Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 11 [4] March 2022 : 210-212

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

SHORT COMMUNICATION **OPEN ACCESS**

Comparative Evaluation of amount of Debris Extruded Apically by Protaper Universal, Wave one, Self-Adjusting and 2 Shape File System: an *In Vitro* Study

Athul Babu Kurian[1], T.Manoj Kumar[1], Praveen Nehrudhas[2]

1. Senior Lecturer, Department of Conservative Dentistry and Endodontics, KarpagaVinayaga Institute of Dental Sciences, Tamilnadu, India.
2. Reader, Department of Conservative Dentistry and Endodontics, KarpagaVinayaga Institute of Dental Sciences, Tamilnadu, India.

Correspondence Email:athulbk87@gmail.com

ABSTRACT

This study aimed to assess the apical extrusion of debris during instrumentation of primary canines using four endodontic file types. Sixty extracted mandibular first molars (distal root) were randomly assigned to three instrumentation groups (n = 15): Protaper Universal, Wave One, Self-adjusting and 2 Shape file system. The apically extruded debris produced during the procedure was collected and dried in pre-weighed Eppendorf tubes, and the mass of debris was calculated. The time required for the endodontic procedure was also recorded. One-Way ANOVA and Tukey's HSD test. The level of significance was set at 5%.. Group1 (PTU) reported more amount of extrusion of debris apically (82.986 ± 12.904 µg) on comparison with other groups. There was significant mean difference in all the parameters across the groups (p<0.05) but highly significant difference was exhibited between Group 1 and Group 3 (p<0.01). Within the limitations of the present study, it may be concluded that 2shape file extruded less debris and compared to Protaper universal, Wave One, SAF.

Keywords: *Myers And Montgomery Apparatus, Apical Extrusion Of Debris, Protaper Universal, Self-Adjusting File, Waveone, 2Shape File*

Received 11.12.2021 Revised 23.01.2022 Accepted 20.02.2022

INTRODUCTION

Cleaning and shaping of the root canal becomes the utmost important step for the success of endodontic therapy. The purpose this study was to evaluate the amount of apically extruded debris of Protaper Universal, Self-adjusting, Waveone, 2Shape file systems [1-5].

MATERIALS AND METHODS

Distal root of sixty extracted vital first mandibular teeth with single oval canal were selected and allocated randomly to four experimental groups (n=15) according to instrumentation file system. Group 1 used PTU (Rotary), Group 2 used SAF (Adaptive), Group 3 used 2Shape (Rotary) and Group 4 used WO (Reciprocating) systems for instrumentation. After root canal preparation; amount of debris extruded apically was assessed using Myers and Montgomery apparatus and digital weighing balance respectively. Pre and post instrumentation weight for amount of apical extruded debris was collected and their mean difference was statistically analyzed using One-Way ANOVA and Tukey's HSD test. The level of significance was set at 5% [6-9].

RESULTS

Group1 (PTU) reported more amount of extrusion of debris apically (83.986 ± 12.904 µg) on comparison with other groups. There was significant mean difference in all the parameters across the groups (p<0.05) but highly significant difference was exhibited between Group 1 and Group 3 (p<0.01) [9-10].

Table 1 Comparison of the mean amount of debris extruded apically after instrumentation

GROUP 1 (Protaper)	83.986
GROUP 2 (SAF)	19.077
GROUP 3 (2Shape)	18.720
GROUP 4 (WaveOne)	35.431

DISCUSSION

The cleaning and shaping of oval shaped root canal always remain as a challenge during its preparation as it facilitates debridement of necrotic pulpal tissue, micro-organisms and three dimensional obturation with good apical and lateral seal [9]. The primary focus in preparation is to minimize the number of extruded debris apically, to reduce postoperative complications. Instrumentation techniques, instrument type, design and size, preparation end point and irrigating solution regulate the number of extruded debris [10]. Least amount of debris extrusion was associated with balanced force and crown down techniques, whereas maximum extrusion occurred with technique involving linear filling motion [11].

Majority of the studies evaluated postoperative root canal cleanliness in relation to debris and smear layer after instrumentation with ProTaper Universal (PTU), WaveOne (WO) and Self-Adjusting file (SAF) systems [6,10,14,15]. This is the first in-vitro study which evaluated the effectiveness of Protaper Universal, Self-adjusting, Waveone, 2Shape file systems on number of debris extruded apically in oval distal root canal of lower mandibular first molar.

CONCLUSION

2shape files extruded less debris when compared to other rotary file systems. Protaper Universal extruded maximum amount of debris.

