

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(وَعَلَّمَكَ مَا لَمْ تَكُنْ
تَعْلَمُ وَكَانَ فَضْلُ اللَّهِ
عَلَيْكَ عَظِيمًا)

صدق الله العظيم

سورة النساء آية (١١٣)

Comparison Between Two Different
Implant Positions Supporting Mandibular
Partial Overdenture (KENNEDY CLASS II)

Thesis

*Submitted to the Partial Fulfillment of a Master
Degree in Prosthodontics*

By

Enas Taha Darwish

B.D.S.

(CAIRO UNIVERSITY)

2003

Faculty of Oral and Dental Medicine

Cairo University

2010

SUPERVISORS

Dr. Mohammad Abd El Monem Nada

Professor of Prosthodontic department

Faculty of Oral and Dental Medicine

Cairo University

Dr. Ehab M. Aboul Rous

Associate Professor of Prosthodontic department

Faculty of Oral and Dental Medicine

Cairo University

Acknowledgment

First and foremost, I am greatly thankful to ALLAH for granting me the power to accomplish this work.

I was fortunate to conduct this work under the supervision of **Dr. Mohammad Abd El Monem Nada** *Professor and chairman of Prosthodontic department*, Faculty of Oral and Dental Medicine, Cairo University; I am in deep gratitude for his faithful supervision and guidance.

I am deeply grateful to **Dr. Ehab Abou.El Roos**, *Associate professor of Prosthodontic department*, Faculty of Oral and Dental Medicine, Cairo University, for his unlimited patience, considerable help and for all the valuable time he has generously given to me.

A special gratitude and thanks are owed to **Dr. Ala'a Abou El Ela** *Professor of Prosthodontic department*, Faculty of Oral and Dental Medicine, Cairo University, for her meticulous supervision, constant care, support and encouragement and for the unlimited generosity the mother could give to her daughter.

Finally, I wish to express my sincere gratitude to all my professors, staff members and colleagues for their endless-cooperation.

Dedications

To my Dear Parents

For Their Sincere Pray To Allah for Me

To My Father and Mother In-law

Who Were Supported Me all the Way Through

For The Most Precious Gift My God Gave To

Me, My Dear Husband, My Prince Marwan

And Princess Lama

Enas Taha

List of Contents

Title	Page No
INTRODUCTION	1
REVIEW	
• Distal Extension Removable Partial Denture	3
• Problems associated in the treatment of Kennedy class II cases	3
• Principles Of Solving Problems Of Distal Extension	5
• Principles of using dental implant as a prosthetic option for partially edentulous patients	16
• Dental Implants	17
• Osseointegration	22
• Implant success	23
• Partial Overdentures	24
• Methods of Evaluation Of Osseointegrated Implant in The Supporting Structures(Radiographic Assessments)	27
-conventional radiography	27
-specialized radiographic imaging	29
• Marginal Bone Height Assessment	30
• Marginal Bone Density Assessment	30
AIM OF THE STUDY	33
MATERIALS AND METHODS	34

RESULTS	65
DISCUSSION	77
• Discussion of Methodology	77
• Discussion of Results	81
SUMMARY AND CONCLUSION	83
BIBLIOGRAPGY	85
ARABIC SUMMARY	-

List of Figures

Fig No	Name	page
Figure 1	Kennedy class II (patient oral cavity)	38
Figure 2	Radiographic template with stainless steel balls	38
Figure 3	Digital panoramic x-ray with metal balls corresponding to the implant position	39
Figure 4	Study cast with surgical template	41
Figure 5	Implant in its sterile package	42
Figure 6	Surgical kit	42
Figure 7	Surgical template inside patient mouth	46
Figure 8	Surgical incision and flap reflection with mucoperiosteal elevator	46
Figure 9	Drilling of implant bed	47
Figure 10	Complete preparation of implant bed	47
Figure 11	Implant top flushed with bone surface	49
Figure 12	Suturing	49
Figure 13	Healing collar (dome –shaped)	53
Figure 14	Metal framework on master cast	53
Figure 15	Metal framework inside patient mouth	54
Figure 16	Creating a space in fitting surface of denture base at area of superstructure	54
Figure 17	Acrylic radiographic template with film holder	59
Figure 18	XCP	60
Figure 19	X-ray machine with mounted long cone	60
Figure 20	Patient sitting on X-ray machine with mounted	61

	Long cone	
Figure 21	X-ray film show the mesial and distal bone height measurement	63
Figure 22	X-ray film show bone density measurement	64
Figure 23	A histogram showing the means values of students t-test for comparison between bone density in the two groups	70
Figure 24	A histogram showing The means values of student-test for comparison between bone height measurements in the two groups.	76

