31 mm³ respectively. **Conclusion:** Both the instrumentation techniques left filling residue inside the root canals. However; efficacy of Self adjusting files was significantly higher than that of H files in retreatment cases.

Key words: Obturation, Retreatment

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INTRODUCTION

Endodontic treatment is fairly predictable in nature with reported success rates up to 86–98%. However, there has not been a consensus in the literature upon a consistent definition of “success” criteria of endodontic treatment. Likewise “failure” has variable definitions. During nonsurgical endodontic retreatment, endodontic instruments are forced apically to remove the root canal filling material and regain canal patency.

Undiscriminating burrowing down the canal in the apical direction may be fruitless and harmful.¹⁻³

Several techniques can be used to remove the root filling material from the root canal system, including the use of stainless steel hand files, Gates Glidden drills, nickel-titanium (NiTi) rotary instruments, ultrasonic instruments, heat-bearing instruments, lasers and use of adjunctive solvents. The removal of gutta-percha using rotary instruments in the retreatment process have decreased the

chair-side clinical time.^{4, 5} Hence; under the light of above mentioned data, the present study was planned for comparing the removal efficiency of root canal fillings and residue using Mtwo retreatment file in adjunct with H-file and self-adjusting file in warm vertical compaction obturated teeth.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the efficiency of root canal fillings and residue using Mtwo retreatment file in adjunct with H-file and self-adjusting file in warm vertical compaction obturated teeth. A total of 20 extracted non-carious mandibular first premolars were included in the present study. 20 extracted single rooted mandibular first premolars having straight canal with fully formed apices were obtained and access cavity was prepared. Estimation of working length was done. The root canals were prepared with NiTi endodontic rotary instruments Protaper Universal. The teeth were obturated with warm vertical compaction. The quality and apical extent of the root fillings confirmed radio graphically. The teeth were divided randomly into Group 1 and Group 2 with 10 specimens each (n=10). Group 1 included specimens retreated with MTwo file initially followed by finishing with H-file; while Group 2 included specimens retreated with MTwo file initially, followed by finishing with Self adjusting file. After the removal procedure, each root was scanned. The percentage volume of the remaining filling material in the canal walls was calculated. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Three-way ANOVA, followed by post hoc Tukey’s test were used for assessing the level of significance. P- value of less than 0.05 was taken as significant.

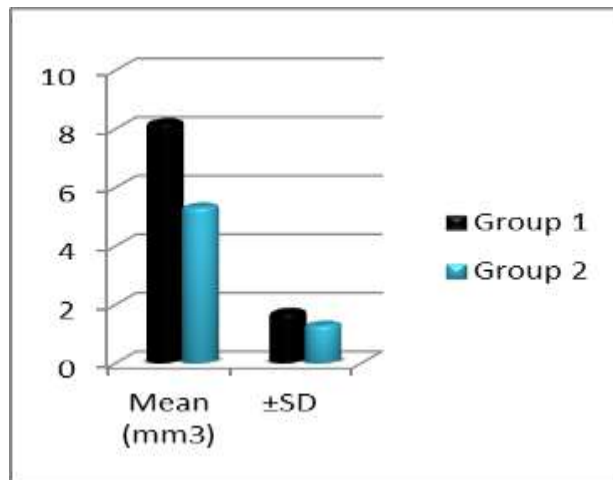
RESULTS

In the present study, a total of 20 tooth specimens were analysed. Mean volume percentage of remaining filling materials present in dentin walls after retreatment among group 1 and group 2 specimens was found to be 8.19 mm³ and 5.31 mm³ respectively. While comparing the mean volume percentage of remaining filling materials present in dentin walls after retreatment, significant results were obtained.

