

**Republic of Iraq  
Ministry of Higher Education  
and Scientific Research  
University of Baghdad  
College of Dentistry  
Conservative Department**



# **SEM Study evaluating the effect of Different Endodontic Irrigant Activators on Smear Layer and Debris Removal from Root Canal Dentin**

A Thesis

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

By

**Fatimah Jamal Khaleefah  
B.D.S**

**Supervised by:**

**Assist. Prof. Dr.Zainab M. Abdul-Ameer  
B.D.S, M.Sc.**

**2020 A.D.**

**1442A.H.**

## **Abstract**

The chemomechanical debridement of root canals is an important step in root canal treatment. Irregular layer of debris is produced during mechanical instrumentation of root canals known as the smear layer. The aim of the study was to assess and compare the effect of different endodontic irrigant activators in the elimination of debris and smear layer from root canal dentine.

Fifty single rooted extracted lower premolars was instrumented up to size X4 (protaper Next, Dentsply) and divided into five groups after biomechanical preparation each groups receive a final irrigation as follows: Each sample irrigated with 1ml EDTA 17% for 1 min., after that the sample receive a 3 ml of distilled water then receive 3 ml of NaOCl 5.25% and activated while the irrigant inside the canal according to groups then receive the final rinse (3 ml) of distilled water and dried with paper point. The first group was control group and other four experimental groups was divided according to the activation system for irrigation, second group was activated by Endoactivator sonic system (Dentsply, Sirona), third group activated by Xp-endo finisher (FKG, La Chaux-de-Fonds, Switzerland), fourth group activated by ultrasonic system Endoultra (MICRO MEGA, France) and finally fifth group was activated by Finisher gentle file brush (Gentle file, Medic NRG, France). The roots then sectioned longitudinally into two halves, and each half was marked into 3 parts (coronal, middle, apical) each part was examined under scanning electron microscope (SEM) for evaluation of residual debris and smear layer. The data was statistically analyzed using Kruskal Wallis and Mann-Whitney U tests using IBM SPSS Statistics (Version21). The significance level was set at  $p < 0.05$ .

Regarding debris and smear layer, using irrigant activators enhance debris and smear layer removal especially in middle and apical third and there is no

activation technique was able to complete elimination of debris and smear layer from root canals.

As a conclusion, the EndoActivator did not show any improvement in smear layer removal but showed improvement in debris removal compared with control group. XP-endo finisher showed enhancement of smear layer removal in coronal and middle third and Endo-ultra device showed enhancement in smear layer removal in apical third in compared with sonic endo activator.