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 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

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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.