



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



MONA MAGHRABY



Ain Shams University

Faculty of Dentistry

Department of Pediatric Dentistry and Dental Public Health

**Comparison of Marginal Micro-leakage and Bond
Strength of Resin Modified Glass Ionomer Restorations
in Primary Teeth Prepared by Erbium Laser (Er:YAG)
and Conventional Method ; An In vitro Study**

A Thesis submitted to the Faculty of Dentistry,

Ain Shams University

*In partial fulfillment of the requirements for the master's degree
in pediatric dentistry*

By

Mohamed Kamal Shahata Elsayed Madian

(B.D.S 2010) Ain Shams University

Faculty of Dentistry

Ain Shams University

2021

Supervisors

Prof. Dr. Amr Mahmoud Abd Al Aziz

Professor of pediatric dentistry and dental public health
department

Faculty of dentistry

Ain shams university

Prof. Dr. Gehan Gaber Allam

Assistant Professor of pediatric dentistry and dental
public health department

Faculty of dentistry

Ain shams university

List of Contents

Title	Page No.
Dedication	i
Acknowledgment	ii
List of tables	iii
List of figures	iv
List of abbreviations	vii
Introduction	1
Review of literature	3
Aim of the Study	40
Materials and methods	41
Results	61
Discussion	66
Conclusions	77
Recommendations	78
Summary	79
References	83
Arabic summary	-

Dedication

First of all, I would like to dedicate my work and effort in the loving memory of my deceased mother, who I'm sure that would be extremely happy for defending and being granted the master's degree

I also dedicate this work and effort my father who I consider my role model and my whole world.

To my wife, no words could describe how supportive and patient you were/are in this path and I'm sure it would not be done without your motivation.

Also, I would like to appreciate and thank my father-in-law, who had supported me so much in this journey and was like my backbone.

I would like also to dedicate this work to my daughters, my brother, sisters, and my family.

Acknowledgment

I would like to express my sincere appreciation to my supervisor, **Professor Dr. Amr Mahmoud Abd Al Aziz** for his constant patience and enthusiastic encouragement. He has always supported and guided me through in this work and without his help, we wouldn't achieve it at all. It was an honor working under her supervision.

I would like also to express my deep gratitude to my supervisor **Professor Dr. Gehan Gaber Allam** for her guidance and useful critiques in this research work. She had given and invested much time, work and effort in this research and her expertise and guidance were invaluable to the completion of my work and I'm forever grateful to her.

I would like also to pay my special regards to **Professor Dr. Ramy Ghaly** and **Dr. Dina Hamdy** for their great assistance, guidance and help in laser part of the thesis.

Last but not least, I'm thankful to all my professors, colleagues and staff members of the Pediatric Dentistry and Dental Public Health Department, Faculty of Dentistry, Ain-Shams University for their constant help and encouragement.

List of tables

Table No.	Title	Page No.
Table 1	Materials used in the tests and their manufacture	43
Table 2	Devices and machines used in the tests and their manufacture	44
Table 3	Frequency and percentage (%) of microleakage test scores	62
Table 4	Mean \pm standard deviation (SD) of shear bond strength values (Mpa)	64
Table 5	Correlation between microleakage scores and shear bond strength scores	65

List of figures

Figure No.	Title	Page No.
Fig 1	The laser machine model used (Pulser) with the used parameters and settings	45
Fig 2	The Hand piece of the laser machine	45
Fig 3 ,4 and 5	Drawing the dimensions of cavity on the rubber dam sheet	47
Fig 6	Symmetrical windowing the drawn cavity on the sheet by a lancet	47
Fig 7	Cutting through the hollowed window in the Rubber sheet to make a cavity on the samples	48
Fig 8	The bur used in the tests and measuring its length by a ruler	49
Fig 9	Samples preparation by ER: YAG laser	49
Fig 10	Polyacrylic Acid as dentin conditioner before restoring the samples, 3M ESPE	50
Fig 11	The used Resin Modified Glass Ionomer in form of capsules, Fuji II LC (GC Japan)	50
Fig 12	The protective adhesive coat used to protect the RMGI, Equia Coat (GC Japan)	51
Fig 13	Thermocycler, Julabo, Germany	52
Fig 14	Specimens after being placed in Methylene Blue	52

Fig 15	Sectioning saw device used under water spray coolant	53
Fig 16	Showing a sample during cutting and sectioning	54
Fig 17	A sample being sectioned into 2 sections in Bucco-Lingual plane direction through the center of the restoration	54
Fig 18	A sample being sectioned into 2 sections in Bucco-Lingual plane direction through the center of the restoration	54
Fig 19	Stereomicroscope for examining and scoring the degree of microleakage, Olympus	55
Fig 20	Prepared and horizontally mounted samples on acrylic resin block exposing the prepared surface outwards	57
Fig 21	The application of Polyacrylic acid as dentin conditioner	57
Fig 22 and 23	Clamping and mounting Polyethylene tube with a diameter of 2.5 mm on the prepared surface as molds to contain and hold the RMGI in cylindrical uniform and shape	58
Fig 24 and 25	Samples restored with Resin Modified Glass Ionomer (RMGI) which was injected into the hollowed Polyethylene tube	58
Fig 26 and 27	Removing the polyethylene tube with a lancet to leave a restoration in cylindrical shape adhered to dentine surface	59

Fig 28	Universal testing machine applying a compression force through a chisel with the upper movable head of the machine at the tooth restoration interface, Instron	60
Fig 29	Bar chart showing percentage of microleakage test scores	63
Fig 30	Bar chart showing average shear bond strength test values (Mpa)	64
Fig 31	Scatter plot showing the correlation between micro-leakage scores and shear bond strength scores	65