

# 









### جامعة عين شمس

التوثيق الالكتروني والميكروفيلم



نقسم بللله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأفلام قد اعدت دون آية تغيرات



#### يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15-20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of 15 – 25c and relative humidity 20-40 %



ثبكة المعلومات الجامعية





Information Netw. " Shams Children Shams of the Shame of the S شبكة المعلومات الجامعية @ ASUNET بالرسالة صفحات لم ترد بالأص

# THE EFFECT OF IONTOPHORESIS VERSUS IMMERSION TECHNIQUE USING DIFFERENT CALCIFYING SOLUTIONS ON THE BOND STRENGTH OF VARIOUS COMPOSITE RESIN ADHESIVE SYSTEMS

Thesis
Submitted in partial fulfillment for the requirements of
Doctor degree in Conservative Dentistery
Faculty of Dentistry
Ain Shams University

By
Farid Mohammed Sabry El-Askary
(B, D, S. – M.Sc.) Cairo University

2001

B . C/2

## بسم الله الرحمن الرحيم

إنما إلهكم الله الذي لا إله إلاهو وسع كل شيء علما

صدق الله العظيم

الآية (٩٨) سورة طه

# THE EFFECT OF IONTOPHORESIS VERSUS IMMERSION TECHNIQUE USING DIFFERENT CALCIFYING SOLUTIONS ON THE BOND STRENGTH OF VARIOUS COMPOSITE RESIN ADHESIVE SYSTEMS

Thesis
Submitted in partial fulfillment for the requirements of
Doctor degree in Conservative Dentistery
Faculty of Dentistry
Ain Shams University

By
Farid Mohammed Sabry El-Askary
(B, D, S. – M.Sc.) Cairo University

#### **Supervisors**

#### Dr. Makeen Moussa Khalaf

Professor of Operative Dentistry
Faculty of Dentistry
Ain-Shams University

#### Dr. Hisham Abdelwahab Mustafa

Ass. Professor of Operative Dentistry Faculty of Dentistry Ain-Shams University

### Dedication

I dedicate this work to my dear family—my parents, my wife

Mayy and my precious daughters Salma and Alia. I wish their

lives be amply filled with happiness, pride and love.

### Acknowledgment

#### List of contents

List of tables	
List of figures	
Introduction	
Review of literature	2
Aim of the study	57
Materials and methods	58
Results	87
Discussion	192
Summary and conclusions	225
References	228
Appendix	235
Arabic summary	

My deepest gratitude and most sincere appreciation to **Dr. Makeen**Moussa Khalaf, Professor of Operative Dentistry, Faculty of Dentistry, AinShams University, for his valuable advices and guiding my thoughts during the course of this work.

My thanks also goes to **Dr. Hisham Abdelwahab Mustafa**, Assistant Professor of Operative dentistry, Faculty of Dentistry, Ain-Shams University, for his helpful discussion in accomplishing this research.

I am grateful for the effort of my professors, Dr. El-Sayed Hassanien Hassan, Professor of Operative Dentistry, Faculty of Oral and Dental Medicine, Cairo University, Dr. Radwan Sedky Farag, Professor of Inorganic Chemistry, Faculty of Agriculture, Cairo University and Dr. Hussein Abd El-Fattah Gomaa, Professor of Operative Dentistry, Faculty of Oral and Dental Medicine, Cairo University.

I am specially indebted to **Dr. Mohammad Lotfy Zamzam**,
Assistant Professor of Design and Production Engineering, Faculty of
Engineering, Ain-Shams University, for the creation of the in-vitro
iontophoresis apparatus needed for this work.

Special thanks are due to **Dr. Ahmed Helmy Salama**, Professor of Oral Biology, Faculty of Oral and Dental Medicine, Cairo University, for his considerable help and valuable explanations in the histological aspect of this study, **Dr. Tarek Salah El-Deen**, Assistant Professor of Dental Biomaterial, Prothodontic department, Faculty of Dentistry, Ain-Shams University, for his valuable assistance in shear bond strength testing and **Dr. Mohammad** 

yahia El-Refaie, Assistant Professor of Orthodontics, Faculty of Dentistry, Ain-Shams University, for his efforts in result analysis.

Great thanks is due to my colleague Aly Ahmed, chemistry department, Faculty of Women, Ain-Shams University, for his effort in preparing the calcifying solutions used in this study.

I am amply thankful for the efforts of my colleague Yasser Ali El-Mourtada, Conservative Dentistry Department, Faculty of Dentistry, Ain Shams University, how pored over every page of the thesis making editing comments and suggestions for changes.

I am grateful for the efforts of a number of colleagues who helped me in the practical work in this thesis. In this respect I would specially like to mention Mohammad Salah. Also Amr Sherif and Dalia El-Korashy members of Dental Biomaterials, Prothodontic Department, Faculty of Dentistry, Ain-Shams University.

Great thanks for all the staff and members of the Conservative Dentistry Department, Faculty of Dentistry, Ain Shams University, for reproductive assistance in this thesis.