List of Tables

No	Name	Page
Table 1	The mean differences, standard deviation values and results of paired t-test for the changes by time in mean bone density of molar group	65
Table2	The mean differences, standard deviation (SD) values and results of paired t-test for the changes by time in mean bone density of premolar group	67
Table 3	The means, standard deviation (SD) values and results of Student's t-test for comparison between bone density in the two groups	69
Table 4	The mean differences, standard deviation (SD) values and results of paired t-test for the changes by time in mean bone height of molar group	71
Table5	The mean differences, standard deviation (SD) values and results of paired t-test for the changes by time in mean bone height of premolar group	73

Table 6	The means, standard deviation (SD) values and results of Student's t-test for comparison between bone height measurements in the two groups	75

INTRODUCTION

The osseointegrated dental implants are widely used and became the key for success during treatment planning for several complicated situations especially to retain and/or support prosthesis for a variety of tooth loss.

The use of implants to support a unilateral distal extension removable partial denture may challenge the tooth-tissue support nature with its shortcomings to tooth-implant nature with its possible beneficial effects.

The clinical success and longevity of osseointegrated implant depends largely on the treatment plan which is responsible for the design, number and position of the implant.

The position and number of implant could be determined in order to define the geometric support capacity for prosthesis; it optimizes a wide distribution of stress and satisfactory esthetics **Duyek et al., (2000)**.

A critical factor that affects the outcome of implant treatment is the distribution of occlusal forces to the bone-implant interface via the implant and the superstructure. **Korioth et al., (1998)**.

The mesiodistal dimension depends on available bone, root proximity of adjacent teeth, access of the instrumentation and labial height of contour of the tooth to be restored. Initial guide lines for the placement of implant into partially edentulous patient have been confirmed in recent studies.

To maintain the bone that supports the interproximal soft tissues between tooth and implant, there must be a distance of 2mm. **Tarnow D, (1999).**

Although posterior implant restorations are rarely displayed in the esthetic zone, proper planning will result in natural looking, esthetically pleasing restoration.

The number of implant and their positions are determined after evaluating the prosthetic needs in terms of additional abutments and bone morphology, as many implants as possible are placed in posterior regions to increase the support in the area at which the largest load will occur.

REVIEW OF LITERATURE

DISTAL EXTENSION REMOVABLE PARTIAL DENTURE:

Glossary of Prosthodontic Terms, 2005, Extension base removable partial denture is defined as removable partial denture supported and retained at one end of the denture base and in which a portion of the function and load is carried by residual ridge.

Curtis et al., 1999, proved that mandibular distal extension cases are found more common than the maxillary ones due to the general pattern of tooth loss and among the various partially edentulous conditions, distal extension cases are perhaps the most common.

PROBLEMS ASSOCIATED IN THE TREATMENT OF KENNEDY CLASS II CASES:

Absence of distal abutment is considered as a problem for both dentist and patients. Many authors tried hardly among their studies and researches to solve this problem, for this reason, Extraction of distal abutments should be avoided whenever possible (**keng, 1996**).

The distal extension removable partial denture has the greatest potential for applying harmful leverage induced load to the abutment teeth.

Monteith, 1984, reported that the resiliency of the mucoperiosteum of the residual ridge is about twenty five times greater than that of the periodontal membrane surrounds the abutment teeth. Moreover, as a result

of this big difference in the nature of support between mucoperiosteum of residual ridge and periodontal membrane of abutments teeth, the distal extension removable partial denture tends to rotate about its most posterior abutment teeth. This rotation will induce heavy stresses on abutment teeth and high vertical force to residual ridge that lead to excessive bone resorption.

Grasso and Millar, 1992, reported that in cases of distal extension base the torsion forces are transmitted to the abutment through the direct retainer, so the direct retainer affects the abutment teeth health and longevity.

Ogata et al., 1992, mentioned that rotation of the distal extension base around fulcrum line takes place inducing heavy torsion stresses on the anterior abutment teeth leading to its looseness.

Lecher and McGregor, 1994, mentioned that the abutment teeth near the saddle in distal extension base cases are more risky than that with tooth bounded cases.

McGivney and Castleberry, 1995; Keng, 1996, pointed out the fact that absence of direct retention of posterior denture base is one of the main problems in distribution of occlusal stresses between the two different supporting structures of distal extension prosthesis. For this reason, whenever possible distal abutment should be preserved.

Mitrani et al., 2003, reported that the common complaints associated with the Kennedy class I and class II removable partial denture cases are the lack of stability, retention and unaesthetic retentive clasp. Moreover, difficulty in the rehabilitation is occurred due to the difference in resiliency between the dental and mucosal nature of support.

McGivney & Carr, 2005, added that the lack of adequate posterior