

Assessment of the Oblique Sandwich osteotomy for Augmentation of Posterior Atrophic Mandible

Thesis submitted to the Oral and Maxillofacial Surgery Department, Faculty of Oral and Dental Medicine, Ain-Shams University

in partial fulfillment of the requirements for the Master Degree in Oral and Maxillofacial Surgery.

By:

Nehal Ibrahim Shobair.

B.D.S. (2010), Misr International University

Supervised By:

Prof. Dr. Mohammed Diaa Zain El Abedeen Ismail

Professor of Oral and Maxillofacial Surgery

Vice Dean for Environmental Affairs and Society
Development

Faculty of Oral and Dental Medicine

Ain-Shams University

Ass. Prof. Dr. Mohamed Abdel Mageed Katamish

Assistant Professor of Oral and Maxillofacial Surgery

Faculty of Oral and Dental Medicine

Ain-Shams university

(2017)



وَمَنْ يِتَوَكَّلْ مَلَى اللَّهِ فَهُوَ حَسْبُهُ إِنَّ اللَّهَ بَالِغُ أَمْرِهِ قَدْ جَعَلَ اللَّهُ لِكُلِّ شَيْءٍ قَدْراً جَعَلَ اللَّهُ لِكُلِّ شَيْءٍ قَدْراً

	·		

Acknowledgement

I want also to express my deep respect and gratitude to **Dr. Amr Ekram,** Assistant Professor of Oral and Maxillofacial Surgery, Cairo University, for his unconditioned, unlimited help, and advice. I was really lucky to have the opportunity to work and learn from him. Thank you for your time, great effort, persistence, and devotion.

I would like to express my deepest and sincere thanks to **Dr. Khaled Mohamed Keraa**, Biostatistician, and Quality Management Specialist Faculty of Oral and Dental Medicine Misr International University (MIU) for his great support, care, and guidance.

Also, I would like to express my most sincere gratitude to **Yassin Salah**, Assistant lecturer of Oral and Maxillofacial Prosthodontics, Misr international University for his great contribution, help and continuous support.

Last but not least, thanks and appreciation to my professors and colleagues in **Oral and Maxillofacial Surgery Department, Ain Shams university and Misr International University.**

List of Contents

	Page
Introduction	1
Review of Literature	3
• Factors influencing ridge resorption	. 4
Anatomic factors	
Metabolic factors	4
Mechanical factors	4
o Prosthetic factors	4
• The biological behavior of bone grafts	. 6
• Types of bone grafts	. 6
• Techniques of ridge augmentation	. 11
Aim of the study	28
Patients and Methods	29
• Patient selection	. 29
Sample size calculation	29
• Inclusion criteria	
Preoperative phase	30
o Patients preparation	
o Study casts	30
o Radiographic stent fabrication	30
o Preoperative radiographs	31
• Surgical phase	. 31
o Patient preparation	32
o Surgical procedure	32
- Flap design	32
- Sandwich osteotomy preparation	33
- Retro molar graft harvesting procedure	34

- The Platelet rich fibrin preparation	34
- Ridge augmentation procedure	35
- Closure of the surgical incision	36
 Post-operative instructions and medications 	36
• Clinical evaluation	37
• Radiographic evaluation	37
Linear measurements	37
o Volume calculation	38
Statistical analysis	38
Results	54
Discussion	62
Summary	71
Conclusions	73
Recommendations	74
References	75
Arabic summary	

List of Tables

Table no.	Content	Page
Table 1	The patient's demographic data.	54
Table 2	The length measurements.	56
Table 3	Descriptive statistics and results of paired t-test for comparison between length measurements before and after treatment.	57
Table 4	The width measurements.	58
Table 5	Descriptive statistics and results of paired t-test for comparison between width measurements before and after treatment.	59
Table 6	The volume measurements.	60
Table 7	Descriptive statistics and results of Wilcoxon signed-rank test for comparison between volume measurements before and after treatment.	61

List of Figures

Fig. no.	Title	Page no.
Fig.1	Radiographic stent with radiopaque (gutta-percha) markings.	40
Fig. 2	Recording preoperative measurements from the CBCT coronal view.	40
Fig.3	Para-crestal Buccal incision with careful exposure of the mental nerve.	41
Fig. 4	Performing the vertical osteotomy using the microsaw.	41
Fig. 5	Performing the horizontal osteotomy using the microsaw.	42
Fig. 6	Separation of the bone segment medio laterally using bone chisels and mallet.	42
Fig. 7	Vertical and horizontal bone cuts of the retromolar block graft.	43
Fig. 8	Separation of the block graft using bone chisels and mallet.	43
Fig. 9	Retromolar block graft harvesting.	44
Fig. 10	Milling the bone block using the bone mill.	44
Fig. 11	Blood sampling armamentarium.	45
Fig. 12	Assembled blood sampling armamentarium.	45

Fig. 13	PRF plug taken from the vacutainer after centrifugation.	46
Fig. 14	Separation of the platelet rich fibrin clot from the coagulated red blood corpuscles.	46
Fig. 15	The PRF membrane shaping between two glass slabs to take a membrane form.	47
Fig. 16	The mobilized segment was fixed to the basal bone using 2.0 plate and screws.	47
Fig. 17	The milled retro molar graft placed between the bony segments.	48
Fig. 18	The PRF membrane was placed laterally over the grafted bone.	48
Fig. 19	Surgical incision closure.	49
Fig. 20	Measuring preoperative height.	50
Fig. 21	Measuring postoperative height.	50
Fig. 22	Measuring preoperative width.	50
Fig. 23	Measuring post-operative width.	50
Fig. 24	Post-operative volume calculations.	51
Fig. 25	Calculation of the plate volume.	51
Fig. 26	Preoperative volume calculations.	52

List of charts

<u>Chart</u> no.	<u>Description</u>	<u>Page</u>
<u>Chart</u> no. (1)	Bar chart representing mean and standard deviation values of the ridge length before and after treatment.	57
<u>Chart</u> no. (2)	Bar chart representing mean and standard deviation values of the ridge width before and after treatment.	59
<u>Chart</u> no. (3)	Bar chart representing mean and standard deviation values of the ridge volume before and after treatment.	61

List of Abbreviations

Abbreviation	Term		
GF	Growth Factors		
BMP	Bone Morphogenic Proteins		
FDBA	Freeze Dried Bone Allograft		
DFDBA	Demineralized Freeze Dried Bone Allograft		
HA	Hydroxy Apatite		
ABM	Anorganic Bovine Matrix		
TCP	Tri-Calcium Phosphate		
GBR	Guided Bone Regeneration		
IAN	Inferior Alveolar Nerve		
PSP	Pedicled Sandwich Plasty		
PRF	Platelet Rich Fibrin		
CBCT	Cone Beam Computed Tomography		
HU	Hounsfield Unit		
VOI	Volume of interest		
MDCT	Multi-Detector Computed Tomography		
MSCT	Multi-Slice Computed Tomography		
EAU	Enzyme Activity Unit		

Introduction