



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



HANAA ALY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



HANAA ALY



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



HANAA ALY

**Effect of Resilient Soft Liner and Clip Attachments on
Peri-Implant Tissue in Splinted Mini-Implant
Retained Mandibular Overdentures
(Randomized Clinical Trial)**

Thesis

Submitted to the Faculty of Dentistry, Ain Shams University, in
partial fulfillment of the requirements for the doctorate degree in
Oral and Maxillofacial Prosthodontics

By:

Omar Samy Mahmoud

B.D.S, 2007

October 6 University

M.D.S, 2013

Cairo University

Faculty of Dentistry

Ain Shams University

2022

Under Supervision of:

Prof. Dr. Mahmoud Hassan El Afandy

Professor of Prosthodontics

Faculty of Dentistry

Ain Shams University

Dr. Shaimaa Lotfy Mohamed Ouda

Assistant Professor of Prosthodontics

Faculty of Dentistry

Ain Shams University

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ لِيُبْحِثْنَا لَعَلَّامُنَا الْإِمَامُ عَلَيْنَا
إِنِّي أَنْتَ الْعَلِيمُ الْحَكِيمُ

صِدْقُ اللَّهِ الْعَظِيمِ

البقرة: ٣٢

Acknowledgement

Praise be to **ALLAH**, with whose Grace good deeds are accomplished. **ALLAH**, whatever I or any of your creatures are blessed with is from You alone, as there is no associate with You. So, all praises and thanks are due to You.

I would like to express my gratitude and appreciation to **Prof. Dr. Mahmoud Hassan El Afandy**, Professor of Prosthodontics, Faculty of Dentistry, Ain Shams University, for his invaluable academic assistance, insightful comments, and continuous support and encouragement throughout the course of this work.

My sincere gratitude and appreciation to **Dr. Shaimaa Lotfy Mohamed**, Assistant Professor of Prosthodontics, Faculty of Dentistry, Ain Shams University, for her meticulous revision, continuous motivation, and outstanding tolerance that helped greatly in finishing this work.

With deepest gratitude, I would like to sincerely thank my friends and colleagues in the Prosthodontics Department, Faculty of Dentistry, October 6 University, for their much-appreciated help throughout the course of this work.

Last but not least, I would like to thank all of my professors and staff members at the Prosthodontics Department, Faculty of Dentistry, Ain Shams University, for their assistance, knowledge and guidance.

This work is dedicated to....

My dear parents, my sister, and my lovely wife who have been a constant source of support and love throughout my life. This thesis would certainly not have existed without them.

List of Contents

List of Figures	iii
List of Tables	vi
Introduction	1
Review of Literature	3
▪ Edentulism	3
▪ Drawbacks of Complete Dentures	5
▪ Implant Retained Overdenture	7
▪ Designs of Implant Retained Overdentures	8
▪ Advantages of Implant Retained Overdenture	9
▪ Limitations of Conventional Dental Implants	11
▪ Bone Availability and Implant Diameter	13
▪ Mini Dental Implants	15
▪ Advantages and Indications of Mini Implants	16

▪ Limitations of Mini Implants	17
▪ Attachment Systems	18
▪ Non-splinted Individual Attachments	20
▪ Stud attachments	20
▪ Ball/O-ring attachments	21
▪ Locator attachments	22
▪ Magnetic attachments	22
▪ Telescopic attachments	23
▪ Splinting Bar Attachments.....	23
▪ The Uses of Soft Liners	24
▪ Definition of soft liners	24
▪ Classification of denture liners	25
▪ Limitations of denture liner materials	27
▪ Indications of denture liners	28
▪ Radiographic evaluations	29
▪ Periapical radiography	29
▪ Panoramic radiography	30
▪ Lateral cephalometric radiography	30
▪ Cone beam computed tomography	31

List of Contents

Aim of the Study	33
Materials and Methods	34
Results	74
Discussion	86
Summary	99
Conclusion	101
References.....	102
Arabic Summary.....	i

