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Original Article

Assessment of Efficacy of D-RaCe files and Manual H-files in removing filling material from the root canals: A Comparative Study

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ABSTRACT:
Background: One of the tedious processes is the removal of gutta-percha from the infected root canal. Different techniques and instruments are available for retreatment. The aim of this in-vitro study was to compare the efficacy of D-RaCe files and Manual H-files in removing filling material from the root canals. **Materials & methods:** The present study included evaluation and comparison of efficacy of D-RaCe files and Manual H-files in removing filling material from the root canals. A total of 50 freshly extracted mandibular first premolars were included in the present study. Teeth were divided broadly into two study groups with 25 premolars in each group as follows: Group 1: Included teeth in which retreatment were done using D-RaCe files, Group 2: Included teeth in which retreatment were done using Hedstrom files with Solvent. Retreatment was done in teeth of both the study groups according to their respective groups. Assessment of remaining root canal filling material was done in all the teeth specimens of both the study groups. Stereomicroscope was used for assessing the area of remaining root canal filling material. **Results:** Mean area of remaining root canal filling materials in group 1 and group 2 was 8.45 and 16.25 respectively. Significant results were obtained while comparing the mean area of remaining root canal filling materials in between two study groups. **Conclusion:** Rotary systems are better in comparison to H-file systems in retreatment cases.
Key words: Files, Retreatment, Root canal therapy

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INTRODUCTION

Despite of the working clinical conditions, great deal of positive prognosis is expected while performing root canal therapy (RCT). Success is the expected outcome after root canal treatment (RCT), regardless of the clinical conditions. However; a referential point has to be fixed for assessing the success of root canal therapy.[1] This referential point evaluation is necessary as it will help in assessing and improving the quality of root canal therapy. Determination of quality of root canal therapy being performed by a dentist is predicted by several factors. Most important morphological parameters predicting the success of root canal therapy included:

- Longitudinal dimension between root tip and point of extension of root canal filling material
- Presence or absence of voids,
- Density of voids, if present,
- Amount of taper present in the root canal.[2-4]

One of the tedious processes is the removal of gutta-percha from the infected root canal. It a meticulous process to select appropriate cases for retreatment. Different techniques and instruments are available for retreatment.[5-7]The aim of this in-vitro study was to compare the efficacy of D-RaCe files and Manual H-files in removing filling material from the root canals.

MATERIALS & METHODS

The present study was conducted in the department of conservative dentistry of the dental institute and it included evaluation and comparison of efficacy of D-RaCe files and

Manual H-files in removing filling material from the root canals. Ethical approval was obtained from the institutional ethical committee before the starting of the study. A total of 50 freshly extracted mandibular first premolars were included in the present study. Inclusion criteria for including the teeth for the present study included:

- Mandibular premolar with closed apex,
- Mandibular premolars with single root canal,
- Mandibular premolars with absence of any sign of dental caries or decay,
- Mandibular premolars with absence of any sign of fracture

After meeting the exclusion criteria, a total of 50 freshly extracted mandibular premolars were selected and were divided broadly into two study groups with 25 premolars in each group as follows:

Group 1: Included teeth in which retreatment was done using D-RaCe files,

Group 2: Included teeth in which retreatment was done using Hedstrom files with Solvent.

Decoronation of all the teeth specimen was done upto a length of 16 mm from the apex followed by preparation of the root canal space. It was followed by obturation of teeth with gutta-percha points. Retreatment was done in teeth of both the study groups according to their respective groups. Assessment of remaining root canal filling material was done in all the teeth specimens of both the study groups. Stereomicroscope was used for assessing the area of remaining root canal filling material. All the results were summarized in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

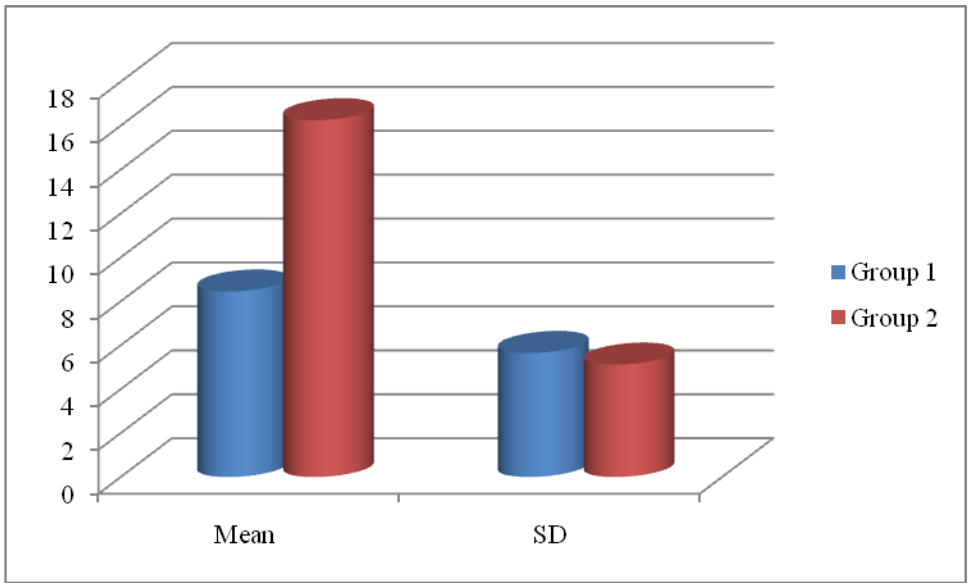
RESULTS

In the present study, we analyzed a total of 50 mandibular premolar samples and divided them broadly into two study groups; Group 1 and group 2, with 25 premolars in each group. Mean area of remaining root canal filling materials in group 1 and group 2 was 8.45 and 16.25 respectively. Significant results were obtained while comparing the mean area of remaining root canal filling materials in between two study groups.

