

EVALUATION OF THE PRIMARY STABILITY OF DELAYED IMPLANT PLACEMENT IN RELATION TO HISTOLOGIC AND RADIOGRAPHIC BONE DENSITY IN MANDIBULAR POSTERIOR AREA.

(A qualitative research study)

Thesis Submitted to

The faculty of oral and dental medicine

Cairo University

In partial fulfillment of the requirements for the

Master Degree in Oral and Maxillofacial Surgery

Submitted by

Mohamed Hamdy Mahmoud

B.D.S

Modern Science and Arts University

2010

Cairo University

2016

Supervisors

Dr. Nievien Askaar

Assistant Professor of Oral and Maxillofacial Surgery
Oral Surgery Department
Faculty of Oral and Dental Medicine
Cairo University

Dr. Tarek El-Faramaoy

Lecturer of Oral and Maxillofacial Surgery
Oral Surgery Department
Faculty of Oral and Dental Medicine
Cairo University

Judgment Committee

Professor Dr. Ragia Mounir

Professor of Oral and Maxillofacial Surgery
Oral Surgery Department
Faculty of Oral and Dental Medicine
Cairo University

Professor Dr.Abdel-Men'am Abdel-Ghafar

Professor of Oral and Maxillofacial Surgery
Oral Surgery Department
Faculty of Oral and Dental Medicine
Al-Azhar University

لجنة التحكيم

استاذ دكتور . راجية منير استاذ جراحة الفم و الوجه و الفكين قسم جراحه الفم كلية طب الفم و الاسنان جامعة القاهرة

استاذ دكتور . عبد المنعم عبد الغفار استاذ جراحة الفم و الوجه و الفكين قسم جراحه الفم كلية طب الفم و الاسنان جامعة الاز هر

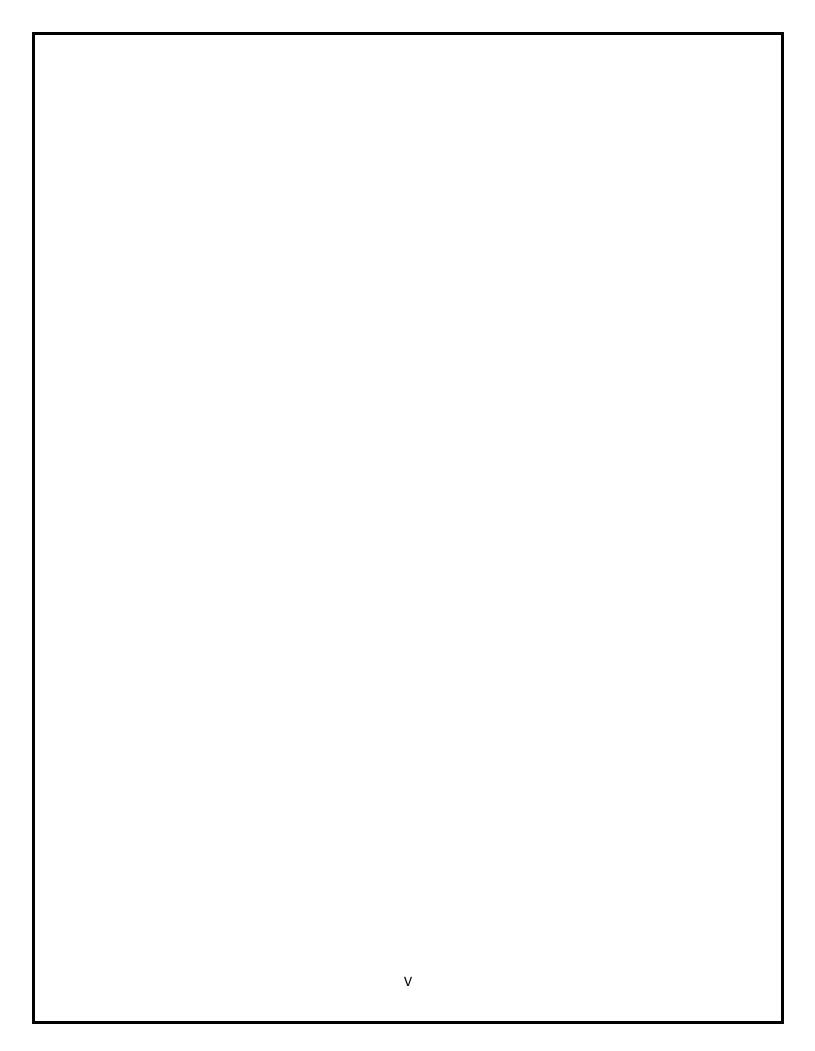
Acknowledgment

First and foremost, thanks to **Allah**.

I wish to conduct my gratitude, plentiful thanks and deep appreciation to *Dr. Nieven Askaar*, Assistant professor of Oral and Maxillofacial Surgery, Faculty of Oral and Dental Medicine, Cairo University, for her precious advice, critical help, wise opinion, infinite support and meticulous assistance that lead to realization of this thesis. It is of great honor to work under her supervision.

