

Salwa Ak1



بسم الله الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات

قسم التوثيق الإلكتروني



Salwa Ak1



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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



Salwa Akl



بعض الوثائق الأصلية تالفة
وبالرسالة صفحات لم ترد بالأصل



B18420

**EVALUATION OF SHEAR BOND STRENGTH AND
MARGINAL ADAPTATION OF CASTABLE
VERSUS SHRINK - FREE CERAMICS**

Thesis

*Submitted in partial fulfillment for the Requirement
of Master Degree*

In

Conservative Dentistry

By

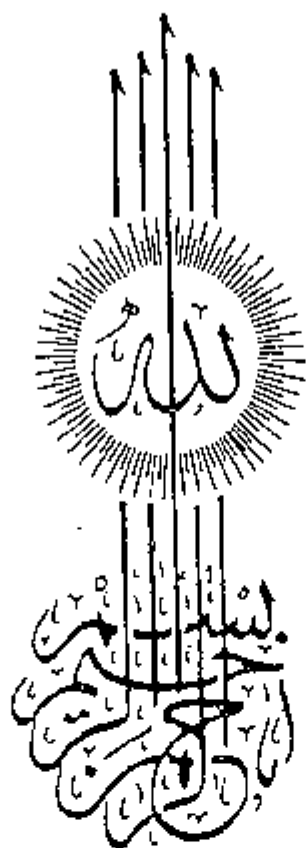
Abeer Moustafa Darrag

B.D.S., Tanta University

Faculty of Dentistry

Tanta University

1999



وما أوتينم من العلم

ولا أقسم

صديق الله العظيم

SUPERVISORS

Prof. Dr.

AMIN A. EL-MESERY

Professor of Conservative Dentistry
Faculty of Dentistry
Tanta University

Dr.

WEDAD ETMAN

Associate professor of Conservative Dentistry
Faculty of Dentistry
Tanta University

Dr.

HATIM ALHADAINY

Lecturer of Conservative Dentistry
Faculty of Dentistry
Tanta University

DEDICATION

TO

**** MY PARENTS ****

**** MY HUSBAND ****

ACKNOWLEDGEMENT

*I am thankful to **GOD** whose care is essential guidance in my life and in every step for accomplishment of this work.*

*I would like to express my deepest gratitude to **Prof. Dr. Amin El-Missiri** Professor of Conservative Dentistry, Faculty of Dentistry, Tanta University for his kind help and assistance while conducting this thesis.*

*I wish to express my deepest gratitude and appreciation to **Assoc. Prof. Dr. Wedad Etman**, Conservative Dentistry, Faculty of Dentistry, Tanta University for her tireless effort and great assistance throughout the preparation and completion of this work.*

*My gratitude and thanks to **Dr. Hatim Alhadiany**, Lecturer of Conservative Dentistry, Faculty of Dentistry, Tanta University for his guidance and help.*

I am so grateful to staff members of Conservative Dentistry Department, Faculty of Dentistry, Tanta University.

*I am also grateful to **Prof. Dr. Oraby Husein**, Geology Department, Faculty of Science, Monofia University for his help in stereomicroscopic examination of sectioned samples.*

CONTENTS

	<i>Subject</i>	<i>Page</i>
I	INTRODUCTION.	1
II	REVIEW OF LITERATURE.	4
	Types of dental ceramics.	5
	MOD inlays.	18
	Luting of ceramic inlays.	22
	Marginal adaptation.	24
	Shear bond strength.	27
III	AIM OF THE WORK.	29
IV	MATERIALS AND METHODS.	30
	Part I: evaluation of marginal adaptation.	33
	Part II: evaluation of shear bond strength.	60
V	RESULTS.	69
VI	DISCUSSION.	80
VII	SUMMARY AND CONCLUSION.	93
VIII	REFERENCES.	97
	ARABIC SUMMAR.	

LIST OF FIGURES

<i>Fig. No.</i>	<i>Page</i>
(1): custom-made specimen holder of brass ring.	34
(2):MOD cavity preparation.....	34
(3):Mounting device with a modified surveyor.....	35
(4):Polysiloxane impression material.....	40
(5):Plastic ring as an impression tray.....	40
(6):IPS corum refractory material.....	41
(7):Anatomically waxed MOD inlay.....	42
(8):Waxed inlays on the IPS-Empress ring base.....	43
(9):The paper ring placed on the ring base.....	44
(10):Special phosphate-bonded IPS-Empress investment material.....	45
(11):The ceramic ingots and alox plungers.....	45
(12):The investment cylinder with ceramic ingot and alox plunger in preheating furnace.....	46
(13):IPS-Empress EP 500 press furnace.....	46
(14):Investment cylinder in the center of EP 500 press furnace.....	47
(15):The investment cylinder after the pressing process.....	47
(16):IPS-Empress staining material.....	48
(17):A steel flask for investing waxed Cerestore inlays.....	51
(18):The flask in the heating oven.....	51
(19):A Cerestore ceramic pellet.....	52
(20):The heated flask with a ceramic pellet in an air press.....	52
(21):The ceramic substrate fired in a special oven.....	53
(22):Variolink dual-curing adhesive luting system.....	58

