

سامية محمد مصطفى



شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم



سامية محمد مصطفى



شبكة المعلومات الجامعية



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



سامية محمد مصطفى



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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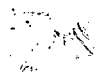
**FINITE ELEMENT ANALYSIS,
CLINICAL AND RADIOGRAPHIC
EVALUATION OF THE EFFECT OF
DIFFERENT FIXED-REMOVABLE
RESTORATION DESIGNS ON
THE SUPPORTING STRUCTURES**

*Thesis
submitted to the Faculty of Dentistry
Alexandria University*

*In partial fulfillment of the requirements
of
the Doctor Degree of Prosthodontics*

By
OSAMA GABER ARAFA
(B.D.S. & M.S.)

DEPARTMENT OF ORAL PROSTHODONTICS
*Faculty of Dentistry
Alexandria University
1998*



Supervisors

Prof. Dr. Mahmoud Khamis Abd El Razek

Professor of Prosthodontics

Faculty of Dentistry

Alexandria University

Prof. Dr. Ebrahim El Darwish

Professor of Testing Materials

Faculty of Engineering

Alexandria University

Dr. Mohamed Sherine El Attar

Ass. Professor of Prosthodontics

Faculty of Dentistry

Alexandria University

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INTRODUCTION



Cultural and social background appear to play a significant role in the reaction of people to partial and complete edentulousness. Better information about oral health and preventive measures have lead to a significant reduction of tooth loss. Patients demand better esthetics, chewing comfort and function. Complete loss of teeth leads to impairment of oral functions and changes in physiognomy, therefore, psychological aspects have to be considered (Regina et al. 1994).

Crum and Loiselle (1978) reported several studies that compare denture wearers to those who retained their teeth and their ability to discriminate between changes of thickness of objects and the minimal thickness of objects held by the teeth. Most of these tests recorded superior discrimination for the dentulous patients.

Loiselle et al. (1972) stated that as long as any teeth remained in the oral cavity, proprioception is more acute. They also found that the anterior teeth to be more sensitive than the posterior teeth.

Treatment modalities in patients with few remaining teeth vary from combined fixed and removable partial dentures to complete dentures. If a treatment plan involving fixed or combined fixed and removable partial dentures is rejected, the dentist and patient may wish to select an alternative treatment that does not involve the removal of all the remaining teeth. That treatment alternative is the overdenture or telescopic overdenture (Badr et al. 1986).

Telescopic crown prosthesis are primarily suitable for molars and premolars, possibly also for canines. They are not suitable for anterior teeth because the double crown construction requires ample space and this gives anterior teeth a plump appearance. The use of the telescopic crowns in removable partial dentures best fulfills the requirement of an abutment teeth. It also acts as a controlling factor in achieving the equalization that must exist between the supporting segments of a partially edentulous mouth. This kind of control results in minimal alveolar bone resorption with maximal preservation of the abutment teeth.

Telescopic crown prosthesis have proven to be more effective than other direct retainers. Their degree of retention can be planned to suit different situations by modifying the design, the amount of intersurface friction, the configuration of the taper angle, and area of surface contact. Being pericoronal devices, they transmit the occlusal forces in the direction of the long axis of the abutment teeth. This has proven to be the least damaging application force. Lateral forces exerted traumatic pressure on the abutment. Telescopic denture is considered to combine good retentive, stability properties with a splinting action and good psychological tolerance (Langer 1981).

Bar attachments act as splints joining teeth or roots and spanning the edentulous regions between them. They give fixation for the overdenture and splinting for the remaining teeth. The elements of the bar denture are crowns on the abutment teeth, connected by a bar. Bar attachments are divided into two groups, bar units and bar joints. The

former as the name applies, provides rigid fixation for the overdenture, whereas bar joints permit some degree of rotational or resilient movement or both (Brewer 1980).

The major objective in the choice of the type of restoration should be in the consideration of how the stress is transferred through the abutment and other structure not only the retention and stability (Thayer and Caputo 1978).

The finite element method is a computerized technique used to determine the stresses and displacement throughout a predesigned model. The method was first introduced in the late sixties in the aerospace industry and was applied in dentistry in 1973 by Farah, Craig and Sikarski to optimize the design of the dental restorations (Farah et al. 1982).

The finite element analysis have been described by several authors, to be a reliable and accurate method for stress analysis. It has been used to study stress patterns induced on the supporting structures by different removable and fixed partial denture designs, and is still used extensively in the field of dental implants (Farah et al. 1988).

The finite element analysis involves the idealization of a continuous structure by a system of discrete components or elements that are one, two or three dimensional. The basic objective is to obtain a solution for the idealized structure, that is, to solve the application of a series of programming systems of equations (Farah et al. 1988).