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Flapless Implant Surgery: A Literature Review

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Abstract:
Since The 1970s, Modern Implantology Is Based On A Concept Of Surgery With Flap Elevation. Gradually, Several Clinical Trials Demonstrated That A Mid-Crestal Incision Gives Similar Success Rates Compared To Those Obtained Using The Classical Protocol [1]. However, Over The Past Decade In Medicine It Has Been Established The Concept Of Minimally Invasive Surgery, Consisting In Taking Advantage Of Advancements Experienced In Diagnostic Techniques And Specific Surgical Instruments, To Perform Surgical Procedures Infringing As Less Damage As Possible To The Patient Through Minimal Incisions (Envelope Incision In The Beginning, Actually Without Lineal Incision (Punch), Reducing The Size Of The Instruments[8].

Key Words: *Dental Implants, Flapless Surgery, Advantage, Limitations, Literature Review*

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I. INTRODUCTION

Bone resorption after tooth extraction is a common phenomenon. when planning an implant placement, this plays a major role. There are techniques that minimize soft- and hard-tissue resorption. Reflection of a soft-tissue flap for surgical access may increase the loss of both hard and soft tissues. In addition, the abutment-implant connection may result in a micro gap causing further bone resorption., This loss of hard and soft-tissue decreases support for the implant and may compromise the final esthetic result[1]. The excessive gingival occlusal dimensions of the implant restoration's clinical crown may cause an unaesthetic result. To preserve tissue and prevent bone loss, some clinicians have recommended immediate implant placement. Immediate implant preserved the bone structure and hence the esthetics [1]. Another approach of preservation is flapless implant placement. This type of placement could be performed by minimum incision, immediate perforation with the drill through the soft tissues, computer guidance, or soft tissue removal using a tissue punch.

II. ADVANTAGES OF FLAPLESS TECHNIQUE

Many are the advantages that have made flapless surgery increasingly demanded by clinicians and patients.

• Faster healing of soft tissue:

Flapless surgery prevents the reflection of soft tissues reducing the surgical trauma. As a result, the necessary process of healing of the wound is minimal, with an absence of scar and its typical complications of conventional surgery as the dehiscence of the flap. The absence of suture in the majority of cases contributes equally to the best postoperative appearance of the surgical area [2].

• Minimal interference on the blood supply[8]:

As flapless technique implies only an essential orifice on the mucosa technique, blood supply is hardly affected. It should be recalled that the vascularization of the underlying bone is determined by three essential sources: major supra-periosteum vessels, vascular plexus of the periodontal ligament, and the vessels of the alveolar bone. With the absence of a tooth, the plexus of the ligament disappears, remaining the vascularization guaranteed due to the two other sources. Under these conditions, the flap reflection entails a loss of the blood supply of the supra periosteum vessels, so the bone vascularization depends upon its own vessels, which is a poor blood source in the case of cortical bone. This will imply a certain level of bone resorption during healing in cases that occur with a mucoperiosteal flap reflection [3]. Several studies corroborate that bone resorption that follows flap surgery causes a decrease of the vascularization threatening the final aesthetic results. Thus, Kim in 2009 [1] shows in one study in dogs, than in areas where it was placed a flapless implant presented a much richer vascularization than the area in which the surgery was conventional, thus making a better vascularization of the areas in which flap was not practiced. Jeong and cols in 2007 [4]published a comparative study in dogs about socket healing after the insertion of an implant with or without flap, showing that sites with flapless technique showed a higher-osseointegration (greater contact bone implant-BIC) and less peri-implantary bone loss, which was

measured by greater crestal bone height in these implants. Furthermore, You et al. 2009 [4] repeated the previous model, finding three months after the implant surgery that the flapless technique could reduce gingival inflammation, reduce the height of the junctional epithelium and reduce the bone loss[8].

• Reduced surgical time:

The absence of flap and suturing greatly simplifies the surgery, shortening its duration in most of the cases [5]. However, we should not forget that this type of surgery requires special concentration when it comes from a technique without direct vision of the bone. For this reason, planning the intervention normally needs a greater dedication and time than conventional implant surgeries (for virtual planning). In a prospective multicenter study, Becker and cols [2] evaluated the technical flapless placement of implants and determined that, besides being a predictable procedure, it was done in a shorter period of time compared to the conventional technique, with 28 minutes on average of duration of the surgery. However, Lindeboom and van Wijk [9]in a report on the year 2010, did not find significant differences in the duration of the procedure between the two techniques.

• Lower morbidity and an increase on patient comfort:

All the studies agree that the postoperative period in these cases is much less symptomatic in contrast to conventional surgery[2]. As patients declare a more comfortable post-operative, are also much more satisfied with the treatment.

