



**THE EFFICACY OF DIFFERENT TECHNIQUES TO
REMOVE CALCIUM HYDROXIDE AS INTRACANAL
MEDECAMENT (IN VITRO STUDY)**

A THESIS SUBMITTED TO THE COUNCIL OF COLLEGE OF
DENTISTRY AT TISHK INTERNATIONAL UNIVERSITY AND
HAWLER MEDICAL UNIVERSITY IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR JOINT MASTER PROGRAM
FOR THE DEGREE OF MASTER OF SCIENCE
IN CONSERVATIVE DENTISTRY

BY:

RANU HOGIR ISMAIL

B.D.S

SUPERVISED BY:

ASSIST. PROF. NAWFAL A. ABDULFATAH

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

AUGUST
2020 A.D.

KHARMANAN
2720 K.

DHU AL- HIJAH
1442 A.

ABSTRACT

Background and objectives: Removal of calcium hydroxide $\text{Ca}(\text{OH})_2$ from root canal system is difficult, and its residuals left on the dentin walls reduce the penetration of root canal sealers into dentinal tubules, resulting in a possible increase of apical leakage. The aim of this study was to evaluate the efficiency of four different techniques including Sonic activator, passive ultra-sonic irrigation, Erbium, Chromium: Yttrium, Scandium, Gallium, Garnet laser activated irrigation and conventional method on the removal of $\text{Ca}(\text{OH})_2$.

Materials and methods: Fifty extracted single-rooted teeth (maxillary second premolar, mandibular first and second premolars) with straight canals were prepared using NSK rotary up to size x5. The root canals were filled with $\text{Ca}(\text{OH})_2$ with the help of a Lentulo spiral and putted inside the incubator for 1 week in 100% humidity. The samples divided in to six groups: conventional irrigation (needle irrigation) considered as control group (n=10), control positive (n=5) and control negative (n=5). while in the experimental groups Sonic activator (n=10), passive ultra-sonic irrigation (n= 10) and Er, Cr: YSGG (n=10) laser activation irrigation was used to remove $\text{Ca}(\text{OH})_2$. After removal of $\text{Ca}(\text{OH})_2$, the roots were split in to two halves and viewed under stereo microscope then surface area of remained $\text{Ca}(\text{OH})_2$ was evaluated by Digimizer software. The data were analyzed statistically using one-way ANOVA and least significant differences (LSD).

Results: The results of this study showed that the Er,Cr:YSGG laser activation irrigation was more powerful in the removal of $\text{Ca}(\text{OH})_2$ in the apical part of the root as compared to other techniques ($P < 0.001$) but, in the middle part ultra-sonic and Er, Cr: YSGG were have the same efficacy in the removal of $\text{Ca}(\text{OH})_2$. In the coronal part of the root there was no significant difference among the groups.

Conclusion: Er,Cr:YSGG

laser activated irrigation is significantly better removal of $\text{Ca}(\text{OH})_2$ in the apical part of the root than other methods, but did not provide complete removal of $\text{Ca}(\text{OH})_2$.

Key words: calcium hydroxide, removal, endoactivator system, ultrasonic irrigation, Er,Cr:YSGG laser.