List of Figures

Fig 1	Mandibular ridge to be examined	38
Fig 2	1 st impression for complete denture construction	40
Fig 3	2 nd impression for complete denture construction	40
Fig 4	Jaw relation recording	41
Fig 5	Mounted try in on semi-adjustable articulator	42
Fig 6	The waxed-up dentures tried in the patient's mouth	43
Fig 7	Final insertion of the denture	43
Fig 8	Clear heat cured acrylic stent	44
Fig 9	Adding radio-opaque gutta percha markers	44
Fig 10	A CBCT radiograph of the mandibular arch using previously constructed clear acrylic stent with radio-opaque gutta percha markers	45
Fig 11	CBCT sagittal cut of the mandible for implant site assessment	45
Fig 12	DURA-VIT™ MINI implant system with straight abutment	46
Fig 13	Modified radiographic stent	47
Fig 14	Using the modified radiographic stent to mark the osteotomy sites in cortical bone	48
Fig 15	Crestal incision with vertical releasing incision	49
Fig 16	Starting with 1.5mm pilot drill	50
Fig 17	Final drill in the first osteotomy site	50

Fig 18	JD surgical guide	51
Fig 19	Drilling guided by JD guide	51
Fig 20	Checking parallelism using parallel pins	52
Fig 21	Mini implant's plastic finger driver	53
Fig 22	The butterfly key	53
Fig 23	Final stage of implant insertion using the ratchet wrench	54
Fig 24	Mini implants before closure	54
Fig 25	Flap suturing	55
Fig 26	Lower denture with soft liner for healing	56
Fig 27	PVS impression for bar construction	58
Fig 28	Cast after pouring	58
Fig 29	Bar mounted on Parallelometer mandrel surveyor tool	59
Fig 30	Bar spruing before investment procedure	59
Fig 31	Bar after casting and deinvesting	60
Fig 32	Metallic bar after finishing and polishing	60
Fig 33	Group I bar after finishing and polishing	62
Fig 34	Bar after cementation	62
Fig 35	Blocking the unwanted undercuts with flowable dam material	63
Fig 36	Light curing of the light cured dam material	63
Fig 37	Injecting self-curing PMMA in relined denture for	64

	attachment pick up	
Fig 38	Picked up clip attachments for group I	64
Fig 39	Undercut blocking in group II	65
Fig 40	Soft-liner bond application	66
Fig 41	Applying soft-liner in denture	66
Fig 42	Final soft-liner attachment	67
Fig 43	Parallelism in 3d frontal view of CBCT (O3 OnDemand 3D viewer)	70
Fig 44	Mesial and distal measurements in coronal view cuts	70
Fig 45	Buccal and lingual measurement in sagittal view cuts	71
Fig 46	Posterior measurements on CBCT panoramic window	72
Fig 47	Bone changes at different interval in buccal, lingual, mesial, distal surfaces, overall and residual ridge of group I (Bar with clip attachment)	76
Fig 48	Bone changes at different interval in buccal, lingual, mesial, distal surfaces, overall and residual ridge of group II (Bar with soft liner attachment)	79
Fig 49	Bone changes at different interval in buccal, lingual mesial, distal surfaces and residual ridge of both group I and group II	81
Fig 50	Bone changes at different interval in overall & residual ridge in both group I and group II	83
Fig 51	Bone changes in both central & peripheral implants in both group I and group II	85

List of Tables

Table 1	Bone changes (mean difference $\pm$ standard deviation) at different time intervals in buccal, lingual, mesial, distal surfaces, overall and residual ridge of group I (Bar with clip attachment)	74
Table 2	Bone changes (mean difference $\pm$ standard deviation) at different time intervals in buccal, lingual, mesial, distal surfaces, overall and residual ridge of group II (Bar with soft liner attachment)	77
Table 3	Comparison between group I and group II regarding bone changes at different interval in buccal, lingual, mesial, and distal surfaces	80
Table 4	Comparison between group I and group II regarding bone changes at different interval in overall & residual ridge	82
Table 5	Comparison between group I and group II regarding overall bone changes in both central & peripheral implants	84