Efficiency of Two Types of Rotary Ni-Ti Retreatment Files in Removal of Gutta-Percha. An In-Vitro Study

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بسم الله الرحمن الرحيم

قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ

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Dedication

First of all To ALLAH the Merciful, who helped me and guided me along my journey.

To my mother, I wish you could be here; you made me on what I'm.

To my father, no words could describe how thankful I'm to you.

To my wife the greatest women in my life for your unlimited support.

To my lovely daughter, I wish you all the best in your becoming life.

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List of contents

List of abbreviations ii

List of figures iii

List of tables vi

Introduction 1

Review of literature 4

- I- Non surgical root canal retreatment versus surgical root canal retreatment 4
- II- Importance of total removal of gutta-percha filling material 5
- III- Methods of removal of gutta-percha filling material........... 7
- IV- Ni-Ti rotary systems and their efficiency in gutta-percha removal 8
- V- Fracture of Ni-Ti instrument 25

Aim of the study 30

Materials and methods..31

1) Materials 31
2) Methods 33

Results 46

Discussion 82

Summary and conclusion 91

References 94

Arabic summary ....

List of abbreviations

NaOCl …….. Sodium hypochlorite

EDTA …….. ethylene diamine –tetra-acetic acid

G.P …… gutta-percha

Ni-Ti ……... Nickel titanium

RaCe …….. Reamer with alternative cutting edges

G.G …… Gates-Glidden

O.S.M …… optical stereomicroscope

SEM …….. Scan electron microscope

CBCT …… cone beam computed topography

SAF ……... Self adjusting file

SME …….. Shape memory effect

SE …….. Super elasticity

TTR ……... Transformation temperature range

DSC ……... Differential scanning calorimetric

List of figures

Figure no.	Title	Page
Figure 1	R-Endo file. The figure shows name, tip size, taper, the length of the working blade.	31
Figure 2	D-race retreatment file the figure shows the name of the file and the tip design.	32
Figure 3	Diagram demonstrating the samples classification	35
Figure 4	Diagram demonstrating samples classification of the retreatment files.	41
Figure 5	Scan electron microscope	43
Figure 6	Column chart showing the differences in time needed for retreatment between D-RaCe and R-Endo.	48
Figure 7	Column chart showing differences in the percent of the remaining filling material for D-RaCe and R-Endo group after single and 5 uses. .	50
Figure 8	Column chart showing differences in the percent of the residual filling material surface area between D-RaCe and R-Endo.	52
Figure 9	Stereomicroscope after the first use showing less residual filling material in the root retreated with D-RaCe compared with the root retreated with R-Endo in the apical, middle and coronal thirds.	55
Figure10	Stereomicroscope after 5 uses showing less residual filling material in the root retreated with D-RaCe compared with the root retreated with R-Endo in the middle and coronal thirds. While the apical third the root retreated with R-Endo showed less remnants. The middle third in the D-RaCe groups showed the separated instrument.	56
Figure 11	Stereomicroscope after the first use showing similar amount of the residual filling material in the apical third in roots retreated with D-RaCe and R-Endo while the middle and coronal third the root retreated with R-Endo showed slightly less residual filling material.	57
Figure 12	Stereomicroscope after 5 uses showing less residual filling material in the root retreated with D-RaCe compared with the root retreated with R-Endo in the apical, middle and coronal thirds.	58

Figure 13	Stereomicroscope after single use showing less residual filling material in the root retreated with D-RaCe compared with the root retreated with R-Endo in the apical, middle and coronal thirds.	59
Figure 14	Stereomicroscope after 5 uses showing less residual filling material in the root retreated with D-RaCe compared with the root retreated with R-Endo in the apical, middle and coronal thirds.	60
Figure 15	SEM top view of DR2 (D-RaCe) sample 1 as received file showing metallic strips.	61
Figure 16	view of DR2 (D-RaCe) sample 2 as received file showing metallic strips.	61
Figure 17	SEM top view of R3 (R-Endo) sample 1 as received file showing metallic strips.	62
Figure 18	Column chart showing the metalic strips seen in SEM in D-RaCe and R-Endo.	63
Figure 19	SEM tilted view of DR2 (D-RaCe) sample 1 after first use showing disruption of the cutting edge.	64
Figure 20	SEM tilted view of R3(R-Endo) sample 2 after five uses showing disruption of the cutting edges.	65
Figure 21	Column chart showing the difference on the disruption of the cutting edge between D-RaCe and R-Endo.	65
Figure 22	SEM tilted view of DR2 (D-RaCe) sample 2 after the first use showing micro fractures.	66
Figure 23	SEM top view R3 (R-Endo) sample 2 after five uses showing micro fracture	67
Figure 24	Column chart of the difference of micro fracture appearance between D-RaCe and R-Endo.	68
Figure 25	SEM tilted view R3 (R-Endo) sample 2 after five uses showing cracks.	69
Figure 26	Column chart showing difference of cracks seen in D-RaCe and R-Endo.	69
Figure 27	SEM top view of DR2 (D-RaCe) sample 2 after five uses showing fracture	70
Figure 28	Column chart showing the difference of the percent of fracture between D-RaCe and R-Endo.	71
Figure 29	SEM tilted view of DR2 (D-RaCe) sample 2 after the first use showing scrapping.	72

