Salwa Akl

بسم اللّه الرحمن الرحيم

مركز الشبكات وتكنولوجيا المعلومات

قسم التوثيق الإلكتروني

Salwa Akl

جامعة عين شمس

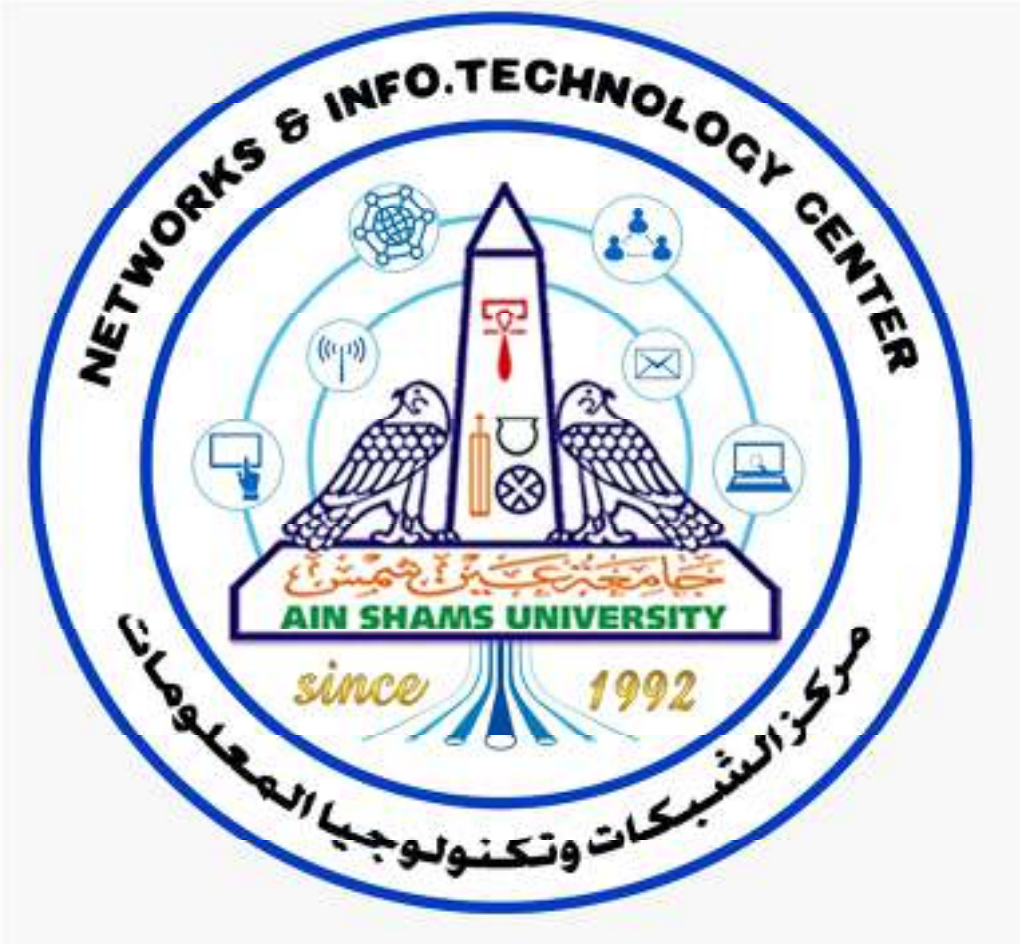
التوثيق الإلكتروني والميكروفيلم

قسم

نقسم باللّه العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

Salwa Akl



بعض الوثائق الأصلية تالفة
وبالرسالة صفحات لم ترد بالأصل

Comparative Evaluation of two Different Designs for Restoring Unilateral Mandibular Distal Extension Using Clinical , Radiographic and Three Dimensional Finite Element Analysis .

