Republic of Iraq
Ministry of Higher Education
And Scientific Research
University of Baghdad
College of Dentistry

Comparison of the Amount of Apically Extrusion of Debris During Root Canal Preparation Using Wave One, TRUShape 3D, Hyflex CM and One Shape Instrumentation Systems

(An In Vitro Comparative Study)

A Thesis

Submitted to the council of the College of Dentistry University of Baghdad in partial fulfilment of the requirements for the degree of Master of Science in Conservative Dentistry

By

Ali Walid Hadi

D.D.S.

Supervised by

Ass. Prof. Dr. Mohammed Rasheed

B.D.S., M.Sc., Ph.D.

2016 AD **1437** AH

Abstract

Many types of instruments and techniques are used in the instrumentation of the root canal system. These instruments and techniques may extrude debris beyond the apical foramen and may cause post-instrumentation complications. The aim of this study was to evaluate the amount of apically extruded debris resulted by using 4 types of nickel-titanium instruments (TRUShape 3D conforming files, WaveOne, Hyflex CM, and One Shape files) during endodontic instrumentation.

Forty freshly extracted human mandibular second premolar were collected for this study. Teeth were cut to a unified length of 15 mm, each tooth was then forcefully pushed through a hole made in the center of a rubber cap of glass vial, the tooth cap assembly was then fitter on a pre-weighted glass vial, and a gauge 25 needle was inserted alongside the tooth through the rubber cup. Samples were then randomly divided into four groups with 10 samples in each group: **Group A** instrumentation by WaveOne reciprocating file, **Group B** instrumentation by TRUShape rotating files, **Group C** instrumentation by Hyflex CM rotating files and **Group D** instrumentation by One Shape rotating file.

Apical patency confirmed and maintained by a size #15 K-File. A total volume of 7 ml of sodium hypochlorite was used for irrigation in each sample. After completion of endodontic instrumentation, the tooth-cap assembly was removed from the vial and held above it while the external root surface was washed with 2 ml of normal saline to collect any adhering debris. Vials were then stored in an incubator for 5 days at 68^{o} C for dryness. Then vials are weighted again, and the pre-weight subtracted from the post-weight, the weight difference resembled the amount of apically extruded debris from the apical foramen during root canal instrumentation.

Data obtained were statistically analysed by using ANOVA and LSD tests. The results showed that the Hyflex CM Group (C) has statistical significant lowest apically extruded debris as compared to other groups of this study, while the TRUShape Group (B) has statistical significant lowest apically extruded debris as compared to One Shape Group (D) and WaveOne Group (A), while the WaveOne Group (A) showed the highest value of apically extruded debris. The result showed that all groups resulted in apical extrusion of debris.