

**Effect Of Using Resilient Attachment
On Different Cantilever Bar Length On
Supporting
Structures Of Implant Supported
Overdenture**

Thesis

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List Of Contents

Introduction.	1
Review of literature	3
I-Implants.	5
Types of Dental Implants:	7
Types of Endosseous implant	11
1-Ramus implant	11
2-Chercheve vent screw or Chercheve piral post implants.	11
3-Linkow vent screw.	12
4-Frialit implant.	12
5-Flexi root implants	12
6-Vitreous carbon.	12
7-Cylindrical endosseous.	13
8-Linkow blade vent.	15
9-Titanium plasma coated screw (TPS)	17
10 -The ITI hollow cylinder and hollow screw system:(ITI: international team for oral implantology)	17
11-.Lew threaded screw:	19
II-Implant supportedoverdentures	21
III- Attachments.	26
1-Intra Coronal attachment	26
2-Extra-Coronal attachments	26
IV-Distal cantilever bar extension.	34
V-Methods Available for StressAnalysis	36
1-Strain gauges.	36
2-Photoelastic techniques.	37
a) Two dimensional model analysis.	37
b) Three-dimensional model analysis.	38
c) Photoelastic coating technique.	38
3-Finite element analysis	38
Aim of the study	40
Materials and methods	41

I.Acrylic model construction.	41
II.Abutment preparation.	45
III.Construction of the bar design containing resilient attachment.	48
IV.Construction of the overdentures.	50
V.Simulation of mucosa.	54
VI.Strain gauge Installation.	54
VII.Load application and Strain measurement tests:	57
Statistical assesement.	59
Results	60
Discussion of Materials and Methods.	65
Discussion of result	73
Summary	76
Conclusions	78
References.	79
Arabic summary.	106

List Of Figures

Fig.(1)	The implants were placed in the interforaminal region using wax	43
Fig.(2)	Duplicating silicon was used to block out all undercuts labially and lingually.	43
Fig.(3)	The impression was taken using putty rubber base additional silicon impression in copper flask	44
Fig.(4)	The duplicated acrylic cast containing the four fixtures in place.	44
Fig.(5)	The milling machine.	46
Fig.(6)	The angulations of the abutments were adjusted using tapered stone of the milling machine.	46
Fig.(7)	The wax was build upon the sleeve abutments.	47
Fig.(8)	Trimming of the copings was done using 15 ⁰ bur.	47
Fig.(9)	The bar connecting the copings was held with mandrel.	49
Fig.(10)	At the distal end of distal extension, ball attachment was adjusted and sealed with pink wax.	49
Fig.(11)	Spruing was performed for both designs.	51
Fig.(12)	Finished and polished abutments.	51
Fig.(13)	Space created in the fitting surface of the overdenture for the first design with clips was positioned in place.	53
Fig.(14)	Space created in the fitting surface of the overdenture for the second design with clips was positioned in place.	53
Fig.(15)	Even thickness of the light body was used for mucosal simulation.	55
Fig.(16)	Strain gauges were supplied with fully encapsulated grid and attached wires.	55
Fig.(17)	strain gauges.	56
Fig.(18)	The wires of the strain gauges were fixed in position using adhesiverecommended by the manufacturer	56
Fig.(19)	Universal testing machine.	58
Fig.(20)	Unilateral load was applied at the central fossa of the left second premolar.	58

Fig. (21)	Mean value of microstrain induced on different sites in design I.	61
Fig. (22)	Mean value of microstrain induced on different sites in design II.	62
Fig. (23)	Mean and Standard Deviation values of recorded microstrains at the left and right ridges.	64
Fig. (24)	Mean and Standard Deviation values of recorded microstrains at the left and right abutments.	64

List Of Tables

Table (I)	Mean values and Standard Deviation (SD) and results of Anova for microstrains induced on abutments and ridge for model design I.	60
Table(II)	Mean values and Standard Deviation(SD) and results of Anova for microstrains induced on abutments and ridge for model design II.	62
Table (III)	Mean and Standard Deviation and result of student t-test for microstrains at the abutment and ridge in different designs.	63

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

﴿وَقُلْ رَبِّیْ زَدَنِیْ عِلْمًا﴾

صَدَقَ اللّٰهُ الْعَظِیْمُ

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Introduction

Implant reconstruction and rehabilitation provide the patients with the opportunity to recapture lost masticatory function restore esthetic and achieve a greater sense of well being of thousands of seriously debilitated edentulous mouths that have been dramatically rehabilitated using osseointegrated fixtures that maintain fixed and removable appliances ⁽¹⁾.

