

Original Research

Effectiveness of three different Rotary systems in removing guttapercha from root canals

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ABSTRACT:

Background: To evaluate the effectiveness of three different rotary systems in removing guttapercha from root canals. **Materials & methods:** A total of 30 subjects were enrolled. Thirty premolar teeth were shaped up to F2 using the ProTaper Universal rotary file system. The samples were randomly divided into three groups according to the file system used to remove gutta-percha was performed (n=10): ProTaper Universal Retreatment, ProTaper NEXT and EdgeFile XR NiTi system. The data were analyzed using the SPSS software. **Results:** A total of 30 subjects were enrolled. The percentage of removal of root canal filling has been recorded. The Protaper Universal R shows median 96.89, minimum 91.55 and maximum 99.22. The Edgefile XR shows maximum value of 99.96. The Protaper NEXT shows median value 99.12 and maximum value 99.75. **Conclusion:** EdgeFile XR produced can be used as an alternative to ProTaper Universal Retreatment files.

Keywords: NiTi files, rotary systems, ProTaper.

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INTRODUCTION

Non-surgical endodontic treatment is routinely practiced in modern dentistry. Revolution of material science and techniques in root canal treatment has resulted in the retention of millions of teeth that would have otherwise been lost. Even as recent advances in surgical, prosthetic and restorative care have made tooth replacement less onerous than in the past, it is universally accepted that a natural tooth with a good prognosis is a superior choice to loss and replacement. ¹Failures are the pillars of success. Endodontic failures are no exception and hence would need retreatment. The main goal of retreatment is cleaning and shaping of the root canal with removal of old root filling material, and this can be achieved by either hand instruments or rotary instruments. Endodontic retreatment can be done either by nonsurgical retreatment (orthograde) or by apical surgery (retrograde). ² The main goal of orthograde retreatment is regaining access to the apical foramen by complete removal of root canal filling material,

thus facilitating sufficient cleaning and shaping of the complete root canal system and then final obturation. ³ ProTaper Universal Retreatment (PTUR; Dentsply, Maillefer, Ballaigues, Switzerland) files are characterized by a progressive taper, a convex triangular cross-section, and a modified guide tip. It consists of three files (D1, D2, and D3) with various tapers and diameters at the tip. The D1 file has an active tip structure that facilitates the penetration of subsequent files. The inactive ends of D2 and D3 reduce the possibility of stepping, perforation, and stripping during the removal of the root canal filling material. ⁴ProTaper Next (PTN; Dentsply, Maillefer, Ballaigues, Switzerland) is a NiTi file system with a rectangular cross-section design, produced from M-Wire alloy, and works with a continuous asymmetric rotation movement. In addition, the offset design facilitates the removal of debris and filler from the canal and increases the flexibility of PTN files along the active part. ⁵ Hence, this study was conducted to

evaluate the effectiveness of three different rotary systems in removing guttapercha from root canals.

MATERIALS & METHODS

A total of 30 subjects were enrolled. Thirty premolar teeth were shaped up to F2 using the ProTaper Universal rotary file system. The samples were randomly divided into three groups according to the file system used to remove gutta-percha was performed (n=10): ProTaper Universal Retreatment, ProTaper NEXT and EdgeFile XR NiTi system. All the samples were scanned with a micro-CT device for the second time to evaluate the amount of residual filling material in the root canals. The percentages of

Table: percentage of root canal filling removed.

	n	Median	Minimum	Maximum
Protaper Universal R	10	96.89	91.55	99.22
ProTaper NEXT	10	99.12	92.3	99.75
EdgeFile XR	10	98.22	95.87	99.96

DISCUSSION

The major factor for endodontic failure is the persistence of microbial infection in the root canal system and/or in the periradicular area. Nonsurgical management of the previously obturated canals is the initial treatment of choice for the management of such endodontic failures.⁶ The goal of nonsurgical endodontic retreatment is to remove as much gutta-percha and sealer as possible. This procedure will uncover the remnants of necrotic tissue and bacteria which might have caused the periapical inflammation and pain. This will, in turn, enable chemomechanical re-instrumentation and disinfection of the root canal system with antiseptic or antibacterial solutions and thus destroy the bacteria and clean the infected root canal.^{7,8} Hence, this study was conducted to evaluate the effectiveness of three different rotary systems in removing guttapercha from root canals.