REFERENCES

1. Deka, A., Bhuyan, A. C., & Bhuyan, D. (2015). A comparative evaluation of root canal area increase using three different nickel-titanium rotary systems: An ex vivo cone-beam computed tomographic analysis. *Contemporary Clinical Dentistry*, *6*(1), 79.
2. Elnaghy, A. M., & Elsaka, S. E. (2016). Shaping ability of ProTaper Gold and ProTaper Universal files by using cone-beam computed tomography. *Indian Journal of Dental Research*, *27*(1), 37.
3. Pawar, A. M., Barfiwala, D., Pawar, M., Metzger, Z., Kfir, A., & Jain, N. (2016). Assessment of the fracture resistance of teeth instrumented using 2 rotary and 2 reciprocating files versus the Self-Adjusting File (SAF): An ex vivo comparative study on mandibular premolars. *Journal of conservative dentistry: JCD*, *19*(2), 138.
4. Peters, O. A., Laib, A., Rüegsegger, P., & Barbakow, F. (2000). Three-dimensional analysis of root canal geometry by high-resolution computed tomography. *Journal of dental research*, *79*(6), 1405-1409.
5. Peters, O. A., Peters, C. I., Schonenberger, K., & Barbakow, F. (2003). ProTaper rotary root canal preparation: effects of canal anatomy on final shape analysed by micro CT. *International endodontic journal*, *36*(2), 86-92.
6. Bürklein, S., & Schäfer, E. (2012). Apically extruded debris with reciprocating single-file and full-sequence rotary instrumentation systems. *Journal of endodontics*, *38*(6), 850-852.
7. Versiani, M. A., Leoni, G. B., Steier, L., De-Deus, G., Tassani, S., Pécora, J. D., & de Sousa-Neto, M. D. (2013). Micro–computed tomography study of oval-shaped canals prepared with the Self-adjusting File, Reciproc, WaveOne, and Protaper Universal systems. *Journal of Endodontics*, *39*(8), 1060-1066.
8. de Siqueira Zuolo, A., Zuolo, M. L., da Silveira Bueno, C. E., Chu, R., & Cunha, R. S. (2016). Evaluation of the efficacy of trushape and reciproc file systems in the removal of root filling material: an ex vivo micro–computed tomographic study. *Journal of endodontics*, *42*(2), 315-319.
9. Uzunoglu, E., & Turker, S. A. (2016). Impact of different file systems on the amount of apically extruded debris during endodontic retreatment. *European journal of dentistry*, *10*(02), 210-214.
10. Kirchhoff, A. L., Fariniuk, L. F., & Mello, I. (2015). Apical extrusion of debris in flat-oval root canals after using different instrumentation systems. *Journal of endodontics*, *41*(2), 237-241.
11. da Silva Limoeiro, A. G., Dos Santos, A. H. B., De Martin, A. S., Kato, A. S., Fontana, C. E., Gavini, G., ... & da Silveira Bueno, C. E. (2016). Micro-computed tomographic evaluation of 2 nickel-titanium instrument systems in shaping root canals. *Journal of endodontics*, *42*(3), 496-499.
12. Siqueira Junior, J. F., Rôças, I. D. N., Marceliano-Alves, M. F., Pérez, A. R., & Ricucci, D. (2018). Unprepared root canal surface areas: causes, clinical implications, and therapeutic strategies. *Brazilian oral research*, *32*.

13. Paqué, F., Balmer, M., Attin, T., & Peters, O. A. (2010). Preparation of oval-shaped root canals in mandibular molars using nickel-titanium rotary instruments: a micro-computed tomography study. *Journal of endodontics*, *36*(4), 703-707.
14. Madhusudhana, K., Mathew, V. B., & Reddy, N. M. (2010). Apical extrusion of debris and irrigants using hand and three rotary instrumentation systems–An in vitro study. *Contemporary clinical dentistry*, *1*(4), 234-236.
15. de Melo Ribeiro, M. V., Silva-Sousa, Y. T., Versiani, M. A., Lamira, A., Steier, L., Pécora, J. D., & de Sousa-Neto, M. D. (2013). Comparison of the cleaning efficacy of self-adjusting file and rotary systems in the apical third of oval-shaped canals. *Journal of Endodontics*, *39*(3), 398-401.

CITATION OF THIS ARTICLE

Athul Babu Kurian, T.Manoj Kumar, Praveen Nehrudhas. Comparative Evaluation of amount of Debris Extruded Apically by Protaper Universal, Waveone, Self -Adjusting And 2 Shape File System: An *In Vitro* Study. Bull. Env. Pharmacol. Life Sci., Vol 11[4] March 2022 : 210-212.