"EFFECT OF USING A READY-MADE PLASTIC STENT WITH APICALLY REPOSITIONED FLAP IN AUGMENTATION OF THE PERI-IMPLANT SOFT TISSUE "

(A randomized controlled clinical trial)

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" تأثير استخدام الدعامات البلاستيكية الجاهزة مع تعديل وضع السديلة اللثوية ذرويا على الأنسجة اللينة المحيطة بالغرسه "

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1. ANOVA= Analysis of variance.
2. APF = Apically repositioned flap
3. BI = Bleeding index
4. CBCT = Cone beam computed tomography
5. FGG = Free gingival graft
6. KM = Keratinized mucosa
7. MIPS= Minimal invasive periodontal surgery
8. MGJ = Mucogingival junction
9. PD= Probing Depth
10. PDL= Periodontal ligament
11. PES = Pink esthetic score
12. PI= Plaque Index

Introduction

Periodontal disease is an inflammatory disease of the periodontium which leads to destruction of the structures comprising the periodontium. ***(Chung et al , 2006)***

The maintenance of periodontal health is related to the presence of adequate zone of keratinized tissue, one of the two types of oral mucosa; masticatory mucosa which is formed of a keratinized squamous epithelial cells over layer of connective tissue (lamina propria) that is firmly attached to the bone through periosteum. it has less elastic fibers and more collagen tissue, it is found in the attached gingiva and hard palate. On the other hand, the lining mucosa is formed of non-keratinized squamous cells epithelium above layer of connective tissue which contains a lot of elastic fibers, the sub mucosa is attached to the periosteum and the muscles which makes it movable so that it could be adapted to the muscles movements. ***(Listgarten et al , 1991)***

As mentioned before the amount of Keratinized gingiva surrounds the neck of teeth is of great importance for the health of periodontal apparatus, this amount is measured from the mucogingival junction to the free gingival margin. Without the aforementioned type of masticatory mucosa, the liability of periodontal disease increase with high score bleeding index and plaque index. as periodontal disease progress , teeth turned to be in un restorable state and get indicated for extraction ***(Lang & Löe, 1972).***

Osseointegrated endosseous titanium implants have shown a great success in replacing the missing teeth as it became the first line of treatment for edentulous areas. It was first presented in 1978 by Branemark, the idea of dental implants depended on osseointegration between the implant surface and the bone, osseointegration is defined as "direct structural and functional connection between ordered, living bone and the surface of a load carrying implant. Nowadays, osseointegration is not the ultimate challenge especially after the huge development in implant macro and micro designs. However, long term success and prognosis of the osseointegrated implants depends to a great extent on the health of the surrounding soft tissues ***(Kim et al., 2009 ; Albrektsson, 2010 ; Abraham, 2014) .***

Implants are more susceptible to the development of inflammation and subsequent bone loss in the presence of plaque accumulation and bacterial infiltration due to several factors ***(Lin et al., 2013).***

Many authors emphasis the importance of keratinized mucosa in order to achieve accepted success rate, many researches reports that a minimum 2 mm of keratinized gingiva are needed in order to achieve healthy gingiva around dental implants However, not any articles had proved the superiority of non-keratinized gingiva to the keratinized gingiva for any reason. ***(Lang & Löe, 1972 ; Bouri et al , 2008)***

Keratinized gingiva around dental implants are necessary to achieve esthetic appearance in the anterior teeth, also it is more resistant to abrasion, recession, less in plaque accumulation and inflammation, and easy to manipulate during stage two surgery and impression making in prosthetic stage. For the aforementioned reasons over year's authors have developed many techniques to increase the amount of keratinized gingiva around the dental implants ***(Adell et al., 1986)***

Such techniques are apically and laterally repositioned flaps , free gingival grafts, acellular dermal matrix allograft , coronally repositioned flap and sub epithelial connective tissue flaps ***(Reddy et al., 2013)***

The apically repositioned flap operation is an outgrowth of the principle of repositioning of the gingiva as conceived by Nabers. His procedure was modified by Ariaudo and Tyrrell, who advocated the use of two vertical incisions instead of one. Later, Nabers modified the handling of the flap by using an initial incision running obliquely from the marginal gingiva downward and inward to the alveolar crest in order to facilitate easier deflection.***(Nabers CL,1954;Ariaudo A.A et al ,1957;Friedman, 1962)***

The apically repositioned flap should be performed with these objectives in mind: 1) The flap should be beveled to the maximum

extent to produce as thin a gingival complex as possible.2) Vertical incisions should be made extending from the gingiva into the alveolar mucosa to permit ease of access to the operative area and provide flexibility in operating. 3) The flap should be sutured precisely at the level of the alveolar crest. This is accomplished by suturing at the vertical incisions and interproximally as well. The use of interproximal sutures will depend on the length of the flap. If they are not used a suspensory ligature may be utilized instead.

(Friedman, 1962)

The apical repositioned flap has shown to predictably increase the width of keratinized tissue around natural teeth. The increasing height of attached gingiva occurs because of an apical alteration of the mucogingival junction. Which includes apical displacement of the muscular insertions. ***(Reddy et al., 2013)***

Although the many advantages of apically repositioned flap procedure as it is well documented that this procedure increase the width of keratinized tissue by 3.5mm and minimal post-operative bone loss. It still has the disadvantage of being unsuitable for a thin biotype gingival tissue, also the use of sutures to close the flap would produce tension and displace the flap coronally around the implant healing abutment making a problem in controlling the desired positioning of the gingival margin. ***(Reddy et al., 2013)***

Regarding the free gingival graft and sub epithelial connective tissue graft respectively, they are replied to cases where there is a shallow oral vestibule; a free gingival graft involves grafting a donor piece of gingiva to a recipient site. For sub epithelial soft tissue graft technique, refers to submerging gingival connective tissue under a partial thickness flap. The gingival connective tissue will induce the formation of keratinized gingiva. However; these methods have the disadvantage of having a second surgical site and not being an easy procedure to perform by general practitioners**.** ***(Chung et al., 2006; Huh et al., 2013 ; Elkhaweldi et al , 2015)***

To overcome these problems many investigators have devised methods for moving the keratinized gingival flap from the lingual to the buccal and apical directions by fixing a ready-made plastic stent to the healing abutment. **(Jun-Beom Park,2006)**

Review of literature