

**Republic of Iraq**  
**Ministry of Higher Education**  
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**University of Baghdad**  
**College of Dentistry**



**Evaluation of the Amount of Debris Extruded Apically by  
Different Rotary Instruments Used to Prepare the Root  
Canal System:**

**(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  
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## Abstract

Different systems and techniques are used in the root canal instrumentation and can result in debris that may be extruded apically causing post-operative pain. Aim of this study was to compare the amount of apically extruded debris after using different rotary instrumentation systems for root canal preparation: WaveOne Gold, Reciproc Blue, 2Shape, ProTaper Gold and ProTaper Universal file systems.

Fifty freshly extracted maxillary first molar were collected for this study and decoronated to a 15 mm, then the palatal root pushed through a pre-perforated rubber cap of pre-weighed glass vial. Then they were isolated with rubber dam ligated with dental floss and a Gauge 25 needle was inserted alongside the root surface. Samples were then randomly divided into five groups with 10 samples in each: Group A instrumented by PTG rotating file system, Group B instrumented by 2Shape rotating files system, Group C instrumented by WOG reciprocating single file system, Group D instrumented by RB reciprocating single file system and Group E instrumented by PTU rotating file system.

Apical patency was confirmed by a size #15 ss K-File. Nine mL of normal saline were used for irrigation protocol. Then samples were desiccated in a hot air oven 100°C for 2hr. The vials were re-weighed, and the amount of apically extruded debris was calculated by subtracting of the pre-weight from the post-weight values.

Data obtained were analysed using ANOVA and LSD tests. The results showed that all groups resulted in apical extrusion, with the least amount of debris extruded apically associated with 2Shape files.