• High survival rates:

In Brodala's systematic revision, [5] there are fourteen studies, with a total overall of 2040 implants in 778 patients with 19-months-average monitoring. Its results show a survival of 98.6% in the prospective studies, and of 95.9% in the retrospectives. In a recent study, Rousseau [8] in 2010 placed 174 implants in 121 patients using flapless technique and compare with a control group to which conventional surgery's performed; They evaluate success, safety and bone changes, finding a 98,3% of success after two years with flapless technic, not having statistically meaningful differences compared to flap technique. Also, Jeong et al. (19) in 2011 conducted a prospective essay over 432 implants achieving 100% of success after a year, with an average bone loss of 0,3 mm. They Conclude that flapless technique is predictable, managing to preserve Crestal bone and peri-implantary mucous health[8].

III. LIMITATIONS AND COMPLICATIONS OF FLAPLESS TECHNIQUE:

As noted from the revision of the scientific evidence, flapless technique presents certain limitations as well which are analyzed below:

• A blind technique:

The lack of flap reflection and the small diameter of mucous openness make a minimal surgery field exist, thus the vision is very limited, being hindered the correct view of cortical, the form of the crest or the concavities. This will ease the arising of complications such as fenestration of cortical, bad implant placing and its bad angulation. As a consequence of all this, it will be fundamental to make a correct previous diagnosis, both clinical and radiological, as well as a proper surgery planning in order to prevent improvisations and intra-operatory complications[3] .In addition to having various radiological researches, specially the orthopantomography and conic beam CT in which the dimensions in the zone to intervene will be seen, it is important to have different clinical resources to determine bone crest width in order to take the decision of whether to conduct or not flapless technic; therefore the use of caliber, endodontic files to evaluate gingival size, crest palpation, etc will help taking decisions on this kind of cases. These limitations make this technique, according to various authors, restricted to experienced surgeons that can obviate the limitations it presents. Domínguez Campelo and Domínguez-Cámara carried out in 2002 an essay making flapless technique along 10 years, finding a 25% of complications in the cases treated in the first year, and a decreasing incidence in the following years until achieving the lack of them in the 10th year, what authors blame on the learning curve. [3]

• Risk of damaging anatomic structures:

The limits on the view have as consequence the possibility of damaging neighbor structures such as cortical, specially the buccal cortical, neighbor teeth roots, important nerves or the sinus. However, even though it is a relatively frequent clinic situation in inexperienced hands, very few essays consider this circumstance Dominguez Campelo 2002, Cannizzaro 2007, Wi-ttwer 2006, 2007, Di Giacomo[4]. It would be interesting that the prospective series included among their variables the presence of injuries to neighbor structures, relating them to the surgeon's experience.

• Difficulty of keratinized gum:

There is some controversy about the role that plays the around-implants keratinized gum, and the success in the long term of them. While there are authors that have defended that lack of keratinized gum does not influence on the success of implants in the long term, [10] the currently most-followed trend is that, although it is not essential, the failure rates are higher when there is little or no keratinized gum around the implant, [11] idea that matches with our results[8].

• Impossibility of flap handling:

For aesthetic reasons not lifting a flap and limiting the openness to just a few millimeters, makes very difficult to conduct this periodontal plastic surgery technics to increase the volume of soft tissues buccal to the implant, or improving the situation and volume of the papilla. These operations get to improve the aesthetic of rehabilitations, ensuring at the same time long-term stability of soft tissues around the implant. For this reason, in those cases in which there is little volume of soft tissues it will be better to conduct a conventional surgery for improving the situation of perimplantary soft tissues[8].

• Impossibility of evaluating and treating bone defects

For the same reasons, low visibility prevents the correct evaluation of bone crest and determining the existence of irregularities such as dehiscences or fenestrations that may compromise the correct intraosseus placing of the implant. Crestal defects go equally undetected and cannot be properly regenerate or regularized. Therefore, in the event of clinical or radiological bone injuries suspicions, it would be more advisable to proceed with a flap reflection to be able to properly see the surgery area and to apply, if needed, bone regeneration processes which ensure long-term stability of peri-implantary tissues[8].

IV. CONCLUSION:

Flapless technique in Implantology falls within the concept of minimally invasive surgery that has been taking prominence throughout last years in different medical disciplines. In Implantology, this technique allows to make intervention with a minimum aggression to both the bone and soft tissues, shortening the surgery time and achieving high levels of satisfaction by the patient. However, the technique is not exempt from complications and limitations; the main obstacle of flapless surgery is the fact of limited visibility of the drilling and during implant placement, so the risk of causing wrong bone directions or damaging neighbor structures is higher than with the conventional technique. The impossibility of performing bone regeneration or soft tissues handling technics would be the other great inconvenience of the technique. For all this, flapless surgeries should be restricted to well-selected cases in which a proper clinical and radiological planning has been made. Patients treated with anticoagulant drugs or medically compromised equally can get benefitted by this minimal invasion technique.

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