



Effect of The Degree of Palatal Coverage on Occlusal Forces Exerted by Implant Retained Maxillary Overdenture

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*To my beloved family, husband and my little
angle yehia*

*Thank you for your endless love,
support & sharing my hard times.
You sincerely light my path and bless
every step.*

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INTRODUCTION

The main objective of complete denture prosthodontics is the restoration of function, facial appearance and maintenance of patient's health. Unfortunately, conventional removable denture in fully edentulous patients is often inadequate.

Retention and support of maxillary dentures depend mainly on posterior denture border and maximum palatal coverage where a border seal is created when the denture posterior border terminates on a soft displaceable tissue. However, this posterior extension may be unbearable by most of the patients as it may cause gagging, alter taste sensation, affect phonation, hygiene and even mastication. So, conventional maxillary denture was no more accepted as the first treatment option for edentulous maxilla. Several attempts were done to decrease palatal coverage of maxillary denture without affecting denture retention.

One of the most ambitious goals in the practice of oral implantology is the resolution of total edentulism and the adequate restoration of both masticatory and aesthetic function. The use of dental implants to provide support and retention for the prostheses offers many advantages, compared with the use of removable soft tissue-borne restorations.

Dental implants can be used to support and retain maxillary overdentures so as to increase their retention, stability and masticatory efficiency. Denture retention depends on the mechanical attachment of implant rather than physical means of the extended palatal coverage.

Dental implants may be more prone to occlusal overloading, which is often regarded as one of the potential causes for peri-implant bone loss and

failure of the implant/implant prosthesis, therefore it is important to control implant occlusion within physiologic limit to provide optimal implant load and to ensure a long-term implant success.

As mentioned previously the palatal portion of conventional maxillary denture is annoying to the patients and its removal will be of great advantage to taste perception, gagging, hygiene and patient comfort. Therefore, studies have to be done to see the effect of removing the palatal portion of the maxillary implant retained overdentures on occlusion.

This study was conducted to compare the effect of palatal coverage on the occlusal forces exerted by maxillary implant overdenture retained by four unsplinted anterior implants using T-Scan.

REVIEW OF LITERATURE

Edentulism

Edentulism is defined as the State of being partially or completely without teeth. It is a multifactorial process involving biological and patient related factors. It is regarded as a poor health outcome since it may compromise an individual's quality of life.^[1-3]

Prevalence of edentulism

Edentulism is a public health problem affecting tens of millions of people worldwide. There are intra- and intercountry variations in the prevalence of complete edentulism, comparison between national samples is hard, because of the impact of various factors like lifestyle, economic, education, circumstances, oral health knowledge, beliefs, and attitude to dental care.^[4-6]

Up to the middle of the 20th century the great majority of elderly people were edentulous. However, during the last few decades, there were a dramatic reduction in prevalence of edentulism and incidence of tooth loss in many industrial countries.^[7]

In the United States, according to the most recent information, the prevalence of edentulism among adults over 60 years of age was 25%. In 2010, the overall rate of edentulism in Canada was 6.4%, and among adults between 60 and 79 years of age, was 21.7%. The rate of edentulism tends to vary among different regions within a country. In Canada, there is variation, from 14% to 5% due to associated factors such as access to fluoridated water and smoking.^[5]

Studies show that edentulism is closely associated with socioeconomic factors and is more prevalent in poor populations and in women.^[7, 8]

Even though several authors stated a decreasing number of edentulous patients, demographic trends show an immense increase in adults over 55 years of age. Given that oral health is strongly age-dependent, which explains that edentulous people are usually found to be 65 years or older, a high number of edentulous patients might be expected in private practice even in the future.^[8]

Problems of Edentulism

There is a unique relationship between Jawbones and teeth. Bone requires stimulation to maintain its form and internal structure. Bone remodels relative to the forces applied to it. When a tooth is lost, adjacent alveolar bone is no longer stimulated and causes a decrease in trabeculae and bone density and loss of width and height of the alveolus. The first year after tooth loss, the width of the alveolus decreases by 25%, and approximately 4 mm in alveolar height following extractions in conjunction with immediate complete dentures.^[9]

Edentulous mandibles lose bone volume four times faster than edentulous maxillae. Posterior edentulous maxillary ridges resorb medially and superiorly; anterior edentulous maxillary ridges resorb superiorly and posteriorly. The mandible resorbs inferiorly, anteriorly, and laterally, this difference in the resorption pattern leads to unfavorable jaw relationships between the arches.^[10]

Residual ridge resorption leads to a reduction in the height of alveolar bone and the size of the denture bearing area. This reduction affects face height and facial appearance, the loss of alveolar bone height and width also

leads to substantial changes in the soft-tissue profile, such as protrusion of the mandibular lip and chin.^[7]

The facial changes that occurs with ageing is accelerated and potentiated by loss of the teeth and many esthetic consequences result from the loss of the alveolar bone. A decrease in the facial height, collapsed vertical dimension, loss of labiomental angle, deepening of vertical lines, decrease in the horizontal labial angle at the corner of the lips the patient appears unhappy when his mouth at rest.^[9]

In the dentate maxilla, lip support is primarily derived from the alveolar ridge shape and the cervical crown contour of the maxillary incisors. In the edentulous maxilla, the resorption pattern is cranially and medially directed, so that a palatal position of the anterior maxilla frequently appears. Thinning of the vermillion border of the lips, deepening of the nasolabial groove and deepening of the vertical lines in the upper lip, all result from the poor lip support.^[9, 11]

Tooth loss is accompanied by loss of several orofacial structures such as boney tissues, nerves and muscle tone, affecting esthetics and speech; the smile line which is determined by the tonus of the orofacial muscles and influence the movement of the upper lip during speech and smiling is also impaired.^[11, 12]

Moreover, edentulism can be accompanied by functional and sensory deficiencies of the oral mucosa, oral musculature, and the salivary glands. Decreased tissue regeneration and decreased tissue resistance are expected in the edentulous population, which can impair the protective function of the oral mucosa. Associations have been reported between aging, denture use, and oral mucosal disorders, including denture stomatitis, an inflammatory

condition of the palatal mucosa seen in complete denture wearers, angular cheilitis, oral candidiasis, and traumatic ulcers.^[7, 13, 14]

Edentulism has a series of deleterious consequences for oral and general health. Oral consequences vary from the well-known residual ridge resorption to an impaired masticatory function, an unhealthy diet, social disability, and poor oral health quality of life. Edentulous individuals are also in greater risk for different systemic diseases and an increase in mortality rate.^[7]

Tooth loss can affect general health in several ways; lower intake of fruits and vegetables, fiber, and carotene and increased cholesterol and saturated fats, in addition to a higher prevalence of obesity, increased risk of cardiovascular diseases and gastrointestinal disorders.^[15, 16]

Management of Edentulism

Management of edentulism remains an issue of concern. There are persistent efforts to improve the treatment modalities that may be offered to the edentulous patient. For decades, conventional denture therapy represented the only treatment for restoring esthetics, function, self-esteem as well as social well-being of the edentulous patient.^[17]

The treatment of edentulism with soft tissue-borne complete dentures, can induce impaired masticatory function due to limited retention and stability. Sensitivity and pain of the mucoperiosteum covering the ridges also restrict the biting forces. The addition of implants has been reported to stabilize dentures, thus improving masticatory performance in edentulous individual. As a result, edentulous patients treated with implant supported overdentures have expressed satisfaction with various aspects of improved social life and general health.^[18]