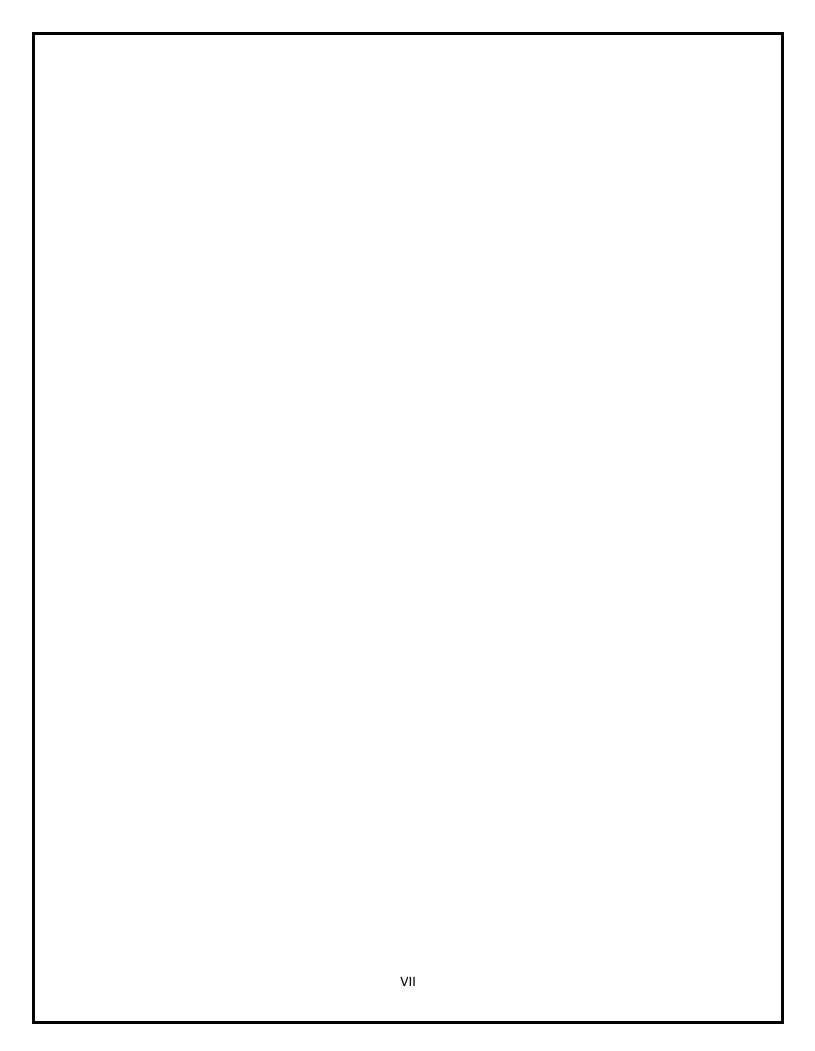
Words can't adequately express the deepest feeling of gratitude and genuine appreciation to *Dr. Tarek El-Faramaoy*, Lecturer of Oral and Maxillofacial Surgery, Faculty of Oral and Dental Medicine, Cairo University, for his limitless efforts, and time he spent in guidance all through this work to direct my steps. I owe him much more than gratitude and appreciation.

My deepest thanks to my parents, my brothers, my friends, and my mentor Dr. Moustafa Abdel-Hady for their love, care, encouragement, and everlasting help throughout my life.



CONTENTS

List of abbreviations	Ι
List of charts	II
List of figures	III
List of tables	IV
Introduction	1
Review of literature	3
Aim of the study	34
Materials and methods	36
Results	55
Discussion	63
Summary	68
conclusion	70
Recommendations	72
References	74
Arabic summary	93



