بسم الله الرحمن الرحيم

(و أنزل الله عليك الكتاب و الحكمة و علمك ما لم تكن تعلم و كان فضل الله عليك عظيما)

سوره النساء آيه (١١٣)

Effectiveness of a New Irrigation System in Cleanliness of the Root Canal

A thesis submitted to the Faculty of Oral and Dental Medicine, Cairo University, in partial fulfillment of the requirements of the Master Degree in Endodontics

By

Fares Mohamad Al-Zamareh

B.D.S (2005)

(Misr University for Science & Technology)

Faculty of Oral and Dental Medicine

Cairo University

2010

SUPERVISORS

Prof. Dr. Randa M. El Boghdadi

Professor of Endodontics

Faculty of Oral and Dental Medicine

Cairo University

Dr. Suzan Abdul Wanees Amin

Lecturer of Endodontics

Faculty of Oral and Dental Medicine

Cairo University

Acknowledgement

First and foremost, I am always indebted to "***Allah***" the kindest and the most merciful.

Prof. Dr. Randa M. El Boghdadi, Professor of Endodontics, Faculty of Oral and Dental Medicine, Cairo University, gave me the confidence and support to complete my Master's thesis issue. You challenged me to look for solutions. I have learned to believe in my future, my work and myself.

I would like to gratefully acknowledge the support, supervision and kindness of ***Dr. Suzan Abdul Wanees Amin***, Lecturer, Endodontic Department, Faculty of Oral and Dental Medicine, Cairo University. Her moral support and continuous guidance enabled me to begin and complete my work successfully and she gave me a generous help throughout my study.

I would like to express profound gratitude to ***Prof. Dr. Medhat Abdel-Rahman Kattaya***, Professor and head of Endodontic Department, faculty of Oral and Dental Medicine, Cairo University for his continuous guidance and useful suggestions.

Finally, endless thanks are extended to all my professors, colleagues and the staff members of the Endodontic Department for their support and concern.

Dedication

This thesis is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time. I hope that this achievement will complete the dream that you had for me all those many years ago when you chose to give me the best education you could.

My son and wife who are the partners in all my thesis work have been a great source of motivation and inspiration, have patiently allowed me to study at the expense of household chores, holidays and countless other little things, all of which only love could endure.

My appreciation is also to all my brothers and sisters, who offered me unconditional love and support throughout the course of this thesis.

List of Contents

List of Tables

List of Figures

Introduction

Introduction

Root canal irrigation plays an important role in the debridement and disinfection of the root canal system and is an integral part of root canal preparation procedures. The presence of debris on the prepared root canal surfaces prevents efficient removal of microorganisms, which is one of the major goals of thorough debridement of the root canal system.

There are many techniques with different devices used for irrigation of the root canals. The use of injection syringe with a 27-gauge needle have been shown to be effective in the debridement of the coronal two segments of the canals, but less effective in the apical segment. Even after irrigation with a specially developed needle, which was perforated at the sides and closed at the end, placed within 1 mm of the working length, it was noted that a large amount of debris and smear layer remained in the apical region of the root canals in addition to the increased possibility of extrusion of the irrigation solutions to the periapical tissue because the needle tip is so close to the apex.

Ultrasonic devices have been developed for root canal irrigation. Even with ultrasonics, the smear layer was retained in the apical region of the canals. It was reported that the smear layer was removed from the apical segment as well as the coronal two segments by using size 15 file energized by ultrasonic agitation. However, excess cutting of the canal dentin and extrusion of the irrigation solution beyond the apex were matters of concern. A system was developed that works on the basis of pressure-suction technology where the irrigant is automatically drawn from the attached syringe and aspirated into the canal. In addition to the complicated

system; it showed inferior cleaning properties in the coronal and middle segments of the canal.

Recently, a new irrigation system, called EndoVac, based on the technology of apical negative pressure, for the removal of debris from the apical portion as well as minimizing the extrusion of irrigant beyond the apical foramen has been developed. EndoVac has been described a simple irrigation system which has a delivery/evacuation tip attached to a syringe of irrigant and the high speed suction of the dental chair. Very few studies, however, have studied the cleaning efficiency of the system. Thus, the purpose of this study was to evaluate and compare the effectiveness of the EndoVac system and needle irrigation in the debridement of the root canal.

Review of Literature