

Effect of Implant Insertion Time on the Supporting Structure of Implant Supporting Mandibular Overdenture

A thesis Submitted to the Faculty of Dentistry
Ain-shams University in Partial Fulfillment of
the requirement for the Master Degree in oral
and maxillofacial prosthodontics.

By

Omnia Mohamed Sameh Omar Alsayed Refaie

B.D.S. (Ain Shams University 2012)

Faculty of dentistry

Ain-shams Univeristy

2018

Supervisors

Prof.Dr.Hany Ibrahuim Eid

Professor of Removable Prosthodontics

Faculty of Dentistry

Ain Shams Univeristy

**Dr.Marwa Kothayer Abd
Elhakeem**

Lecturer of prosthodontics

Faculty of dentistry

Ain-shams Univeristy

Acknowledgement

All praise is to Allah, for giving me the strength, patience, and persistence to complete this work.

I would like to express my thanks and gratitude to Prof. Dr.Hany Eid, Professor of prosthodontics, Faculty of Dentistry, Ain-Shams University for his great support, valuable advice and precious time in guiding and teaching me throughout this study. Working under his supervision was both a great opportunity to learn and a big honor that I will always be proud of throughout my academic and professional career.

Also, I am extremely grateful to Dr.Marwa Kothayer, Lecturer of prosthodontics, Faculty of Dentistry, Ain-Shams University for her encouragement, support and for revising this study. Without her help and guidance it would have never been possible to finalize this research.

I would also like to express my thanks to Prof. Dr.Marwa Ezzat Sabet, Professor of prosthodontics and Head of the Department, Faculty of Dentistry, Ain-Shams University for providing the necessary equipment for the study.

Also, I would like to extend my thanks to all staff members of the prosthodontics Department, Faculty of Dentistry, Ain-Shams University for their encouragement and support throughout this research.

Finally, all words can never express my gratitude and appreciation for all the love and support I was surrounded by from my family and my husband, without whom this study would have never seen the light.

.

Dedication

I dedicate this work to:

My loving parents; for providing me with unlimited support and continuous encouragement. This accomplishment would not have been possible without them. Thank you, love you so much.

My wonderful husband; I certainly would not have accomplished this without his everlasting encouragement, patience, commitment and support.

My brothers ahmed and ashraf; for their endless support and their help.

List of Contents

	page
Introduction	1
Review of literature	3
I. Edentulism	3
II. Residual ridge resorption	5
III. Treatment options for partially edentulous patients	9
A) Fixed bridge	9
B) Removable partial denture	9
C) Tooth supported overdenture.	10
IV) Treatment options for completely edentulous patients	12
A) Complete denture.	12
B) Overdenture	13
1) Implant supported overdenture.	15
2) All on four.	
C) Full mouth rehabilitation of a patient with implant retained hybrid restoration.	15
V) Osseointegration of Dental Implants.	17
VI) Loading protocol of Dental Implant.	19
A) Conventional Loading.	19
B) Immediate Loading.	20
C) Progressive Loading.	21
VII) Timing of implant placement	23
A) Late Implant placement.	23
B) Early Implant placement.	24

C) Immediate Implant placement	24
1) Advantages of immediate implant placement.	25
2) Disadvantages of immediate implant placement.	25
3) Keys for success of immediate implant placement:	27
a) Facial bone integrity.	27
b) Facial bone thickness.	27
c) Horizontal gap.	27
d) Primary stability.	29
e) Thickness of soft tissues.	29
f) Tooth extraction atraumatically.	30
4) Indications and contraindication of immediate implant placement.	32
VIII) Methods of evaluation	34
A) Clinical evaluation	34
1) Pocket depth	34
2) Stability:	34
a) Stages of stability.	34
b) Measuring methods	35
i. Cutting torque resistance analysis.	35
ii. Percussion test.	35
iii. Periotest.	35
iv. ostell.	36
v. Plaque assessment	36
B) Radiographic evaluation	36
1) periapical radiograph	37
2) occlusal radiograph	38
3) panoramic radiograph	38
4) Computed tomography	39
5) Cone beam c.t	39
Aim of the study	42
Materials and methods	43
Results	69

Discussion	83
Summary	94
Conclusion	96
References	97
Arabic summary	

List of Figures

Fig. No.	Title	Page
1	Mandibular edentulous ridge (Group A patients)	44
2	Mandibular edentulous ridge with remaining two teeth at interforminal area (Group B patients)	44
3	Centric jaw relation	48
4	Upper secondary impression	48
5	Try in stage (Group A patients)	50
6	Lower denture with two radiographic markers (gutta percha)	50
7	Cone beam c.t using lower denture with two radiographic markers (Group A patients)	51
8	Cone beam c.t showing two remaining mandibular teeth (Group B patients)	51
9	Two marked locations for implants position (Group A patients)	54
10	Lingual crestal incision (Group A patients)	54
11	Implant insertion with ratchet	56
12	Implant in its marked position (group A patients)	56
13	Inserted ball abutment	57
14	Two ball abutments joined to two implants	57

