

The Effect of Green Tea Irrigant on the Cleanliness of Root Dentin and on the Adaptability of Self Etching Adhesives

(An in Vitro Study)

Thesis submitted to the Faculty of Dentistry, Ain Shams University

For

Partial Fulfillment of Requirements of the master degree in Endodontics

Ву

Walaa Amr Hussein

B.D.S.

(Ain Shams University, 2008)

Supervisors

Prof. Salma El Ashry

Professor of Endodontics
Faculty of Dentistry, Ain Shams University

Dr. Abeer El Gendy

Assistant professor of Endodontics Faculty of Dentistry, Ain Shams University

DEDICATION

To my Father

The greatest gift I had ever had from Allah, and the source of strength and endless support from the early start, words fall short to express my deep gratitude for your unlimited backing.

To my beloved Sister and brother

Who lighten up my way, I wish you a long joyful life, I' am really blessed having you in my life.

And I' am really grateful to everyone supported me in this work.

ACKNOWLEDGMENT

First of all thanks to **Allah** the most merciful for his endless blessings upon me throughout my whole life.

I would like to express my deepest gratitude to **Professor Doctor Salma El Ashry**, Professor of Endodontics, Faculty of

Dentistry, Ain Shams University for her sincerity, valuable

guidance, and strong support throughout my academic work.

I would like to thank **Doctor Abeer El Gendy**, Assistant
Professor of Endodontics, Faculty Of Dentistry, Ain Shams
University for her excellent advice and appreciated effort
during this study

I would like to thank all staff members of Endodontic department, Faculty of Dentistry, Ain Shams University for their great cooperation.

CONTENTS

	Page
LIST OF FIGURES	i
LIST OF TABLES	vii
INTRODUCTION	1
REVIEW OF LITERATURE	
Green Tea	3
Root canal cleanliness	8
Adaptability of resin sealers	14
AIM OF THE STUDY	30
MATERIAL AND METHODS	31
RESULTS	
Root canal cleanliness	50
Adaptability	60
Push out bond strength & Mode of failure	67
DISCUSSION	79
SUMMARY AND CONCLUSION	91

REFERENCES	94
ARABIC SUMMARY	-

LIST OF FIGURES

Fig. No.	Title	Page
1	Decoronation of teeth at the level of cement enamel junction to obtain root length of 16mm.	32
2	Experimental design scheme highlighting the grouping of samples as a function of the irrigating protocols.	35
3	RealSeal self etching resin sealer supplied with it's mixing tip.	37
4	AH Plus resin sealer supplied as two tubes one as a base and the other as a catalyst.	37
5	Post operative radiograph after root canal obturation with Resilion / Real Seal SE and Guttapercha / AH Plus.	38
6	The two halves of the sample after longitudinal Splitting by a mallet	39
7	Basic steps of Image J soft ware used to calculate the surface area of canal debris in relation to total root canal area.	40
8	Scanning electron microscope.	42
9	Specimen section. The cutting sequence followed to obtain the slices.	44
10	Diamond disc used to transversely cut the root into three sections. Each slice was marked on its apical side with an indelible marker and kept in 100% humidity till testing.	45
11	Transverse sections of 2mm thickness each for the coronal, middle, and apical thirds.	45

Fig. No.	Title	Page
12	Universal testing machine attached to computer software for calculation of push-out bond strength.	717
13	Push-out strength test specimen mounted on Instron universal testing machine.	47
14	Failure manifested by the extruded filling material after compressive loading by the universal testing machine.	T 7
15	Bar chart showing the effect of different irrigation protocols on total amount of canal debris.	
16	Bar chart showing the effect of irrigation protocols on the remaining amount of debris along different thirds within the same irrigation material.	
17	a,c,e Stereomicrpgraph; showing tissue debris on coronal, middle apical(respectively) with samples irrigated with (GT). Bd,f, SEM; showing smear layer on coronal, middle apical(respectively), with samples irrigated with the same irrigant.	34
18	Stereomicrpgraph; showing tissue debris on coronal, middle apical(respectively) with samples irrigated with (EDTA/Naocl). Bd,f, SEM; showing smear layer on coronal, middle apical(respectively), with samples irrigated with the same irrigant.	

