BONDING TO DEMINERALIZED DENTIN USING SELF-ETCHING ADHESIVE SYSTEMS

Thesis

Submitted to the faculty of Oral and Dental Medicine, Cairo University for Partial fulfillment of the requirements of Master Degree in Dental Surgery (Operative Department).

By
Shereen Farouk Mohamed
(B.D.S.) Cairo University

Faculty of Oral and Dental Medicine Cairo University

2007

بسم الله الرحمن الرحيم

(قالوا سبحانك لا علم لنا إلا ما علمتنا إنك انت العليم الحكيم)

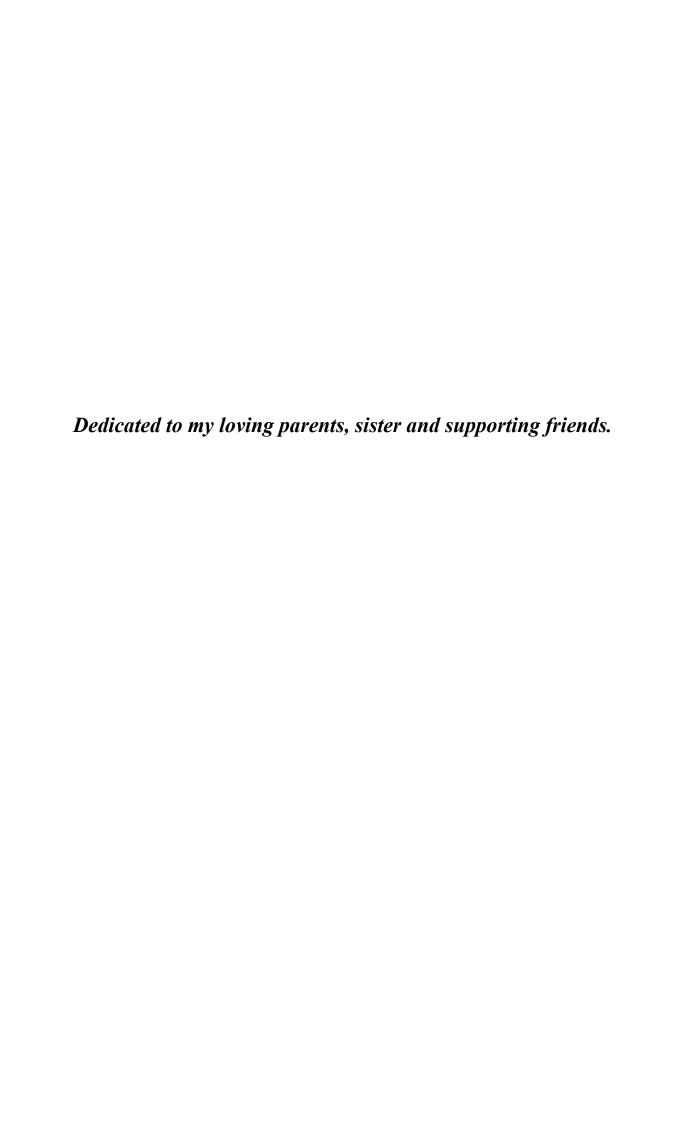
صدق الله العظيم آية ٣٢ سورة البقرة

Supervisors

Dr. Dalia Mostafa Mohamed Aboul MagdAssistant Professor of Operative DentistryFaculty of Oral and Dental MedicineCairo University

Dr. Dina Wafik Mahmoud El KassasLecturer of Operative DentistryFaculty of Oral and Dental MedicineCairo University

Dedication



Acknowledgement

I would like to express my endless gratefulness to *Gracious God* for helping me to achieve this work.

I would also like to express my sincere thanks and appreciation to my supervisor, *Dr. Dalia Mostafa Mohamed Aboul Magd*, Assisstant Proffessor of Operative Dentistry, Faculty of Oral and Dental Medicine, Cairo University, for her kind supervision and generous assistance.

I would also like to thank *Dr. Dina Wafik Mahmoud El Kassas*, Lecturer of Operative Dentistry, Faculty of Oral and Dental Medicine, Cairo University, for her fruitful instructions, devotion and unfailing guidance.

I would also like to thank the stuff of Biochemistry, Faculty of Science, for their kind cooperation.

