

Effect of Single Versus Multiple Files Retreatment Concepts on Canal Curvature and Surface Topography of the Used Files (An In Vitro Study)

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم
سورة البقرة الآية (32)

Dedication

I would like to dedicate my Thesis to my family who helped me a lot and without them I couldn't have achieved anything.

I dedicate it also to my colleagues who stood beside me and haven't saved effort to help me.

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List of Contents:

Introduction.....	1
Review of literature.....	3
*Effect on canal.....	3
*Effect on canal.....	42
Aim of the study.....	54
Materials and methods.....	55
1) Materials.....	55
2) Methods.....	57
Results.....	77
Discussion.....	94
Summary and Conclusion.	105
References.....	108
Arabic summary.....	

List of figures

Figure No.	Title	Page No.
1	One shape file. The figure shows the lateral aspect of the file and the different cross sections of the file	55
2	R-endo files. The figure shows name, tip size, taper and the length of the working blade	56
3	Roots in Acrylic resin block in the CBCT machine	59
4	Roots in Acrylic resin in the CBCT machine (2)	59
5	Scanora 3D Soredex CBCT machine	60
6	Ondemand 3D software. The figure shows the method of measuring root canal curvature	61
7	Sample classification diagram	62
8	Files suspended in file holder before SEM examination	68
9	Quanta 250 FEG "SEM microscope"	69

10	Defects detected by SEM A) Metallic strips, B) metallic folds, C) Disruption of the cutting edge, D) Microfracture, E) Cracks, F) Fracture, G) scraping, H) pitting, I) craters, J) corrosion, K) fretting L) debris	72
11	Column chart showing the effect of retreatment system and canal curvature on the degree of difference in canal curvature after retreatment	79
12	Column chart showing the effect of Canal curvature on the degree of difference in canal curvature after retreatment regardless of retreatment system	81
13	Column chart showing the effect of retreatment system on the degree of difference in canal curvature after retreatment regardless of canal curvature	82
14	Chart of degree of difference in canal curvature (canal transportation) mean values for all different variables [Canal curvature and Retreatment system]	84
15	new one shape file (23x)	86
16	new one shape file. Figure shows file tip. (130x)	86

17	new one shape file. Figure shows metallic strips and pitting defects on file surface (200x Mag.)	87
18	new one shape file. Figure shows metallic strips, debris and pitting defects on file surface (200x)	87
19	used one shape file. Figure shows metallic strips, debris and pitting defects on file surface (200x)	88
20	used one shape file. Figure shows metallic strips, debris, scrapping and pitting defects on file surface (200x)	89
21	used one shape file. Figure shows unwinding of the file (26x)	89
22	used one shape file. Figure shows apparent cracks on the file surface (250x)	90
23	used one shape file. Figure shows metallic strips, debris, scrapping, pitting and microfracture defects on file surface (120x)	90
24	Fractographic surface of the one shape file. Figure shows beach mark striations and the site of crack initiation indicating brittle fracture.	91

25	Fractographic surface of the one shape file (2). Figure shows beach mark striations and the site of crack initiation indicating brittle fracture	92
26	Fractographic surface of the one shape file (3). Figure showing site of crack initiation (1200x)	92
27	Fractographic surface of the one shape file (4). Figure shows beach mark striations and the site of crack initiation indicating brittle fracture	93
28	Fractographic surface of the one shape file (5). Figure showing site of crack initiation (1200x)	93

List of tables

Table No.	Title	Page No.
1	General definitions of observed SEM defects	70
2	Mean and standard deviation values of the degree of difference in canal curvature after retreatment for all variables	79
3	Mean and standard deviation values of Canal curvature regardless of retreatment system	80
4	Mean and standard deviation values of retreatment system regardless of canal curvature	82
5	Effect of different variables [Canal curvature and Retreatment system] on degree of difference in canal curvature (Canal Transportation)	84

In recent years, patients increasingly expect to retain their natural teeth and are often reluctant to have their natural teeth extracted. Root canal retreatment might offer patients a second chance to save their teeth. The success of nonsurgical root canal treatment is dependent on cleaning and shaping of the root canal space, technical quality of the root canal filling, and an adequate coronal restoration. Since the main cause of endodontic failures was found to be inadequate root-filling quality ⁽¹⁾, therefore the role of root canal retreatment was found to be crucial for enhanced treatment outcomes and better success rates.

The alternatives when root canal treatment fails are conventional root canal retreatment, surgical retreatment or extraction. Among these alternatives, nonsurgical retreatment offers a more favorable long-term outcome than the peri-radicular surgery ⁽²⁾. Many techniques have been advocated for the removal of gutta-percha from the root canal system including ultrasonic instruments, lasers, hand files, and hand files combined with heat or chemicals. Removal of gutta-percha by conventional methods by using hand files from the root canal system might be difficult and time-consuming. For this reason, rotary nickel-titanium (NiTi) files have been proposed for the removal of the root canal filling, and in recent years, a number of retreatment file systems were developed.

In the last few years, several retreatment systems were introduced to the market. These systems consist of 2 or more files. Recently single file concept in cleaning and shaping of root canal was introduced to decrease time the

consumption. Among those systems are one shape and wave one. Therefore for the purpose of decreasing the time consumed in retreatment this study was conducted as it was thought that evaluation of the efficiency of single rotary NiTi file system in removal of gutta pecha is of a value. This is from the prospective of effect on canal curvature and the surface topography of the files used.

¹ Roggendorf MJ, Lenger M, Ebert J; Fillery E, Frankenberger R and Friedman S. Micro-CT evaluation of residual material in canals filled with active GP or Gutta-Flow following removal with NiTi instruments. *Int Endod J.* 2010; 43: 200-9.

² Barletta FB, Rahde NM, Limongi O, Moura AAM, Zanesco C, Mazocatto G. In vitro comparative analysis of 2 mechanical techniques for removing gutta-percha during retreatment. *J Can Dent Assoc* 2007; 73: 1.

Over the years, nonsurgical endodontic retreatment has replaced surgical endodontic retreatment as the treatment of choice for cases of endodontic therapy failure. The use of rotary Ni-Ti instruments in root canal retreatment has decreased patient and operator fatigue and reduced time as well. Single versus multiple file concept in retreatment will be proposed in this study so the effect of files on canal curvature as well as the surface topography of the used files will be discussed.

Part I: Effect of files on canal curvature:-

Bertrand et al. ⁽³⁾ evaluated curved root canal preparations using HERO 642 rotary nickel-titanium instruments by the Bramante method in twenty four canals with curvature greater than 20. Evaluation was done using image analysis software. Results showed no significant difference in terms of the amount of dentine removed, or canal centre displacement in both coronal and middle thirds. In the apical third transportation was significantly higher with stainless steel hand instruments than with Hero system.

Versümer et al. ⁽⁴⁾ compared root canal preparations using ProFile .04 and Lightspeed rotary Ni–Ti instruments. They