Effect of Two Different Treatment Modalities for Retaining Fixed Detachable Mandibular Dentures Regarding Implant Stability

Thesis

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INTRODUCTION

Dentistry science has evolved over the years since its introduction in nineteenth century. It has provided numerous solutions for edentulous people, ranging from complete dentures to recently developed root analogues implants.

The highest target in dental profession is the fulfillment of patient desires. The greatest desire of the patient is always the fast, painless and properly functioning replacement of their missing teeth or stabilization of the prosthesis. A fast, stable and esthetic reconstruction of the patient's dento-facial system is the main goal of every dentist.

Conventional dentures are not an ideal treatment for mandibular edentulism. When considering contemporary treatment of the edentulous patient, endosseous dental implants can offer an alternative treatment to complete denture therapy. Among the advantages of mandibular implants are the improvements in mandibular function, the prevention or reversal of alveolar bone loss, and the measurable improvement in self-reported satisfaction with treatment.

The oral rehabilitation of atrophic edentulous jaw with dental implants is limited by anatomic conditions. Insufficient alveolar bone height is a common clinical situation encountered more in the posterior jaws.

Advanced surgical procedures such as bone grafting, sinus lifting, and nerve repositioning are required to overcome this condition and make implant treatment possible for such patients. Prolonged healing period,

increased morbidity, and longer duration of the implant treatment accompanies these procedures.

Short implants are considered as a viable alternative in patients with reduced alveolar bone height to avoid more invasive surgical procedures. They simplify the implant treatment, reduce patient morbidity, shorten the duration of treatment, and make it less expensive.

In the past, when machined implants were used, rehabilitation with short implants showed increased failure rate in comparison to longer implants. Thus, most dentists prefered to position implants in the interforaminal region of edentulous patients to avoid advanced surgical procedures. Nowadays, by the innovation of short implants which are considered as a viable alternative in patients with reduced alveolar bone height and with the improvements in the surface topography of implants, which increase the bone implant contact, and use of adapted surgical protocols similar survival rates as that of regular implants have been reported even with short implants. Thus, the question is whether to use four conventional implants in the interforaminal region or to use two conventional interforaminal implants with two short implants in the posterior region is better regarding implant stability.

REVIEW OF LITERATURE

Edentulism is the state of being edentulous; without natural teeth. [1] Complete edentulism is a clinical condition present especially in elderly, with a multifactorial etiology, which associates severe local and general changes, which may have negative implications on self-image, daily functioning and quality of life. Scientific evidence shows that complete edentulous patients may encounter masticatory deficiencies, have a greater risk of malnutrition, coronary artery plaque formation, asthma, diabetes, rheumatoid arthritis and certain cancers. In some cases, behavioral changes appear, with a tendency of isolation and psychosis related to extraction of the last teeth or dissatisfaction with the complete dentures.[2,3] Edentulous patients report difficulty in chewing foods that are hard and tough in texture, forces them to modify diets in unhealthy ways (low vegetables, low protein, high fat). Nutritional intake is generally reduced vs. those with natural teeth.[4,5,6]

Edentulism is a major public health problem. It fulfills the World Health Organization (WHO) definition of a physical impairment, because important body parts have been lost. It is also a disability, because it limits the ability to perform two essential tasks of life (speaking and eating). Edentulism can be a debilitating handicap, significant changes are needed in order to compensate for such deficiencies. [7]

Conventional complete dentures, which is the most common treatment alternative, has many problems and patient dissatisfactions. The main complaint reasons identified, in old denture wearers, were related to mastication and denture stability. Regarding the ability of completely

edentulous patients to perform mastication, studies from the literature generally show similar results, concluding that teeth loss deeply affects masticatory ability. Conventional complete denture restores this function, but only to approximately 1/6 of natural dentition. The mastication of hard food is especially compromised, complete edentulous patients selecting foods with softer consistency, consuming a lower quantity of fibers, proteins, fruits, vegetables, and calcium. The difficulties in obtaining a good denture stability represents a major issue in the complete conventional dentures referring problems. The balance of prosthesis realized by physical means (interfacial attraction realized by adhesion, cohesion, superficial tension, suction, atmospheric pressure, prosthetic adhesives) or physiological means (muscle action, saliva) is often affected by the forces exercised during the functional acts of mastication or phonation. [8,9]