List of contents

LIST OF CONTENTS

	Page
- List of tables	i
- List of figures	ii
- Introduction	1
- Review of literature	4
- Aim of the study	47
- Materials and methods	48
- Results	64
- Discussion	83
- Summary and conclusions	94
- References	97
- Arabic summary	

List of tables

LIST OF TABLES

		Page
Table 1:	Variables of the study	50
Table 2:	Interaction of variables	50
Table 3:	Mean and descriptive statistics of shear bond strength	
	values in MPa of the two adhesive systems, HEMA-	
	containing adhesive system (Adper Prompt L-Pop) (B ₁)	
	and HEMA-free adhesive system (G-Bond) (B ₂),	
	irrespective of the tissue substrates	65
Table 4:	Mean and descriptive statistics of mean shear bond	
	strength values in MPa showing the effect of different	
	tissue substrates (A ₁ , A ₂ , A ₃ , A ₄), irrespective of the	
	adhesive systems used	67
Table 5:	Mean and descriptive statistics of shear bond strength	
	values in MPa of the adhesive systems (B ₁ , B ₂) with	
	each tissue substrate (A_1, A_2, A_3, A_4)	69
Table 6:	Mean and descriptive statistics of shear bond strength	
	values in MPa of the tissue substrates (A_1,A_2,A_3,A_4)	
	with each adhesive system (B_1, B_2)	71
Table 7:	Mean and descriptive statistics of shear bond strength	
	values in MPa of the interactions of the tissue	
	substrates (A ₁ , A ₂ , A ₃ , A ₄) and the adhesive systems	
	(B_1, B_2)	73
Table 8:	Summarization of the results of univariate ANOVA	
	test	74

List of figures

LIST OF FIGURES

		Page
Figure 1:	HEMA-containing adhesive system (Adper Prompt	
	L-Pop)	51
Figure 2:	HEMA-free adhesive system (G-Bond)	51
Figure 3:	Filtek Z250 resin composite	52
Figure 4:	Coltolux 75 visible light curing unit	52
Figure 5:	Stainless steal mould	60
Figure 6:	Parts of the mould	60
Figure 7:	Diagram showing the specimen before and after	
	dentin exposure	60
Figure 8:	Specimen in acrylic resin block inside the mould	
	(upper view)	60
Figure 9:	Specimen in acrylic resin block inside the mould	
	(side view)	61
Figure 10:	The grinding machine	61
Figure 11:	The specimen in the grinding machine	61
Figure 12:	The specimen in acrylic resin block inside the	
	mould after exposure of the buccal surface	62
Figure 13:	The mould with split Teflon cover	62
Figure 14:	The specimen after bonding and application of resin	
	composite	62
Figure 15:	Universal testing machine (LRX-Plus Llyod)	63
Figure 16:	SEM machine	63
Figure 17:	The mean shear bond strength values in MPa of the	
	two adhesive systems, HEMA-containing adhesive	
	system (Adner Prompt L-Pop) (B ₁) and HEMA-free	

	adhesive system (G-Bond) (B ₂), irrespective of the	
	tissue substrates	65
Figure 18:	The mean shear bond strength values in MPa of the	
	tissue substrates (A ₁ , A ₂ , A ₃ , A ₄), irrespective of the	
	adhesive systems used	67
Figure 19:	The mean shear bond strength values in MPa of the	
	adhesive systems (B ₁ , B ₂) with each tissue substrate	
	(A_1, A_2, A_3, A_4)	69
Figure 20:	The mean shear bond strength values in MPa of the	
	tissue substrates (A ₁ , A ₂ , A ₃ , A ₄) with each adhesive	
	system (B_1, B_2)	71
Figure 21:	The mean shear bond strength values in MPa of the	
	interactions of the tissue substrates (A_1, A_2, A_3, A_4)	
	and the adhesive systems (B_1, B_2)	73
Figure 22:	SEM representing resin-dentin interface of subgroup	
	$(A_1 B_1)$ at 1000 X	79
Figure 23:	SEM representing resin-dentin interface of subgroup	
	(A ₂ B ₁) at 1000 X	79
Figure 24:	SEM representing resin-dentin interface of subgroup	
	(A ₃ B ₁) at 1000 X	80
Figure 25:	SEM representing resin-dentin interface of subgroup	
	(A ₄ B ₁) at 1000 X	80
Figure 26:	SEM representing resin-dentin interface of subgroup	
	(A ₁ B ₂) at 1000 X	81
Figure 27:	SEM representing resin-dentin interface of subgroup	
	$(A_2 B_2)$ at 1000 X	81
Figure 28:	SEM representing resin-dentin interface of subgroup	
	(A ₂ B ₂) at 1000 X	82

Figure 29:	SEM representing resin-dentin interface of subgroup		
	$(A_4 B_2)$ at 1000 X	82	