



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



**EFFICACY OF SMEAR LAYER REMOVAL FROM ROOT
CANAL SURFACE USING LASER AND NON-LASER
IRRIGATION ACTIVATION METHODS.
(SEM STUDY)**

**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**

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ABSTRACT

Background: This study aims to assess the efficacy of different irrigation activation systems in removing smear layer from the confines of root canals using SEM analysis.

Subjects/Materials and Methods: A total of 80 maxillary first molars with a straight palatal root canal were prepared to size X4 (Protaper Next, Dentsply) and assigned to 2 groups (n = 40): Normal saline and EDTA 17% groups, each group subdivided into five subgroups (n = 8): Conventional needle irrigation (CN), sonic activation with EndoActivator (EA), ultrasonic activated irrigation (UAI), Er.Cr.YSGG 2780nm laser, and Diode 940nm laser. Palatal root canals were split longitudinally, and after sectioning, each half was divided into three regions corresponding to the apical, middle, and coronal. Then, scanning electron microscope investigations were accomplished, and three pictures for each region were taken and scored. The presence of the smear layer was evaluated using a 5-grade scoring system. Data were submitted for statistical analysis using a nonparametric test.

Results: Activation of irrigants using Er.Cr.YSGG 2780nm significantly improved the removal of the smear layer ($P < 0.05$). Sonic EndoActivator and ultrasonic showed similar results. Lasing EDTA solution by 940nm Diode laser was significantly more effective for smear layer removal than normal saline at ($P < 0.05$) and showed a similar effect to Er.Cr.YSGG laser.

Conclusion: Er.Cr.YSGG laser appears to have an interesting application in laser-assisted endodontic therapy. Diode laser used for EDTA activation might provide Diode laser a beneficial, cost-effective choice for smear layer removal with added photothermal disinfection and opened the way

for more studies to investigate the effect with different irrigation solutions in the scope of smear layer removal.



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فعالية إزالة

طبقة اللطاخة من سطح قناة الجذر باستخدام طرق تفعيل السائل الأروائي الليزرية
والغير ليزرية
(دراسة مختبرية)

رسالة مقدمة الى مجلس كلية طب الاسنان/جامعة بغداد

كجزء من متطلبات نيل شهادة الماجستير

في معالجة وتجميل الاسنان

من قبل:

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