Table 1: Comparison of area of remaining root canal filling material

Group	N	Mean	SD	P-value
Group 1	25	8.45	5.65	0.02 (Significant)
Group 2	25	16.25	5.12	

Graph 1: Area of remaining root canal filling material



DISCUSSION

Disappointment may happen because of a few causes including-iatrogenic procedural mistakes, for example, poor access depression plan, untreated canals, trenches that are inadequately cleaned and obturated, intricacies of instrumentation (edges, punctures, or isolated instruments) and overextension of root filling materials or because of variables, for example, coronal spillage, industrious contamination and radicular cysts.[8-10] Conventionally, the evacuation of gutta-percha utilizing hand documents has been observed to be a dreary and tedious process. Very much compacted filling material offers protection from instruments and deficient expulsion of gutta-percha and sealer confines the entrance to the apical foramen and impedes root trench sanitization and reshaping. Utilization of solvents has been prescribed to break up and evacuate gutta-percha for retreatment.[6-8]Hence; we undertook the present study to compare the efficacy of D-RaCe files and Manual H-files in removing filling material from the root canals.

In the present study, mean area of remaining root canal filling materials in group 1 and group 2 was 8.45 and 16.25 respectively. Significant results were obtained while comparing the mean area of remaining root canal filling materials in between two study groups. In the present study, the rotary instrumentation techniques were found to be significantly faster than the manual technique using Hedstrom files with solvent. It very well may be guessed that the dynamic tip and the cutting sharp edges of the rotating records utilized in this examination emphatically affected the time required for retreatment. This most likely is because of the way that the higher rotational speed creates a specific level of frictional warmth which may plasticize the gutta-percha all the more quickly making it less demanding to evacuate. The plasticized gutta-percha would along these lines present less protection from removal.[10, 11]Kesim B et al looked at the viability of manual and mechanical instrumentation strategies, including ProTaper Universal retreatment framework, Mtwo retreatment framework, Reciproc framework, and Hedström records, with respect to evacuation of overextended root trench filling material. Eighty removed human mandibular premolar teeth were set up at the apical foramen level utilizing Revo-S revolving documents and in this way obturated. The root trench filling material was purposely expelled from the peak. Tests were exchanged to glass vials that reenacted the periapical territory. Eighty examples of packed teeth were haphazardly allocated to four equivalent gatherings (n = 20) for evacuation of the root filling material with ProTaper Universal retreatment records (Group 1), Mtwo retreatment documents (Group 2), Reciproc framework (Group 3), and hand records (Group 4). Expulsion of the root trench filling material and extra planning were performed by singular instruments from each extraordinary framework up to a #40 estimate. The outside apical surface of the teeth and the encompassing glass vials were checked utilizing a dental task magnifying lens with ×12.5 amplification. Tests were partitioned into two gatherings in view of whether evacuation of the overextended root trench filling material was fruitful or not. The achievement rate for expulsion of overextended gutta-percha was more prominent for the Mtwo (30%) and hand records (30%) contrasted and the ProTaper (20%) and Reciproc (10%). Be that as it may, no noteworthy factual contrasts existed among the test gatherings ($P > 0.05$). This investigation exhibited that every tried framework had comparative viability in expelling overextended root waterway filling material.[12] Kaşıkçı Bilgi I et al thought about the measure of apically expelled flotsam and jetsam and of outstanding filling material amid the evacuation of root channel filling material utilizing three revolving NiTi retreatment instruments or Hedström records. Ninety-six extremely bended human molars of the two jaws were chosen. The root waterways were set up to measure X2 (tip estimate 25, .06 decrease) utilizing the ProTaper Next framework (Dentsply Sirona, Ballaigues, Switzerland), loaded up with gutta-percha and AH Plus sealer (Dentsply De Trey, Konstanz, Germany) and afterward haphazardly separated into four test gatherings (n = 24 each) with two subgroups of maxillary and mandibular teeth each. A test show was utilized as a ghost make a beeline for mimic the upper and lower jaws. The root filling materials were expelled with one of the accompanying grinds utilizing a crown-down planning method: I. Hedström records (H-documents) (VDW, Munich, Germany), II. R-Endo (Micro-Mega, Besançon, France), III. Reciproc (VDW) and IV. ProTaper Universal Retreatment framework (PTU-R) (Dentsply Maillefer). Apically expelled material was gathered in vials, which were weighed with a microbalance (10-5 g) when the retreatment. The region of remaining filling material in the coronal, center and apical root level was surveyed utilizing advanced investigation. Reciproc was related with fundamentally less expelled flotsam and jetsam than the H-records ($P = 0.009$). No noteworthy contrasts were recognized among the four retreatment strategies concerning lingering filling material ($P = 0.082$). The measure of expelled flotsam and jetsam and zones of outstanding filling material were not related ($P = 0.901$). Area of teeth in the maxilla or mandible had no effect on the measure of expelled garbage inside each instrument gathering ($P = 0.609$). Nonetheless, when teeth were assessed by and large independent of the instruments, altogether more flotsam and jetsam was expelled in the mandibular area ($P < 0.001$). All retreatment frameworks were related with apical expulsion of trash, however H-documents expelled essentially more material than Reciproc.[13]

CONCLUSION

Under the light of above obtained data, the authors conclude that rotary systems are better in comparison to H-file systems in retreatment cases. However; further research is recommended.

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