In the present study, a total of 30 subjects were enrolled. The percentage of removal of root canal filling has been recorded. The Protaper Universal R shows median 96.89, minimum 91.55 and maximum 99.22. A study by Ozlek E et al, studied forty premolar teeth were shaped up to F2 using the ProTaper Universal rotary file system and obturated with MTA Fillapex. The samples were randomly divided into four groups according to the file system used to remove root canal filling material (n=10): ProTaper Universal Retreatment, ProTaper NEXT, EdgeFile XR, and EdgeFile® X3 NiTi system. There were no significant differences between the groups in the percentage of root canal filling material removal. However, a statistically significant difference was found between the groups in the time required to reach the apex and remove the entire filling material. The time required to remove the root canal filling material was higher in the EdgeFile® X3 group. NiTi files manufactured for root canal preparation can be used effectively and safely to remove root canal filling materials. EdgeFile XR produced for

filling material removed from root canals were calculated. The data were analyzed using the SPSS software. P value <0.05 was considered statistically significant.

RESULTS

A total of 30 subjects were enrolled. The percentage of removal of root canal filling has been recorded. The Protaper Universal R shows median 96.89, minimum 91.55 and maximum 99.22. The Edgefile XR shows maximum value of 99.96. The Protaper NEXT shows median value 99.12 and maximum value 99.75.

retreatment can be used as an alternative to ProTaper Universal Retreatment files.⁹

In the present study, the Edgefile XR shows maximum value of 99.96. The Protaper NEXT shows median value 99.12 and maximum value 99.75. Another study by Marfisi K et al studied ninety single root canals were instrumented and randomly allocated into 6 groups of 15 specimens each with regards to the filling material and instruments used. Group 1: gutta-percha/ProTaper; Group 2: Resilon/ProTaper; Group 3: gutta-percha/Mtwo; Group 4: Resilon/Mtwo; Group 5: gutta-percha/Twisted Files; Group 6: Resilon/Twisted Files. No system completely removed the root filling material from root canal walls. No significant differences were observed between the rotary systems in terms of the area of filling material left within the canals (P>0.05). There were statistically significant differences between the filling materials: Resilon/Real Seal had less residual material than gutta-percha/AH plus (CBCT: P=0.01; microscope: P=0.018). Mtwo Retreatment files were more rapid when removing filling material than ProTaper Retreatment files (P=0.19) and Twisted Files (P=0.04). No system removed the root filling materials entirely. Mtwo Retreatment files required less time to remove root filling material than the other instruments.¹⁰ Another study by Tasdemir T et al studied sixty freshly extracted human single-rooted teeth, each with one root canal, were instrumented with K-files and filled using cold lateral compaction of gutta-percha and AH Plus (DentsplyDetrey, Konstanz, Germany) sealer. The teeth were randomly divided into four groups of 15 specimens each. Removal of gutta-percha was performed with the following devices and techniques: ProTaper, R-Endo, Mtwo and Hedström files. The ProTaper group had less filling material inside the root canals than the other groups, but a significant difference was found between only the ProTaper and Mtwo groups (P < 0.05). The retreatment time for Mtwo and ProTaper

was significantly shorter compared with R-Endo and manual instrumentation with Hedström files ($P < 0.001$). R-Endo was significantly faster than manual instrumentation ($P < 0.001$).¹¹

CONCLUSION

EdgeFile XR produced can be used as an alternative to ProTaper Universal Retreatment files.

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