Fig. No.	Title	Page
19	Stereomicrpgraph; showing tissue debris on coronal, middle apical(respectively) with samples irrigated with (EDTA/GT). Bd,f, SEM; showing tissue debris on coronal, middle apical(respectively), with samples irrigated with the same irrigant.	
20	Stereomicrpgraph; showing tissue debris on coronal, middle apical(respectively) with samples irrigated with (EDTA/GT). Bd,f, SEM; smear layer on coronal, middle apical(respectively), with samples irrigated with the same irrigant.	37
21	Bar chart showing remaining amount of debris along different thirds	58
22	Bar chart showing the effect of different irrigation materials on root canal debris	60
23	SEM image for samples treated with (GT). a,c,e: represent coronal, middle, apical thirds respectively in AH Plus showing poor sealer adaptation with areas of complete sealer separation.b,d,f: represent coronal, middle, apical third (respectively) in RealSeal SE showing absence of uniform interfacial layer with of complete sealer separation.	

Fig. No.	Title	Page
24	SEM image for samples treated with NaOCl/GT. a,c,e: represent coronal, middle, apical thirds respectively in AH Plus showing poor adaptation with absence of uniform interfacial layer, b,d,f: represent coronal, middle, apical thirds (respectively) in RealSeal SE showing areas with of complete sealer separation.	64
25	SEM image for samples treated with EDTA/GT. a,c,e: represent coronal, middle, apical thirds respectively in AH Plus: showing good adaptation with minimum sealer separation .b,d,f: represent coronal, middle, apical thirds (respectively) in RealSeal SE showing: excellent adaptation with uniform interfacial layer.	65
26	SEM image for samples treated with EDTA/NaOCl. a,c,e: represent coronal, middle, apical thirds respectively in AH Plus showing: excellent adaptation with uniform interfacial layer.b,d,f: represent coronal, middle, apical thirds (respectively) in RealSeal SE showing very good adaptation with a uniform interfacial layer.	66
27	Bar chart showing the effect of different irrigation protocols on push out bond strength along root segments	68
28	Bar chart showing the effect of different irrigation protocols on push out bond strength along root segments.	70

Fig. No.	Title	Page
29	Bar chart representing push out bond strength of testing sealers	72
30	Shows the percentage of failure in each root third with different irrigation protocols with AH Plus resin sealer.	74
31	Stereo micrograph showing the predominance mixed failure with both (GT) irrigation (Left), and (NaOCl/GT) (Right) with AH Plus resin sealer.	74
32	Stereomicrograph showing the predominance of mixed failure with both (EDTA/GT) irrigation (Left), and (EDTA/NaOCl) (Right) with AH Plus resin sealer.	75
33	Shows the percentage of failure in each root third after different irrigation protocols with RealSeal SE resin sealer.	76
34	Stereo micrograph showing the predominance mixed failure with both (GT) irrigation (Left), and (NaOCl/GT) (Right) with RealSeal /Resilion resin sealer.	77
35	Stereomicrograph showing the predominance of mixed failure with both (EDTA/GT) irrigation (Left), and (EDTA/NaOCl) (Right) with RealSeal /Resilion resin sealer.	77

Fig. No.	Title	Page
36	chart shows that there was a significant difference in percentage of mode of failure between AH Plus and RealSeal SE.	78

LIST OF TABLES

Table. No.	Title	Page
1.	Effect of irrigation protocols on root canal cleanliness at the same root segment.	51
2.	The mean, standard deviation (SD) of tissue debris along different thirds	58
3.	The mean, standard deviation (SD) of root canal debris of different irrigation materials.	59
4.	Effect of different irrigation protocols on root segments with AH Plus/ Gutta percha (subdivision A)	68
5.	Effect of different irrigation protocols on push out bond strength along root segments in RealSeal SE/ Resilon (subdivision B).	70
6.	The mean, standard deviation (SD) of push out bond strength of different irrigation materials	71
7.	The mean, standard deviation (SD) of push out bond strength of testing sealers.	71
8.	Percentage of failures in each subgroup with AH Plus sealer (subdivisionA).	73
9.	Showing percentage of failures in each subgroup with RealSeal SE sealer (subdivision B).	76