Table 1: Mean volume percentage of remaining filling materials present in dentin walls after retreatment

Group	Mean (mm ³)	±SD	p- value
Group 1	8.19	1.71	0.00 (Significant)
Group 2	5.31	1.28	

Graph 1: Mean volume percentage of remaining filling materials present in dentin walls after retreatment



DISCUSSION

When endodontic retreatment is performed, irritants in the form of filling materials, necrotic pulp, bacteria or irrigant might be introduced into the apical region. Apical extrusion of debris produced in endodontic treatment and retreatment might lead to post-operative pain and discomfort. These apically extruded materials have been held clinically responsible for post-operative inflammation and flare ups eventually leading to failure of apical healing. Orthograde retreatment may be considered when persistent pain or symptoms develop in a root canal treated tooth. Retreatment procedure involves the removal of the root canal filling, further cleaning, and refilling of root canal. Several instruments and solvents, heatbearing instruments and ultrasonics have been suggested for removing root canal materials.⁶⁻⁹ Hence; under the light of above mentioned data, the present study was planned for comparing the removal efficiency of root canal fillings and residue using Mtwo retreatment file in adjunct with H-file and self-adjusting file in warm vertical compaction obturated teeth.

In the present study, a total of 20 tooth specimens were analysed. Mean volume percentage of remaining filling materials present in dentin walls after retreatment among group 1 and group 2 specimens was found to be 8.19 mm³ and 5.31 mm³ respectively. Joseph M et al assessed the efficacy of three different rotary nickel titanium retreatment systems and Hedstrom files in removing filling material from root canals. Sixty extracted mandibular premolars were decoronated to leave 15 mm root. Specimen were hand instrumented and obturated using gutta percha and AH plus root canal sealer. After storage period of two weeks, roots were retreated with three (Protaper retreatment files, Mtwo retreatment files, NRT GPR) rotary retreatment instrument systems and Hedstroem files. Subsequently,

samples were sectioned longitudinally and examined under stereomicroscope. Digital images were recorded and evaluated using Digital Image Analysing Software. The retreatment time was recorded for each tooth using a stopwatch. The area of canal and the residual filling material was recorded in mm² and the percentage of remaining filling material on canal walls was calculated. Significantly less amount of residual filling material was present in protaper and Mtwo instrumented teeth compared to NRT GPR and Hedstrom files group. Protaper instruments also required lesser time during removal of filling material followed by Mtwo instruments, NRT GPR files and Hedstrom files. None of the instruments were able to remove the filling material completely from root canal. Protaper universal retreatment system and Mtwo retreatment files were more efficient and faster compared to NRT GPR files and Hedstrom files.¹⁰

In the present study, while comparing the mean volume percentage of remaining filling materials present in dentin walls after retreatment, significant results were obtained. Preetam CS et al evaluated the efficacy of the cleaning ability of two different rotary Ni-Ti systems; ProTaper Retreatment files and RaCe System compared to hand instrumentation with Hedstrom files for the removal of gutta-percha during retreatment. Thirty mandibular premolars with one single straight canal were decoronated and instrumented with ProTaper files and filled with thermoplastic gutta-percha. After 30 days, the samples were divided into three groups and gutta-percha was removed with the test instruments. The postoperative radiographs were evaluated with known criteria by dividing the root into cervical third, middle third, and apical third. The results were tabulated and Statistical Package for Social Sciences Software (IBM Corporation) was used for analysis. The mean deviation of the results were first calculated and then t-test and analysis of variance test (two-tailed P value) were evaluated for establishing significant differences. The rotary instruments were effective in removing the gutta-percha from the canals. Therefore, significant difference was observed between the efficacies of the two rotary systems used. The rotary instruments showed effective gutta-percha removal in the cervical and middle one third. However, apical debridement was effective with Hedstrom files. The study concluded the use of both rotary and hand instrumentation for effective removal of gutta-percha for retreatment.¹²

CONCLUSION

From the above results, the authors concluded that both the instrumentation techniques left filling residue inside the root canals. However; efficacy of Self adjusting files was significantly higher than that of H files in retreatment cases. However; further studies are recommended.

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