Extracoronal Resilient Attachment Versus Ball Attachment for Mini Dental Implants Retained Mandibular Overdenture (In Vitro Study)

Thesis

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Dedication

Deepest thanks to my beloved family and true friends who do their best to always help me and support me.

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Introduction

Introduction

Loosing teeth leads to lack of stimulation to the residual bone causes a decrease in the trabeculae and bone density, thus causing residual ridge resorption.

The loss of bone first causes decreased bone width followed by bone height; leaving a remaining narrow residual ridge. Thus over 50% of mandibular complete dentures have problems with stability and retention.[1]

Problems arise from inadequate supporting tissue volume for mandibular denture treatment, denture adhesives can sometimes prove inadequate. In the past, treatment solutions have generally focused on providing increased supporting tissue volume. Alveolar ridge augmentation and alveoloplasty have been used for this purpose. These treatments have provided mixed long-term success and have occasionally introduced significant complications and morbidity.

The restoration of the atrophic edentulous mandible with an overdenture supported or retained by implants placed in the interforaminal region has thus become regarded as the first prosthodontic treatment option.[2]

Mandibular implant overdenture treatment can show significantly improved retention and stability characteristics as compared with conventional mandibular complete dentures.[3]

The use of Narrow diameter implants (approximately 1.8mm to 2.4mm in diameter) has been suggested in order to reduce trauma for elderly patients when the use of standard-sized implant would require bone reshaping or grafting.

The mini implants available on the market have utilized a Ball and Bar attachments, which, due to the height needed, may create restorative issues or allow lateral loads to be placed on the head during insertion or removal of the prosthesis.

Sterngold introduced a mini implant using a smaller version of their ERA attachment. As less of the fixture is supercrestal, the manufacturer claims that less lateral load can be placed on the fixtures during function or insertion/removal of the prosthesis. An added benefit is with a lower attachment head, less acrylic needs to be removed from the denture to accommodate the attachment's male than when a ball is used. The manufacturer also claimed that the Micro ERA saves 0.5mm in height and almost 1 mm in width, with no loss of retention or longevity.[4]

Whether or not the newly introduces ERA attachment is really beneficial in reducing stresses, while providing as good retention as the ball attachment; is a question that needs to be answered.

Review of literature

Review of Literature

Edentulism

Edentulism is defined as the loss of all permanent teeth[5], which is the terminal outcome of a multifactorial process involving biological processes (caries, periodontal disease, pulpal pathology, trauma, oral cancer) as well as non biologic factors related to dental procedures.[1]

It would be inaccurate to state that disease factors such as caries or periodontal disease are the sole causes of patients' edentulism, research has demonstrated that several nondisease factors such as attitude, behavior, dental attendance, and characteristics of health care system play an important role in the decision to become edentulous, in addition, a significant relationship exists between the edentulous state and financial concerns usually associated with low occupational levels. It is therefore reasonable to conclude that edentulism is due to various combinations of cultural, financial, and dental disease attitudinal determinants, as well as to treatment received in the past.[3]

The truth about edentulism is that it has not disappeared nor is it disappearing. Many reports claim that while the prevalence of tooth loss is diminishing with each generation, the longevity of populations worldwide and the potential accommodation to sugar-rich diets and Western lifestyles contribute to sustaining the actual number of edentulous individuals throughout the world.[4]

It is conservatively assumed that 10% of the world's population of 6 billion is partially or totally edentulous. Which means that there are millions of edentulous people worldwide who need treatment for a condition that can represent considerable disability.[6]

Consequences of edentulism

I. Bony consequences

The alveolar ridge is the bony structure of the maxilla and the mandible that contains the dental sockets and supports the teeth. The structure left after extraction of teeth is called " residual alveolar ridge" and this term ridge encompasses all the changes that accompany bone loss after tooth extraction.[6]

The close relationship between the tooth and alveolar process continues throughout life. It was stated that bone remodels in relationship to the forces applied whereas disuse and a loss of mechanical stimulation is followed by the reduction of bone mass. Bone needs stimulation to maintain its form and density. Teeth transmit compressive and tensile forces to the surrounding bone. When a tooth is lost, the lack of stimulation to the residual bone causes a decrease in trabeculae and bone density in the area, with loss in external width then height of the bone volume.[7]

Continuous reduction in alveolar ridges is regarded as a 'major oral disease' including anatomical, metabolic, prosthetic and functional factors.[8]