

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

## قسم

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



## يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of  
15-25- c and relative humidity 20-40%

# بعض الوثائق الأصلية تالفة

بالرسالة صفحات  
لم ترد بالأصل

# **EFFECT OF PRESSURE CURING TECHNIQUE ON PROCESSING SOFT LINING MATERIAL**

617.69

*Thesis*

Submitted to the Faculty of Oral and Dental  
Medicine in partial fulfillment of the  
Requirements of the master Degree in  
Prosthodontics

*[Signature]*

By

*[Signature]*

Hisham Abd El-Hamid Abd El-Aziz

B.D.S. Cairo University *(بصير)*

*فكر ابو لطف*



Department of prosthodontics  
Faculty of Oral and Dental Medicine  
Cairo – University  
2000

*177*

## **Supervisors**

*Professor Dr. Samy Mahmoud El-Sayed*

**Professor Of Prosthodontics**

Faculty of Oral and Dental Medicine

**Cairo University**

*Professor Dr. Nadia Mohamed Mawsouf*

**Professor of Prosthodontics**

Faculty of Oral and Dental Medicine

**Cairo University**

*Dr. Faten Hassan Amin*

**Associate Professor of Biomaterial Department**

Faculty of Oral and Dental Medicine

**Cairo University**

*To My Father,*

*My Mother,*

*My Family,*

*And My Fiancee,*

*For their Love and Support.*



## Acknowledgment

First of all I would like to thank GOD deeply and express my gratitude for his favor and support.

I wish to express my sincere gratitude to **Professor Dr. Samy Mahmoud El-Sayed**, professor of prosthodontics, Faculty of Oral and Dental Medicine, Cairo University for his valuable supervision, guidance and continual advice throughout this work.

I would like to express my deep appreciation and thanks to **Professor Dr. Nadia Mohamed Mawsouf**, professor of prosthodontics, Faculty of Oral and Dental Medicine, Cairo University for her supervision, valuable advice and encouragement.

I would like to express my sincere gratitude and appreciation to **Dr. Faten Hassan Amin**, Associate professor of Biomaterial department Faculty of Oral and Dental Medicine, Cairo University for her supervision, guidance and valuable encouragement.

I would like to express my deep thanks to **Dr. Nelly Hassan Ali El-Din** lecturer of Epidemiology and Biostatistics, National Cancer Institute for her great help in the statistical analysis of the data of this study.

I am greatly indebted to **Professor Dr. Tharwat W. Abou Arab**, Director of Measurement & Calibration lab, Faculty of Engineering, Cairo University for his generous help, support and kindness.

I would like to express my deep thanks to staff members of the Physics Department, Faculty of Engineering, American University in Cairo for their great help and advice.

Countless thanks are extended to all my Professors, Colleagues and Staff members of the Prosthodontics Department, Faculty of Oral and Dental Medicine, Cairo University for their encouragement and support.

## Table of contents

Chapter	Page
<b>I Introduction .....</b>	<b>1</b>
<b>II Review of Literature .....</b>	<b>2-49</b>
1- Classifications of soft lining materials.	2-3
2- Composition of different soft lining materials.	4-7
3- Indication and uses of soft lining materials.	8-10
4- Ideal requirements of soft lining materials.	11
5- Properties of soft lining materials.	12-37
6- Spacer techniques for processing soft liner materials.	38-40
7- Processing techniques of soft lining materials.	41-46
8- Pressure polymerization for acrylic resin and soft liner.	47-48
9- Limitation of resilient lining material.	49
<b>III Aim of study .....</b>	<b>50</b>
<b>IV Material and methods .....</b>	<b>51</b>
<b>V Results .....</b>	<b>72</b>
<b>VI Discussion .....</b>	<b>83</b>
<b>VII Summary and Conclusion .....</b>	<b>88</b>
<b>References.</b>	<b>91</b>
<b>Arabic summary.</b>	