Implant supported over denture was usually used to achieve stress distribution especially when the opposing arch has natural teeth. It was also indicated for patients with sensitive mucosa, and extreme gag reflex.

Overdentures were sometimes designed to overlie implants with attachments as bars, stud attachments, or magnets ⁽²⁾.

Four to six implants were usually required to provide support for the overdenture. Bar was usually used to rigidly connect the implants in the anterior region. Bar clip was placed in housing made in the fitting surface of the denture to overly and fit the bar ⁽³⁾.

The overdenture bar attachments were classified by their biomechanical behavior into rigid and resilient attachment. In an attempt to minimize the undesirable forces transmitted to the overdenture supporting structures, a short (8 mm) and long (16 mm) distal cantilever extension bar have been suggested.

Cases that require increased retention such as compromised ridge and cases exhibiting high muscle attachments, prominent mylohyoid ridges have been indicated for cantilever bars. The cantilever design may satisfy the increased demand for retention and tissue protection providing a more economic treatment approach ⁽⁴⁾.

In spite of the functional advantages offered by cantilever supported prosthesis, the distal cantilever bar may cause bending moments which may lead to mechanical failure and subject the abutments and their supporting structures to excessive bone resorption. Many experimental stress analysis methods have been employed to evaluate biomechanical loads. These techniques compromise photoelastic stress analysis, strain gauge analysis, holographic interferometry and finite element stress analysis ⁽⁵⁾.

Although, long term studies have been published evaluating the generalized effect of overdenture attachment on denture supporting structures, however there was rareness of studies on the effect of the length of distal extension cantilever bar retained design on the overdenture supporting structures. Thus this study was done to evaluate the effect of using resilient attachment on different cantilever bar length on the supporting structures of implant supported overdenture.

Review of literature

Overdenture was defined according to the glossary of prosthodontics as a removable partial denture or complete denture that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a prosthesis that covers and was partially supported by natural teeth, natural tooth roots, and/or dental implants and called also overlay denture, overlay prosthesis, superimposed prosthesis.

Overdenture should be considered a preferred alternative to complete denture therapy especially in patients with badly worn down teeth. Overdenture was indicated for the treatment of cases, suffering from severe attrition associated with Dentinogenesis Imperfecta. The use of cast coping will protect the soft remaining dentition without exerting excessive stresses on the abutments ^(6,7).

Overdenture was indicated for patients with cerebral palsy as they often have difficulty in chewing, speaking and swallowing because of the involuntary muscle spasms caused by their condition. These problems also make it very difficult or even impossible for them to wear complete mandibular dentures.

In addition, overdenture was preferred than complete dentures for the treatment of irradiated patients to decrease the risk of osteoradionecrosis and to enhance stability and retention especially in xerostomic patient ^(8,9)

The use of maxillary overdenture has been suggested to minimize the destructive changes observed in combination syndrome

in individuals rehabilitated with single denture opposing a bilateral distal extension mandibular removable partial denture ⁽¹⁰⁾.

Contraindications for overdenture were relatively few and, above all, were related to the absence of patient's motivation to maintain an acceptable oral environment. Overdenture was contraindicated when the remaining natural teeth were adequate to restore the dental arch with fixed or removable partial denture ^(11, 12).

It was also contraindicated in cases with insufficient interarch distance and poor oral hygiene. The presence of bony prominence may prevent the insertion of a denture with complete labial flange ^(13, 14).

I- Implants:

Dentistry has long thought a superior method of tooth replacement through dental implants which support overdenture and fixed prosthesis ^(15, 16).

Implantation is the placement of inert alloplastic materials onto or into the jaw bones for the purpose of supplying artificial abutments for retention of a bridge or denture. Most dental implants are supportive and are able to transmit functional occlusal loads directly to the underlying bone ^(17, 18).

The material to be implantable should be strong enough to resist fracture with over load, of multiple shapes, sizes, with various physical properties, and able to resist corrosion. It must distribute forces of mastication to interfacial tissues in a manner to ensure long term of viability of the implant. Titanium plasma sprayed alloys, porous coated titanium alloys, titanium alloys, alumina, hydroxylapatite, stainless steel, tantalum, vitallium, and vitreous carbon were different materials which were being used ^(19, 20).

Implantation, was primarily indicated in cases of extreme bone atrophy or poor bone quality that were not feasibly treated with a fixed prosthesis and cases in which proper esthetics cannot be achieved. Cases of distal extension were best treated by the placement of at least one implant fixture on the edentulous side to balance the support ⁽²¹⁾.

It was used effectively to keep the facial skeleton intact and to splint the adjacent teeth which have advanced mobility prolonging their