

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**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 الازهر

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	I
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	Computed Tomography
CBCT	Cone Beam Computed 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 No.	Title	Page
1	Ridge width measurement.....	41
2	Incision	41
3	Flap reflection	42
4	Trephine bur	42
5	Bone core biopsy	43
6	Fixture placement.....	44
7	Closure.....	45
8	Components of the Ostell™.....	46
9	ISQ measurement	47
10	Smartpeg placement	48
11	Bucco-lingual ISQ measurement	49
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 biopsy	52
15	x100 Hematoxylin and Eosin stain of the bone core biopsy	53
16	x100 Masson's trichrome stain of the bone core biopsy	53
17	suprastructure placement.....	54
18	shows measurement of cortical and spongy bone.....	61

LIST OF TABLES

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

INTRODUCTION

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