Thermoplastic versus Conventional Heat Cured Denture Bases for Implant - Retained Mandibular Overdenture

Thesis outline Submitted to

The Faculty of Dentistry Ain Shams University

for the partial fulfillment of Doctorate Degree in Prosthodontics

By

Hany Mohammed Mohammed Ali

B. D. S. (Ain Shams University 2002)

M. Sc (Cairo University 2010**)**

Under Supervision of

Dr. Hany Ibrahim Eid

Professor of Prosthodontics

Faculty of Dentistry-Ain Shams University

Dr. Noha Helmy Nawar

Associate Professor of Prosthodontics

Faculty of Dentistry-Ain Shams University

Faculty of Dentistry

Ain Shams University

2017

List of Contents

List of Figures

List of Tables

INTRODUCTION

Loss of natural dentition, eventual edentulism and resultant wearing of complete denture has been part of the expected course of aging. The prevalence of edentulism has decreased in the past few years due to the improvement of conservative dental treatment modalities as well as the greater frequency of their use. However, the expansion of the elderly population results in an increase in the need of various forms of oral health care.

Years of wearing complete denture lead to progressive bone resorption. This destructive process leads to loss of denture support, improper retention of mandibular denture, intolerance to loading by mucosa, difficulties with eating and speech, pain and altered facial appearance.

The introduction of osseointegrated implants in dentistry has provided new alternative options for the rehabilitation of edentulous patients. A conventional complete mandibular denture is less appropriate than a maxillary denture in term of retention. However, the use of two implants to retain the denture significantly improves the prognosis of mandibular edentulism.

The concept of overdentures has many advantages including preservation of alveolar bone and protects the patient from the psychological trauma of finding himself edentulous. Moreover, they enhance support, stability and retention. Attachments are one method to improve retention. They may connect either individual implants or

splinted implants to the overdenture. During masticatory function , overstress around dental implants may lead to bone resorption, which lead to peri-implant infection and failure of dental rehabilitation. The way in which bone is loaded can affect its response. In case of repetitive cyclic stresses application; microcracks in bone may occur and may lead to osteoclastic activity.

In recent years, thermoplastic polymers has been attracting attention as a denture base material due of its advantageous proberties such as better elasticity and higher moulding precision than heat-cured base resins that decreases the stresses on ridge bone, abutment teeth or implant as well as facilitate denture retention by way of utilizing the available undercuts according to the denture base design.

Though the question is whether the thermoplastic polymers is better than other denture base materials regarding for the stress distribution and alveolar bone resorption or not

REVIEW OF LITERATURE

Incidence and prevalence of edentulism

Edentulism is loss of all permanent teeth. This is a result of a complicated interaction between biological process (as caries and periodontal disease) and non-biological entities (e.g. economy, dental awareness, access to dental services, and education). (1)

Edentulism has several bad consequences on oral health with residual ridge resorption that leading to impaired masticatory and speaking function , nutritional deficiency status that increase the risk for systemic diseases, Appearance and social problems. (2)

10% of the adult population suffers of total edentulism over forty years with gradual increases to reach 45% in population over 75 years. (3)

Complete edentulism is considered a serious pathological condition of the maxillofacial system that affects its basic functions (mastication, phonation, physiognomy, etc.). Out of these considerations, the prosthetic treatment of complete edentulism is considered to be the most complicated situation, because the treatment requires restoring basic features of the stomatognathic system such as occlusal vertical dimension (OVD), occlusal plane, and lost intermaxillary relations and on the same side achieving retention and stability of prostheses. (4)

Optimal complete denture treatment requires the understanding, differentiation and integration of certain mechanical, biological and

physical factors that determine the properties of retention, stability and support in complete dentures. [5]

Factors affecting degree of ridge resorption:

The residual ridge resorption in edentulous patients is considered a serious clinical issue. Progressive bone loss without proper prosthetic treatment and rehabilitation of the masticatory function can contribute to numerous unfavorable sequelae. [6]

Total teeth loss results in impairment of mastication as well as loss of receptors of the periodontal tissue. Thus the efficiency of mastication is markedly decreased with subsequent deterioration in general condition and increased risk of systemic and neoplastic diseases. [7]

There are many individual features that determine speed and extent of resorption such as age, sex and time elapsed since tooth extraction, osteoblast life span, local and systemic biochemical factors and physical factors, such as the pressure exerted on the bone by dentures. [8]

Knowledge of the causative factors that affect alveolar resorption in the mandible is important to avoid the potentially severe consequences of residual ridge resorption in edentulous patients. [9]

1. Anatomic factors:

A. Bone size

The resorption is influenced by the original size of the ridge and the depth of the extraction sockets. [9]

It is reported that ridge resorption differs with both the quantity and quality of bone of the residual ridges. The more the amount of bone, the more resorption will be present however, the amount of bone is not a good detector of the resorption rate because sometimes large ridges resorb rapidly and some knife-edge ridges may remain with little change for long periods of time. [10]

Evaluating the present status of the residual ridge gives clear evidence about the resorption pattern. The residual ridges which are high and well-rounded for several years will continue to do so. If it has resorbed in short time, it will resorb at a higher rate. [11]

B. Bone type

It has been postulated that cortical and cancellous bones respond differently to either local or systemic influences. In humans, the number, distribution, and arrangement of trabeculae varies highly in edentulous maxillas and mandibles. [12]

The thin cortical bone and the relatively large amount of trabecular bone in the maxilla are proposed to absorb bite impulses more efficiently than does mandibular bone. [11]

C. Bone density

The density of the ridge is another important (considerable) factor. However the density does not signify the current metabolic