



“Radiographic evaluation of the effect of implant number retaining fixed detachable lower single denture designed by CAD/CAM “

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا
مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ
الْحَكِيمُ)

صدق الله العظيم

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DEDICATION TO

My mother

A strong and gentle soul who taught me to trust in allah.

My dear father

I hope that this achievement will complete the dream that you had
for me all those many years ago, proud of you forever

My sister

Thank you for your encouragement and support.

My Grand Mother

This is all for you for the support you gave me since my first years
in egypt



"التقييم الاشعاعي لتأثير عدد الغرسات في حالات الاطقم السفلية الفردية المثبتة القابلة للخلع المصممة والمصنعة بالكمبيوتر"

رسالة مقدمة الى كلية طب الأسنان جامعة عين شمس كجزء من
مقومات الحصول على درجة الدكتوراه في الاستعاضة الصناعية
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INTRODUCTION

INTRODUCTION

The mandibular edentulous ridge opposing dentate maxillary arch is one of the most perplexing problems in removable prostheses. The occlusal form of the remaining teeth makes it difficult to achieve harmonious balanced occlusion. The remaining teeth may be malposed, tilted and or over erupted. As a result, occlusion and articulation involve contacting steeply inclined planes of cusps in such a way that the denture is thrust horizontally causing problems in the stability of the denture. In addition, the impact of occlusal forces induced by the static dentate maxillary arch during function initiates deleterious effects on supporting tissues. ⁽¹⁾

Several treatment options were suggested to rehabilitate individuals with mandibular single complete denture. The use implants to support and and or retain mandibular single complete denture proved to be an effective treatment modality . The use of implant retained mandibular overdenture offers considerable functional advantages. Preservation of the residual ridges, tactile discrimination, improvement of masticatory performance, retention and stability, maintaining occlusion and vertical dimension have been reported in the literature. ⁽¹⁾

Implant treatment options may range from the use of removable implant supported over denture to the creation of fixed implant supported prosthesis. An alternative to fixed prosthesis is the fixed detachable prosthesis (Screw-Retained Dentures). The Treatment planning is balanced between the patient preferences, finances, and clinical factors. ⁽¹⁾

Screw-Retained Dentures offer a fixed implant solution for edentulous patients desiring a stable and esthetic replacement for removable prostheses. Furthermore they may be successfully used in combination of tilted and axially placed implants in the posterior part or resorbed dental arch.

The fixed detachable prosthesis can be made on a variable number of implants, with a minimum of four, although there ideally should be placed the biggest number of implants that is possible. However, in the completely edentulous mandible problems such as minimum bone volume, poor bone quality, and the need for bone-grafting procedures prior to implant placement create some challenging conditions.

Various material combinations including metal/acrylic, (with metal frame work and resin), multi-unit ceramo-metal restorations, CAD/CAM-based restorations with metal or zirconia frameworks, or monolithic zirconia have been used for constructing fixed detachable prosthesis. ⁽²⁾

The ongoing research for aesthetic and biocompatible materials has favored using all ceramic reconstructions for fixed dental prostheses (FDPs) as alternatives to conventional porcelain fused to metal (PFM) prostheses. High strength metal oxide ceramics have been developed to overcome the mechanical drawbacks and high fracture rates of earlier all ceramic systems. Zirconium oxide (ZrO₂ or zirconia) has gained increasing popularity in contemporary dentistry due to its high biocompatibility, low plaque surface adhesion, high flexural strength, absence of mucosal discoloration, and aesthetic properties. ⁽²⁾

Computer-aided design/ computer-aided manufacturing (CAD/CAM) technology has gain popularity in implant dentistry. The applications of 3-dimensional (3-D) imaging (computerized tomography scan), 3-D software for treatment planning, fabrication of computer- generated surgical guides using additive prototyping, as well as fabrication of all-ceramic restorations significantly improves implant therapy. ⁽²⁾