15	simple interrupted sutures	58
16	Relieved denture	58
17	Peozotome	59
18	Extraction socket after tooth removal atraumatically	59
19	Drilling through extraction socket(Group B patients)	61
20	Implant insertion with torque ratchet	61
21	Implant inserted apical to crestal bone of the socket (Group B)	62
22	Inserted ball abtument (Group B patients)	62
23	Lower denture relined with soft liner	65
24	Two ball abutments after healing	65
25	Block out shims and metal caps inserted around implants	66
26	patient closing in centric relation while doing direct pick up of acrylic resin	66
27	Denture after pick up of metal housings	67
28	Measurment of bone height around implant at sagittal and coronal views	67
29	Column chart showing mean difference of peri-implant bone height loss in group A (delayed implant insertion) at different surfaces in each of the follow –up periods	70

30	Column chart showing mean difference of peri-implant bone height loss in group B (immediate implant insertion) at different surfaces in each of the follow –up periods	72
31	Column chart showing mean difference of peri-implant bone height loss in group A (delayed implant insertion) at different follow –up periods in each surface	74
32	Column chart showing mean difference of peri-implant bone height loss in group B (immediate implant insertion) at different follow –up periods in each surface	76
33	Column chart showing mean difference of peri-implant bone height loss in both groups at different follow –up periods in each surface	79
34	Column chart showing mean difference (mm) of peri-implant bone height loss around implants for both groups during the follow-up periods	81

List of Tables

Table No.	Title	Page
I	Mean difference, standard deviation of peri-implant bone height loss in group A (delayed implant insertion) and p value measured at different surfaces in each of the follow –up periods (ANOVA test)	70
II	Mean difference, standard deviation of peri-implant bone height loss in group B (immediate implant insertion) and P-value measured at different surfaces in each of the follow –up periods (ANOVA test)	72
III	Mean difference, standard deviation of peri-implant bone height loss in group A (delayed implant insertion) and p- value measured at different follow –up periods in each surface (ANOVA test)	74
IV	Mean difference, standard deviation of peri-implant bone height loss in group B (immediate implant insertion) and p- value of different follow –up periods in each surface (ANOVA test)	76
V	Mean difference (mm), standard deviation and p- value of peri-implant bone height loss measured at buccal, lingual, mesial, and distal surfaces for group A and B patients during the follow-up period	78

VI	Mean difference (mm), standard deviation and P value of T test of peri-implant bone height loss around the implants for both groups during the follow-up period	81
----	--	----

Introduction

For several decades conventional complete denture was the treatment of choice for completely edentulous patients.

Mandibular complete dentures have well known problems in retention and stability unlike maxillary denture due to presence of large palatal vault and suction force.

Tooth supported overdentures have well documented problem that patient should achieve good oral hygiene to protect abutments against caries and periodontal disease and it is bulkier than conventional denture.⁽¹⁾

Dental implants changed the concept of removable prosthodontics treatment options and expectations. Such treatment modalities need careful diagnoses, good treatment planning, long term evaluation to assure success and survival.^(2, 3)

Two Implant supported overdenture is considered the most popular treatment modality of lower edentulous ridge as implant provides support, retention and patient satisfaction.

A two stage surgical technique was originally supported in order to enhance the process of new bone formation and remodeling, following implant placement.

In one-stage surgical procedures, flaps are sutured around the polished neck of implants avoiding the need for second stage surgical intervention.

The concept of progressive loading based on the idea that low grade bone stimulation of gradual loading will allow bone to mature, grow denser and improve in quality

Cone beam CT is used during implant treatment planning to measure accurately the height and the width of bone and to avoid placing of implants in vital structures such as inferior alveolar nerve and mental foramen

Conventional implant practice dictates a delay between tooth extraction and implant placement, dividing the treatment into two steps.

Delayed implant placement can ensure that surrounding tissues have time to heal properly.

Immediate implant placement reduces the number of surgical procedures. This fact is being popular among patients and increases their acceptance, that prefer submit themselves into fewer surgical interventions.

Many dentists and patients prefer to place immediate implant rather than preserving a tooth with poor prognosis to preserve the remaining bone from resorption.

So the question raised now which is better immediate or delayed implant placement?

REVIEW OF LITERATURE

I) Edentulism:

Edentulism is defined according to the glossary of prosthodontics as the state of being edentulous without natural teeth which is divided into two major categories: 1) complete edentulism 2) Partial edentulism.⁽⁴⁾

Edentulism is a debilitating and irreversible condition and is described as the "final marker of disease burden for oral health".⁽⁵⁾

Complete edentulism has become less frequent as a result of recent breakthroughs in dental technologies and materials as well as higher public awareness due to frequent conservative and preventive programs.⁽⁶⁾

The risk factors for tooth loss are plenty. Dental diseases such as caries and periodontitis are among the most frequent risk factors. Poverty, ignorance and unhealthy hygienic habits such as smoking and alcoholism are also common risk factors. Systemic diseases such as diabetes and osteoporosis could also be counted as risk factors. Given the large number of those diverse risk factors, one cannot single out one risk factor as the most threatening.⁽⁷⁾

Edentulism has a negative impact on oral and general health. Oral consequences vary from the well-known residual ridge resorption to an impaired masticatory function and this will lead to an unhealthy diet, social disability, and poor oral health quality of life. Edentulous individuals are also in greater risk for different systemic diseases and