Most difficulty with complete denture prostheses arises from the inability to function with the mandibular prostheses. Factors that adversely affect successful use of a complete denture on the mandible include the mobility of the floor of the mouth, thin mucosa lining the alveolar ridge, reduced support area, and the motion of the mandible. These factors alone can explain the difficulty of wearing a denture on the mandibular arch compared to the maxillary arch. The maxilla exhibits much less mobility on the borders of the denture than the mandible, moreover having a stable palate with thick fibrous tissues available to support the prostheses and resist occlusal forces. These differences explain most of the reasons why patients experience difficulty with using a complete denture on the mandibular arch compared to the maxillary arch. [10]

The mandibular denture is a difficult prosthesis to manage. Many articles and techniques have been written about improving the efficacy of the restoration, from differing impression techniques to tooth form. Despite these efforts, there still remain a population of patients who cannot manage using this type of restoration. Presently, some feel that the complete denture prostheses are below the standard of care and that the most basic restoration for the edentulous mandible should be an implant retained overdenture with two implants placed in the anterior mandible. [11] Preliminary evidence suggests that providing edentulous people with one of the least complicated forms of implant prosthesis (two-implant OD) will modify diets, improve their nutritional state and has a strong impact on general health.[12]

Implant retained dentures have been developed and studied as a method for solving the problem of instability associated with conventional dentures. Both fixed and removable implant-retained complete dentures have evolved over the past 15 years. [13]

Implant-retained dentures have many advantages compared to conventional complete dentures. The oral rehabilitation of edentulous patients has been improved by the use of dental implants [14] (using fixed and removable prosthesis). [15,16] The use of two or four implants to retain mandibular overdentures has been indicated with similar clinical and radiographic outcomes. [17] In situations with short or narrow implants that require increased retention, more than two implants are inserted. [18] In order to support mandibular fixed full-arch implant prosthesis, four to six implants are placed in the foramina area. Several factors play a role on the decision

between fixed and removable implant dentures as interforaminal space, inter-jaw relationship, oral hygiene, cost, and patient's preference. [19]

Overdentures are indicated when patients are not satisfied with stability and retention of the conventional removable denture but no complain about pain and discomfort of mucosa should exist. Fixed full arch implant-supported prosthesis is indicated in the presence of enough bone and inter-arch space. However, when there is loss of soft and hard tissues to support the facial tissue by the buccal denture flange, fixed prosthesis is contraindicated. [20,21]

Treatment options for edentulous mandible with implants:

Treatment options for the edentulous mandible include implant assisted prosthesis, and implant supported prosthesis.

The implant assisted overdenture:

This type of restoration is ideal for patients who complain of looseness and mobility of the mandibular denture but not of pain or soreness of the mucosa with use of a mandibular complete denture. The complete overdenture prosthesis is made to full extensions as conventional complete dentures usually are to maximize areas of support for the prosthesis. The function of the implants in this type of restoration is to aid in retention of the prosthesis and not for support of the restoration. Studies have shown that over the long-term implants supporting this type of restoration have a high success rate. In its simplest form, two implants are placed between the mental foramina. Due to the function of the genio-glossus muscle and the fact that the mandibular

anterior teeth are usually the last teeth to be lost, there is usually sufficient bone to place implants in this area even though the rest of the alveolus may be severely resorbed. [11]

The attachments used for implant overdentures (ODs) are mainly divided into the bar type and the solitary type and into the resilient type and the rigid type, depending on the movement allowance. Popular OD attachments used are: Ball attachments with rubber o-rings and/or metal housings, Bar attachments with clips, Locators, Magnets, and bar with locators cast or tapped into the framework. [19]

In a V shaped anterior mandibular ridge, if bar is placed at canine locations, it encroaches on the tongue space and if placed anteriorly, length of the bar becomes inadequate. Therefore in such cases, ball attachments or 3-4 implants with a connecting bar supported OD is indicated. Use of a bar may complicate the procedure, increase the cost of the prosthesis, is more technique sensitive and generally require more space than individual attachments. One perceived advantage of the bar is that it can accommodate divergent implants. However, individual attachments can also be used for divergent implants. [22]

The available data supports the use of independent implants for a mandibular OD. Stress transmitted to implants by ball attachment or bar attachment is controversial in the literature. [23]

A low profile attachment with easily replaceable retainers should be used. At present the most efficacious attachment is the locator attachment the advantages of this particular attachment are that it is made for many