LIST OF ABBREVIATIONS

RF Resonance Frequency

RFA Resonance Frequency Analysis

ISQ Implant Stability Quotient

CT Computered Tomography

CBCT Cone Beam Computered Tomography

CRA Cutting Resistance Analysis

RTT Reverse Torque Test

BIC Bone Implant Contact

RTV Removal Torque Value

DMC Dental Mobility Checker

FFT Fast Fourier Transform

POWF Pulsed Oscillation Waveform

AED Acousto Electric Driver

AER Acousto Electric Receiver

PTV Periotest Value

PDL Periodontal Ligament

SLA Sandblasting and Acid etching

LIST OF CHARTS

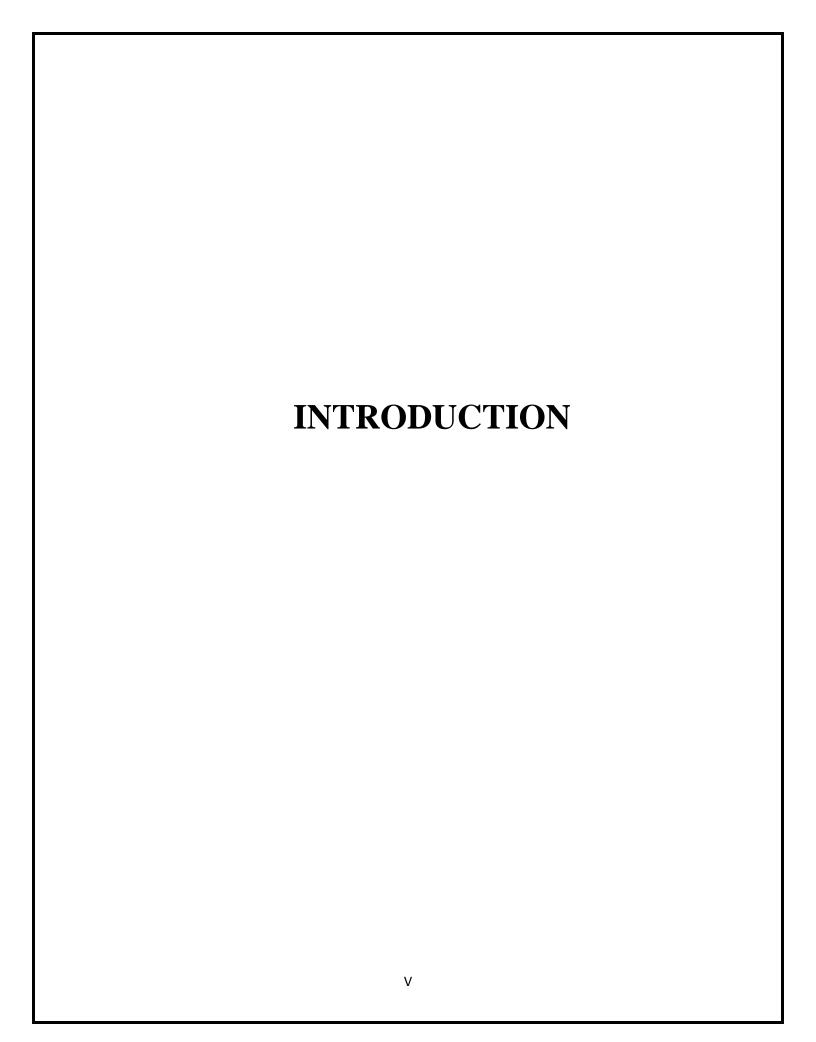
Chart No.	Title	Page
1	A pie chart shows implants placed in males and females	57
2	A pie chart shows percentage of implants in males and females	57
3	A pie chart shows percentage of implants in molars and premolars	58
4	A column chart shows average bone density in molars and premolars	59
5	A column chart shows average implant stability in molars and premolars	59
6	A column chart shows final torque in molars and premolars	60
7	A pie chart shows percentage of cortical and spongy bone	60
8	An X Y (scatter) chart Shows significant correlation between age and bone density	61

LIST OF FIGURES

Figure	Title	Page
No.		
1	Ridge width measurement	41
2	Incision	41
3	Flap reflection	42
4	Trephine bur	42
5	Bone core biopsy	43
6	Fixture placement	٤4
7	Closure	٤5
8	Components of the OstellTM	٤6
9	ISQ measurement	٤7
10	Smartpeg placement	٤8
11	Bucco-lingual ISQ measurement	٤9
12	Bone density measurement	51
13	x40 Masson's trichrome stain of the bone core biopsy	52
14	x40 Hematoxylin and Eosin stain of the bone core	52
4 =	biopsy	. 0
15	x100 Hematoxylin and Eosin stain of the bone core	03
4.6	biopsy	. 0
16	x100 Masson's trichrome stain of the bone core	03
1.7	biopsy	~ 4
17	suprastructure placement	54
18	shows measurement of cortical and spongy bone	61

LIST OF TABLES

Fable	Title	Page
No.		
1	shows descriptive statistics of age, maximum bone	39
	density, implant stability, starting and final torque	
2	shows percentage of bone density type	56
3	Shows descriptive data of age, gender, and site of	58
	implant placement	



INTRODUCTION

The goal of modern dentistry is to restore the patient to normal contour, function, comfort, esthetics, speech, and health, whether by removing caries from a tooth or replacing several teeth. What makes implant dentistry unique is the ability to achieve this goal, regardless of the atrophy, disease, or injury of the stomatognathic system. The more missing teeth, the more challenging this task becomes. As a result of continued research, diagnostic tools, treatment planning, implant design, materials and techniques; predictable success is now a reality for rehabilitation of many challenging clinical situations. ¹

Bone is an organ that is able to change in relation to a number of factors including hormones, vitamins, and mechanical influences. However biomechanical parameters such as duration of edentulous state are predominant. Every change in the form and function of bone or of its function alone is followed by certain definite changes in the internal architecture, and equally definite alteration in its external conformation in accordance with mathematical laws. ²

The implant stability, indirect indication of osseointegration, is a measure of clinical immobility of implants. Adequate stability of an implant in the surrounding bone is essential to allow undisturbed healing and bone formation to occur following placement and also to permit optimal stress distribution from