بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

"Comparing the Accuracy of Direct and Indirect Completely Limiting Design of Computer Guided Surgical Stents in Implant Supported Mandibular Partial Overdentures"

Thesis

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INTRODUCTION

Partially edentulous patients have problems with aesthetics, speech and eating abilities. Many biomechanical sequelae are usually associated with teeth and periodontal ligament loss leading to health complications. Accordingly, the construction of highly retentive and stable partial denture for these patients is an essential requirement to improve their life style and satisfaction.

In comparison with conventional partial denture, dental implant supported partial overdentures showed a decreased rate of bone resorption, hence better retention, stability and support. Such positive features improve patients' psychological satisfaction as well as chewing efficiency.

The osseointegration of dental implant is predictable and it is related to the surgical technique and implant handling. The success of dental implant is mainly dependent on the proper treatment planning and perfect placement of the implant.

Surgical guide templates help in diagnosis and treatment planning. In addition, they also facilitate proper positioning and angulation of the implants in the bone and decrease postoperative complications by assisting in implant placement with minimal surgical exposure or even applying a flapless technique that simplifies clinical and laboratory procedures.

Generally, fabrication of a surgical guide template is based on one of the following three design concepts, Non-limiting design, Partially limiting design or Completely limiting design.

Fabrication of CAD/CAM based surgical guides involves several steps. The optical impression of the surgical guide can be taken directly to the ridges or indirectly by making a conventional impression, pouring the casts and thereafter, scanning them. Proving the accuracy of the direct technique in making the surgical stents will have a major impact on the patient comfort and will help in decreasing the overall time of the treatment plan, thus saving the time for both dentist and patient. Accordingly, this study was done to compare the accuracy of both direct (intraoral scan based) and indirect (cast scan based) completely limiting CAD/CAM-based surgical guide for locating dental implants in implant supported mandibular partial overdenture.

REVIEW OF LITERATURE

The need of the prosthetic treatment due to loss of teeth is an essential demand that increases as the patient gets older. Although nowadays the rate of edentulism among elderly is decreasing, 75-year-old patients are still likely to have more than 16 teeth in average due to the improvement of prophylactic treatments [(1)].

I- Sequelae of edentulism

Extraction of natural teeth affect remaining teeth as the adjacent teeth may drift or tilt and opposing teeth super erupt. Loss of teeth also cause facial appearance changes, speech alternations and these lead to social problems. The general health of the individual also get affected as the chewing ability is altered, leading to weight loss and health problems [(1,2)].

The importance of the prosthodontic treatment is to save the remaining natural teeth and stop any progression of the disease. It was stated that "The patient's fundamental need is the preservation of what remains of masticatory apparatus rather than the meticulous restoration of what is missing [(3)].

There are several treatment options for treating a partially edentulous patient, but the conventional method is a removable partial denture that replaces the lost teeth and the supporting structure. Among partially edentulous patients, the distal extension cases are the most common ones and the mandibular cases are more than the maxillary ones due to the general pattern of losing teeth [(4)].

According to the academy of prosthodontic terms, extension base removable partial denture is defined as “a removable dental prosthesis that is supported and retained by natural teeth at one end of the denture base

segment and in which a portion of the functional load is carried by the residual ridge." [5]

In distal extension cases and due to the difference in support of the prosthesis between teeth and residual ridge, the peridontium of the most posterior abutment is found to be affected by stresses and strain, especially if the patient is showing higher biting forces [6]. Therefore, a well-constructed and designed biomechanically acceptable partial denture that does not adversely affect the teeth, the soft tissues or the tempromandibular joint must be always the aim of the prosthodontist [7].

The control of vertical, horizontal and torsional forces that may act on the abutment teeth and the posterior mandibular residual ridges is difficult. These forces have a detrimental effect on denture stability, retention and support [8].

II- Dental implants for partially edentulous patients

Implant supported prosthesis: According to the glossary of prosthodontic terms, the *implant supported prosthesis* is a dental prosthesis, such as crown and other fixed dental prostheses, removable dental prostheses, as well as maxillofacial prostheses, that can be supported and retained in part or whole by dental implants [5].

After long-term rehabilitation with distal extension removable partial denture, extrusion of teeth and ridge resorption can occur. Several adverse conditions, such as occlusal disharmony, ill-fitting retainers and soreness under connector or denture base, may result from the displacement of distal extension removable partial denture [9,10].

Dental implants have improved treatment modalities for the edentulous mandible; the success rate was greater than 95% [11,12]. These provide a successful treatment modality in solving problems associated with the support and retention of distal extension bases, especially in the mandibular arch with limited denture bearing area [13].

(A) Implant supported fixed partial denture:

It was stated that implant-supported fixed prosthesis serves as a long term predictable treatment modality [14]. A fixed prosthesis can be totally implant supported or tooth-implant supported. Fixed prostheses are more commonly used in short span cases and when patients are not accepting removable partial denture.

Implant-supported prostheses have the advantage of bone preservation, restoring functions and esthetics, in addition to increasing the patient's acceptance to the treatment [14].

The combination of implant to natural tooth supported fixed partial denture has numerous biomechanical implications. If the restoration was not loaded in a vertical direction, failure of the implant may occur, which can be implant fracture, screw fracture, or screw loosening. Furthermore, intrusion of a natural tooth abutment is possible [15].

(B) Implant supported removable partial denture:

Implant-supported removable partial dentures provide patients with stable prostheses. This treatment modality should be considered when fixed prostheses are not a valid option. Meticulous hygiene measures and a follow-up protocol are highly recommended to obtain satisfactory results [16].