<i>Fig. No.</i>	<i>Page</i>
(23) Cemented IPS-Empress ceramic inlays.....	58
(24) Cemented Cerestore ceramic inlays.....	58
(25) Light stereomicroscope.....	59
(26) A metal cylinder with flattened dentin surface positioned against a Teflon disk.....	64
(27) A specially designed Teflon ring fitted on the top of the mounting cylinder for fabrication of patterns of ceramic disks.....	64
(28) A Teflon ring with central hole for application of the luting system to the center of flat enamel and dentin surfaces.....	65
(29) IPS-Empress ceramic disks cemented to the center of enamel and dentin specimens.....	66
(30) Cerestore ceramic disks cemented to the center of enamel and dentin specimens.....	66
(31) Lloyd 10000 universal testing machine.....	67
(32) Specimen attached to the testing machine.....	68
(33) Score 0 leakage at the gingival margin of ceramic inlay.....	73
(34) Score A leakage at the gingival margin of ceramic inlay.....	73
(35) Score C leakage at the gingival margin of ceramic inlay.....	74
(36) Score D leakage at the gingival margin of ceramic inlay.....	74

LIST OF TABLES

<i>Table No.</i>	<i>Page</i>
(I): Materials used in the present study.....	31
(II): Microleakage scores of tested IPS-Empress and Cerestore ceramic inlays.....	71
(III): Frequency distribution of leakage scores in tested samples.	71
(IV):Shear bond strength of tested ceramics.....	77



INTRODUCTION

INTRODUCTION

The aim of restorative dentistry is to substitute the decayed parts of the teeth with a material that matches natural enamel in appearance and physical characteristics. The process must also ensure an effective seal to protect the underlying tooth as well as to restore and maintain occlusal anatomy to promote proper oral function (Grossman, 1985).

The use of aesthetic materials is becoming more popular due to the increased interest in tooth appearance. Patients are looking forward for improved aesthetics even in the posterior regions of the mouth (Gemalmaz, et al., 1997). One of the most aesthetic material is ceramic restorations. Ceramics are well known for being aesthetically pleasing and biocompatible and should therefore be viable alternatives when the appropriate case selection for their clinical use are applied (Milleding, et al., 1995).

All-ceramic inlays can provide esthetic pleasing restorations currently available in posterior teeth. They can match natural tooth structure accurately in terms of colour, surface texture, and translucency. Well-made all-ceramic restorations can be virtually indistinguishable of unrestored natural teeth. In conclusion with growing demand of patients for esthetic restorations, interest in ceramic inlays has recently been re-aroused (Rosenstiel, 1995).

However, many of problems as marginal inaccuracy and decreased strength with conventional porcelain restorations still persist. These problems are related to one property of the dental porcelain, namely, the shrinkage that occurs from the build up (green state) to the fired state. In an attempt to overcome the shrinkage problem, the alumina ceramic developed. Alumina ceramic formulation is such that on firing, chemical and crystalline transformation occur to compensate for the decrease shrinkage volume ordinarily experienced with traditional dental ceramics. By controlling the time and temperature of the firing cycle minimal shrinkage of the ceramic from the unfired state to the fired state can be obtained (Sozio and Riley, 1983).

Castable glass ceramics are another attempt to control porcelain shrinkage. The recent introduction of cast glass ceramics and more accurate fabrication methods that bring together unique advantages for the dentist and the patient. Castable ceramic inlays made by lost wax technique, are a recent development of the all-ceramic inlay concept. Clinical acceptability of the castable ceramic system suggests that the castability and marginal fit of the restorations are excellent. (Kelsey, et al., 1995, Holmes, et al., 1992).

Previous studies were performed to compare marginal fit and microleakage between: castable ceramic and conventional ceramic inlays, castable ceramic and CAD/CAM (Computer-aided design/ Computer-aided manufacture) inlays, shrink-free and conventional ceramic inlays. However