Thesis submitted in partial
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بسم الله الرحمن الرحيم

"وما أوتيتم من العلم إلا قليلا"

صدق الله العظيم

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To my Family

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Introduction

Introduction

Distal extension base is defined as a removable partial denture base supported and retained by natural teeth at one end of the denture base , and in which a portion of the functional load is carried by the residual ridge . Unilateral distal extension removable partial denture is a removable partial denture replacing the distal most tooth or teeth on one side of the arch.(Glossary of Prosthodontic terms 1994)

An important role of all prosthetic restorations of the partially edentulous arch is to protect and preserve the supporting tissues and to optimize the distribution of the functional load to the abutments and the edentulous ridge (Kraft and Dent 1997) .

The free end saddle removable partial denture drives its support from two different types of tissues, the abutment supporting the prosthesis anteriorly is less displaceable through the periodontal ligament than the denture base posteriorly which rests on the more displaceable soft tissue overlying the edentulous alveolar ridge. These two tissues have different degrees of displaceability where the soft tissue is four to twenty times displaceable than a healthy abutment. This difference results in uncontrollable movements of partial denture (Ogata et al 1992). As the distal extension removable partial denture is subjected to vertical, horizontal and rotational forces that may become adverse functional and para functional activities .(Krol et al 1990)

The challenge in designing removable partial prosthesis is always to align the forces as vertical as possible and to distribute the stresses optimally not to exceed the physiologic tolerance of teeth supporting structures. The stresses which can adversely affect the

removable partial denture are often compensated for some extent by framework and denture base design variations (Giffen 1996).

Attempts for improving the design of prosthesis to protect the abutment teeth still a topic for research for many years. The RPI (mesial rest ,proximal plate , I bar) and RA (reversed Aker) assemblies are designed to give the denture framework some freedom to move tissueward under occlusal stresses , therefore minimizing damage to the abutment teeth.

Blatterfein et al (1976) noticed that wearing partial dentures may cause damage to the oral tissues and abutment teeth. The damage may be caused by failure to recognize the oral changes. The most common trouble observed in patients wearing partial dentures was ridge resorption under the saddle. Page (1975) reported that the use of natural teeth in function transmits stresses to the supporting alveolar process, which could be physiologically helpful serving to increase the density and strength of alveolar bone, while traumatic forces transmitted to the supporting bone might cause resorption and reduced density of supporting bone.

Numerical techniques offer evaluation of stress and deformation fields by making use of computer based models .They are used for bodies of extremely complex configuration. In numerical solutions , a high degree of accuracy can be obtained . Finite element method is powerful and can be obtained relatively accurately . In less than two decades it has become one of the most popular methods for stress analysis. (Knoel 1977).

Intra oral conventional radiographs are considered a primary and very important diagnostic method used for assessment of bone

support as well as for detection of minor osseous changes . Visual comparison of conventional radiographs is not adequate to detect slight bone changes over a short time. Using the principles of digital subtraction radiography and gray level changes enable higher detect ability of small bone changes over a short period compared to the conventional methods. (Jeffcoat 1992).

Many designs were suggested for the restoration of the unilateral free end saddles. The present study had compared two designs, a design having an occlusally approaching clasp and the other with a gingivally approaching clasp. Clinical, radiographic and three dimensional finite element analysis were used as evaluation parameters.

Review of Literature

Review of Literature

Harmful effects of the removable partial dentures

1- Effects on the abutment teeth

A well made RPD using the abutment teeth with adequate alveolar bone support and healthy periodontium together with a strict maintenance recall program for oral hygiene offers satisfactory treatment results (Ramfjord 1967 – BoBergman 1982)

Cecconi et al (1971 a,b) and Cecconi et al (1972) investigated the effect of different partial denture clasps on the abutment tooth mobility in lower bilateral free end saddle cases , and found that the I – bar clasp with mesial occlusal rest and distal guiding planes had caused less tooth mobility than the Aker's clasp with lingual bracing arm and distal occlusal rest

Bissada et al (1974) studied the effect of gingival response to various types of removable partial dentures and found that degree of gingival inflammation and pocket depth had increased at 6 and 12 months after insertion of the RPDs. However they did not report radiographic bone changes at 6 or 12 months. So it was concluded that covering the marginal gingiva with the prosthesis induces inflammatory changes ranging from mild gingivitis to advanced periodontitis if the condition is left without correction. If it is possible the marginal gingiva should be left uncovered but if it is unavoidable a slight