



# **The Effect of Two Natural Irrigations on Canal Cleanliness and Dentine Microhardness (In-Vitro Study)**

This Thesis Submitted Faculty Of Dentistry, Ain Shams  
University For Partial Fulfillment Of Requirements For The  
Master Degree In Endodontic

By  
**Shaimaa Fathy Abd Elaziz**  
B.D.S Faculty of Dentistry  
Ain Shams University (2009)

Faculty of Dentistry  
Ain Shams University  
2021



## **Supervisors**

**Prof. Dr. Abeer A.Elhakim El Gendy**

Professor of Endodontics

Faculty of Dentistry

Ain Shams University

**Dr. Mohamed Mokhtar Nagy**

Associate Professor of Endodontics

Faculty of Dentistry

Ain Shams University

Faculty of Dentistry  
Ain Shams University  
2021



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا  
إلا ما علمتنا إنك أنت  
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٣٢



# Acknowledgement

First and foremost, I feel always indebted to **ALLAH**, the most Kind and Most Merciful.

I express my deepest gratitude to ***Prof. Dr. Abeer El Gendy***, Professor of Endodontics, Faculty of Dentistry, Ain Shams University for his constant guidance, support, motivation and untiring help during this work, her depth knowledge has been extremely beneficial for me.

I express my profound sense of respect to my supervisor ***Dr. Mohamed Mokhtar Nagy***, Associate professor of Endodontics, Faculty of Dentistry Ain Shams University, for the time, support, motivation, and guidance, he devoted to me. His high moral ethics was a model for me.

**Shaimaa Fathy**





# Dedication

I would like to dedicate this thesis to my whole family, without their sincere support, prayers and pushing me forward, this work wouldn't have ever completed. They have been there for me my whole life and I will never find adequate words to express my gratitude.

Special thanks deeply from my heart to my parents, husband and my kids (Adam & Malek) for being my backbone and for their continues support and effort through this work.

I also dedicate this thesis to my friends who have supported me and being there throughout the process.

Finally, great thanks for my big family for their kind affection and encouragement.

Thank you from all my heart



# *List of Contents*

| Title                       | Page No. |
|-----------------------------|----------|
| List of Tables .....        | i        |
| List of Figures .....       | ii       |
| List of Abbreviations ..... | iv       |
| Introduction.....           | 1        |
| Review of Literature .....  | 3        |
| Aim of the Study.....       | 38       |
| Material and Method.....    | 39       |
| Results.....                | 56       |
| Discussion.....             | 78       |
| Summery and Conclusion..... | 89       |
| Recommendations.....        | 92       |
| References.....             | 93       |
| Arabic Summary .....        | —        |



## *List of Tables*

| Table No.         | Title  | Page No. |
|-------------------|--|----------|
| <b>Table (1):</b> | Materials, instruments and devices.....  | 39       |
| <b>Table (2):</b> | Sample classification .....  | 41       |
| <b>Table (3):</b> | Descriptive statistics for debris percentage (%) for<br>different irrigant groups .....  | 58       |
| <b>Table (4):</b> | Mean $\pm$ standard deviation (SD) of debris percentage<br>(%) in different irrigant groups.....                                       | 61       |
| <b>Table (5):</b> | Mean $\pm$ standard deviation (SD) of debris percentage<br>(%) of different irrigation materials at the same root<br>canal level. .... | 63       |
| <b>Table (6):</b> | Descriptive statistics for microhardness percentage<br>change percentage (%) for different groups .....                                | 71       |
| <b>Table (7):</b> | Mean $\pm$ standard deviation (SD) of microhardness<br>percentage change (%) in different irrigant groups .....                        | 74       |
| <b>Table (8):</b> | Mean $\pm$ standard deviation (SD) of microhardness<br>percentage change (%) in different irrigation groups at<br>the same level. .... | 77       |



## *List of Figures*

| Fig. No.            | Title  | Page No. |
|---------------------|--|----------|
| <b>Figure (1):</b>  | Aloe vera plant. ....  | 41       |
| <b>Figure (2):</b>  | 90 gm Aloe Vera gel. ....  | 42       |
| <b>Figure (3):</b>  | 90% Aloe Vera solution. ....   | 42       |
| <b>Figure (4):</b>  | Propolis powder.....   | 42       |
| <b>Figure (5):</b>  | 4 gm propolis powder.....  | 43       |
| <b>Figure (6):</b>  | High purity solvent Dimethyl Sulfoxide. ....   | 43       |
| <b>Figure (7):</b>  | Preparation of propolis solution. ....   | 43       |
| <b>Figure (8):</b>  | Filtration of propolis solution.....   | 44       |
| <b>Figure (9):</b>  | Propolis solution ready to use. ....   | 44       |
| <b>Figure (10):</b> | Split root after root canal instrumentation.....   | 46       |
| <b>Figure (11):</b> | Stereomicroscope .....   | 48       |
| <b>Figure (12):</b> | A plate showing the steps of quantitative evaluation<br>of debris.....   | 49       |
| <b>Figure (13):</b> | Scanning electron microscope attached with EDX<br>Unit.....  | 51       |
| <b>Figure (14):</b> | Root halves embedded in acrylic resin.....   | 52       |
| <b>Figure (15):</b> | Vickers's microhardness tester.....  | 53       |
| <b>Figure (16):</b> | Sample testing with microhardness indenter.....  | 53       |
| <b>Figure (17):</b> | Bar chart showing average debris percentage (%) for<br>different irrigant groups.....  | 58       |
| <b>Figure (18):</b> | Bar chart showing effect of different irrigant groups<br>on different levels.....  | 61       |
| <b>Figure (19):</b> | Bar chart showing average debris percentage (%) for<br>the effect of each irrigation material at different<br>levels.....                                    | 63       |
| <b>Figure (20):</b> | Stereomicroscope images for one sample prepared<br>using 90% aloe vera (a) represents image of<br>coronal level, (b) middle level and (c) apical level ..... | 64       |