شبكة المعلومات الجامعية

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بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

“CAD/CAM Milling versus Rapid Prototyping Surgical Guide Techniques in Dental Implant Placement”

Thesis

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INTRODUCTION

Osseo-integrated implants are a practical substitute to the conventional prosthodontics; nevertheless, designing a prosthesis which is implant supported with proper function and esthetics is a challenge. Precise accuracy in planning and conduction of surgical steps is vital for assuring a high-success probability exclusive of iatrogenic damage. The success of implant placement primarily relies on well-organized treatment planning and correctly performed surgery. Disorderly placed implant is a very common problem that regularly complicates not only the clinical, but also the laboratory procedures of superstructures. This actually dictates a close teamwork between prosthodontists and surgeons to work conjointly as a single unit that will smoothen the accurate construction of the surgical stent or surgical guide.

A surgical stent is an appliance utilized for radiographic assessment of the available bone regarding height and width pre-operatively or intra-operatively to provide the ideal site for implant placement [(1)]. Surgical templates not only aid in diagnosis and treatment planning but also eases proper positioning and correct angulation of the implant body in the bone. Furthermore, restoration- driven implant placement accomplished with a surgical guide template, for sure, decreases the clinical and laboratory complications. Thus, the increasing demand for dental implant placement using surgical guides has resulted in more advanced techniques for the fabrication of these templates [(2)].

Guides should be constructed of transparent material, stable and firm when in position. It should cover sufficient teeth to stabilize its location, and when teeth are absent, they should extend onto the un-reflected soft tissue

regions[3]. A surgical guide is supported by the teeth, mucosa or bone and is usually made of polymer. It has pre-drilled holes and, during the dental implant surgery, the surgeon uses these holes to guide the osteotomy at the anticipated locations and angulations in the patient's subsequent implantation site [4].

Surgical guide template construction involves a diagnostic tooth arrangement through one of the following manners: (1) a diagnostic waxing, (2) a trial denture teeth arrangement, or (3) the duplication of a preexisting dentition/restoration.

Several computer guided surgical stents fabrication methods have been advocated over the past several years including design-related processing and milling based on coordinate synchronization. In design-related processing, a template is designed on a computer which is then used to construct a surgical stent either by subtractive or additive method. Thus this thesis is prompted to evaluate which 3-D surgical stent is more accurate in implant placement.

EDENTULISM

Edentulism is defined as the state of being edentulous; without natural teeth [5]. While, partial edentulism is defined as the absence of some but not all of the natural teeth in a dental arch [6].

Edentulism whether partial or complete edentulism is an indicator of the oral health of a population. It may also be a reflection of the success of various preventive and treatment modalities designed by the health care system[7,8,9].

It is obvious that tooth loss and age are linked. A specific tooth loss relationship with increasing age has been documented. An inter-arch and intra-arch difference in tooth loss were reported as it was found that the maxillary teeth are usually lost before mandibular teeth. Also, posterior teeth are usually lost before anterior teeth. The last remaining teeth usually are the mandibular anterior teeth, especially the mandibular canines [10].

Sequelae of Partial Edentulism

Tooth loss carries a number of consequences, from simple loss of function to long-term deleterious effects on the remaining teeth, temporomandibular joint, facial appearance, and the increased demands on the residual dentition. Functional impairment is often the first concern expressed by patients [11].

Patients generally experience a preferred chewing side resulting in loss of occluding contacts on the contralateral side but with little effect on function. Conversely, loss of one tooth on the preferred chewing side effectively eliminates an occluding pair of teeth. This may causes functional impairment. Loosing teeth diminish the patient's ability to triturate the food bolus. In addition, loss of occluding surfaces interferes with the patient's ability to control the food bolus. Loss of a tooth generally affects the adjacent

and opposing teeth. Loss of an antagonist tooth allows the extrusion of unopposed teeth, while loss of an adjacent tooth allows drifting and tipping of the surrounding teeth. Left unchecked, extrusion, drifting, and tipping may result in loss of normal arch form and alteration in the orientation and inclination of the occlusal plane. As arch integrity is compromised, the potential for abnormal wear on the remaining dentition is increased [(12)].

Moreover, loss of posterior opposing teeth may lead the patient to move his mandible in an upward and anterior position in relation to the maxilla in order to improve mastication, which leads to decrease vertical dimension, prognathic look, and creates instability of the temporomandibular joint and causes adverse effects on the health of the joint [(13)].

Moreover, esthetic concerns are associated with tooth loss, the loss of teeth within the esthetic zone probably affects the patient's smile and results in loss of lip support, deepening of folds and a senile appearance [(14)].

Sequelae of edentulism also include decreased width and height of the supporting bone, prominent genial tubercles, oblique ridge and mylohyoid ridge, besides, increased risk of mandibular body fracture. Thinning of mucosa with sensitivity, pain and high liability to abrasion with hyperplastic and hypertrophic tissue changes. Gingival and periodontal diseases was also reported. Muscles attachment become closer to the crest of the ridge, moreover, the tongue increased in size as it was reported that the tongue shares more active role in mastication [(15)].

Clinical longevity dental restoration is essentially influenced by the state of the edentulism and by the applied concept of connecting the removable denture with the remaining teeth. With regard to number, alignment, and periodontal status of the remaining teeth, the clinician has to select the appropriate treatment plan for a long-term successful restoration, also considering the esthetic demands and financial limitations of the patient[(16)].

Treatment modalities and Prosthetic Management of partially edentulous cases

Restoring partially edentulous cases could be achieved by either one of the following ways

1. Conventional removable partial dentures.
2. Removable partial overdentures.
3. Telescopic partial denture.
4. Fixed partial dentures and/or with cantilever bridge.
5. Implant.

Implant Prosthesis for partially Edentulous Patients

Implant supported prosthesis: According to 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 [(17)].

Misch in ***(1989)***, stated that the implant supported prosthesis may be one of five prosthetic options. The first three options are fixed prosthesis, and the last two options are removable prosthesis. The two removable options are either supported completely by implants or supported by implants in combination with soft tissue [(18)].

Classification of implant supported prosthesis:

Mericske-Stern, ***(2000)*** classified the implant supported prosthesis into fixed implant supported prosthesis, fixed detachable prosthesis, fixed removable prosthesis and overdenture prosthesis [(19)].