Figure 30	Column chart showing scrapping difference between D-RaCe and R-Endo.	73
Figure 31	Column chart showing the difference of pitting between D-RaCe and R-Endo.	74
Figure 32	SEM tilted view of DR2 (D-RaCe) after first use showing pitting.	74
Figure 33	SEM top view of R3(R-Endo) as received file showing pitting.	75
Figure 34	Column chart showing difference in crater incidence between D-RaCe and R-Endo.	76
Figure 35	column chart showing difference in corrosion incidence between D-RaCe and R-Endo	77
Figure 36	SEM top view of the DR2 (D-RaCe) sample 2 after the first use showing debris.	78
Figure 37	SEM top view of R3 (R-Endo) sample 1 after the fifth use showing debris.	78
Figure 38	Column chart showing differences between debris seen in SEM between D-RaCe and R-Endo.	79
Figure 39	SEM side view of DR2 (D-RaCe) sample 3 after the fifth use showing unwinding.	80
Figure 40	Column chart showing differnces of unwidining between D-RaCe and R-Endo.	81

List of tables

Table no	Title	Page no
Table 1	List of surface topographic defects.	44-45
Table	Mean and standard deviation of the time needed for retreatment with D-RaCe and R-Endo.	48
Table 3	Mean and standard deviation of the surface area of the residual filling material in D-RaCe group.	49
Table 4	Mean and standared deviation for the percent of the residual filling material of D-RaCe and R-Endo.	52
Table 5	Fisher exact test of the presence of metallic strips.	62
Table 6	Fisher exact test for the disruption of the cutting edge	65
Table7	Fisher exact test for the occurance of microcracks.	67
Table 8	Fisher exact test for cracks in D-RaCe and R-Endo.	69
Table 9	Fisher exact test of the percent of fracture in D-RaCe and R-Endo	71
Table 10	Fisher exact test of scrapping seen in SEM in D-RaCe and R-Endo	72
Table 11	Fisher exact test of pitting seen in SEM in D-RaCe and R-Endo.	73
Table 12	Fisher exact test of crater seen in SEM in D-RaCe and R-Endo	76

Table 13	Fisher exact test of the corrosion seen in SEM in D-RaCe and R-Endo	76
Table 14	Fisher exact test for debris seen in SEM in D-RaCe and R-Endo	79
Table 15	Fisher exact test unwinding seen in SEM in D-RaCe and R-Endo	81

Root canal therapy despite having a high degree of success may not lead to the desired response and failure may occur. Recent publications reported failure rates of 14%–16% for initial root canal treatment. When root canal therapy fails treatment options include conventional retreatment, periradicular surgery or extraction. Whenever possible the retreatment option is preferred because it is the most conservative method to solve the problem.

The clinical success rate of endodontic retreatment has been estimated to vary between 50% and 90%, the variability of the outcome in endodontic retreatment is related to patient's age, the type of teeth treated, presence of alteration in natural course of the root canals, the possibility of removing the coronal restoration to access the pulp chamber and possibility of repairing pathologic and iatrogenic defects, preoperative perforations, apical periodontitis and quality of previous filling materials. The outcome of endodontic retreatment is depending on the effective elimination of necrotic tissue, bacteria, and infected obturation material such as gutta-percha and cements from root canal.

However, well-compacted filling material offers resistance to instruments and incomplete removal of gutta-percha and sealer limits the access to the apical foramen and impairs root canal disinfection and reshaping. Removal of root canal filling could be done by several techniques; first thermally heat-bearing

instruments, second chemically using different types of solvents; such as chloroform, eucalyptol, xylene, halothane, turpentine, or orange solvent, third ultrasonically and forth mechanically which could be done manually by the use of stainless steel hand files or engine driven by the use nickel-titanium (Ni- Ti) rotary system.

Several Ni-Ti systems were used in the retreatment such as Profile (Dentsply Maillefer, Ballaigues, Switzerland), Quantec, GT Rotary files, K3, RaCe (FKG Dentaire, La Chaux-de-Fonds, Switzerland), FlexMaster (VDW Antaeos, Munich, Germany) and ProTaper instruments (Dentsply Maillefer, Ballaigues, Switzerland). Recently several Ni-Ti rotary which are specially designed for the retreatment procedure have been introduced to the market such as ProTaper universal retreatment files(Dentsply Maillefer, Ballaigues ,Switzerland) , M-Two R(VDW, Munich, Germany), R-Endo(Micro-Mega, Basancon, France) and D-RaCe (FKG Dentaire, La Chaux-de-Fonds, Switzerland).

Since that there are several rotary Ni-Ti instruments in the market several studies were carried out for the evaluation of their efficiency in the removal of the root canal filling material, In these studies the evaluation was carried out on the bases of several factors; remnant of the filing material, post operative pain, apical extrusion of debris, effect on curvature and fractures of the uses instrument.

Based on these factors it was thought that the evaluation of the remaining amount of the root canal filing material on the root canal walls after retreatment with two different systems of Ni-Ti retreatment files is of value.