## **List of figures**

	<b>Page</b>
<b>Fig (1) :</b> Schematic diagram of teflon assembly.	62
<b>Fig (2) :</b> Teflon mould assembly.	63
<b>Fig (3) :</b> Wax pattern.	63
<b>Fig (4) :</b> Boxing of wax pattern.	64
<b>Fig (5) :</b> Stone mixture poured over wax die.	64
<b>Fig (6) :</b> Wax pattern with its cast.	65
<b>Fig (7) :</b> Two wax patterns and its casts embedded into plaster mixture.	65
<b>Fig (8) :</b> Ivomate pressure pot.	66
<b>Fig (9) :</b> Heat cured acrylic resin soft liner bonded to acrylic resin block.	66
<b>Fig (10):</b> Loyal universal testing machine.	67
<b>Fig (11):</b> Teflon cover with central hole and Teflon solid base.	67
<b>Fig (12):</b> Wax poured into Teflon mould.	68
<b>Fig (13):</b> Wax patterns of 10mm in diameter and 4mm in height.	68
<b>Fig (14):</b> Heat cured acrylic resin soft liner samples, used for measuring surface hardness and roughness.	69
<b>Fig (15):</b> Laser light beam source.	69
<b>Fig (16):</b> Photo detector.	70
<b>Fig (17):</b> Data processing system.	70

## **List of figures cont'd**

	<b>Page</b>
<b>Fig (18):</b> Shore-A durometer hardness tester.	71
<b>Fig (19):</b> Cohesive bond failure within the acrylic resin soft liner.	75
<b>Fig (20):</b> Shear bond strength of acrylic resin soft liner cured by pressure and conventional hot water curing techniques.	76
<b>Fig (21):</b> Surface hardness values of acrylic soft liner cured by pressure and hot water curing techniques.	79
<b>Fig (22):</b> Surface roughness values of acrylic resin soft liner cured by pressure and hot water curing techniques.	82

## **List of table**

<b>Table No.</b>	<b>Page</b>
<b>Table(1):</b> Materials used in this study.	60
<b>Table(2):</b> The number of the samples and the conditions of testing used in the study.	61
<b>Table(3):</b> The means shear bond strength values recorded after using pressure and conventional hot water curing techniques at different times.	74
<b>Table(4):</b> Mode of failure between acrylic resin soft liner and denture base resin material.	74
<b>Table(5):</b> The means surface hardness values recorded after using pressure and conventional hot water curing techniques at different times.	78
<b>Table(6):</b> The means surface roughness values recorded after using pressure and conventional hot water curing techniques different time.	81

# **Chapter I**

## **Introduction**

## INTRODUCTION

Soft lining materials may be defined as elastic and resilient materials that are applied to all or part of the fit surface of denture for the purpose of achieving more equal distribution of load and reduction of masticatory forces transmitted by prosthesis to the underlying tissue by acting as cushion between hard denture base and the supporting tissues. <sup>(41, 51, 69)</sup>

These polymers are soft at mouth temperature as their glass temperature is below 37°C <sup>(1)</sup>. These materials are divided into operationally defined groups: tissue conditioners, functional impression materials and soft liners. Also it may be classified according to polymer compositions and type of curing techniques <sup>(52, 63, 85)</sup>. Soft lining materials have different compositions, properties, indications and uses. <sup>(13, 76)</sup>

Although soft lining materials have been in use for more than a century as the earliest soft lining material recorded was used by Twitchell in 1869, the ideal material has yet to be developed <sup>(52, 69)</sup>, due to some drawbacks that considered a serious defects of these materials in clinical practice. <sup>(85)</sup>

Soft lining materials have different curing techniques as it may be cured by conventional hot water <sup>(67)</sup>, microwave radiation <sup>(8, 54)</sup>, and visible light techniques <sup>(24, 35)</sup>. Saunder and Corwin <sup>(72)</sup> cured a soft liner against polymerized acrylic resin in pressure pot to extend soft denture liner longevity.