

Flapless Dental Implant: Contemporary Trends in Literature Coverage

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Abstract

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. The present work aims to produce a thorough review of the literature published on the field of Implantology with flapless implant surgery, to determine the current scientific evidence of the technique. After presenting the contemporary trends in literature coverage, we can say that flapless surgeries should be restricted to well-selected cases in which a proper clinical and radiological planning has been made.

Introduction

The cause of the increased initial bone loss within the first year after insertion is not fully understood, and based on data available to date there is evidence that effect of surgical trauma caused by raising a mucoperiosteal flap is a subject of scientific investigation [1-4]. The idea that the attendant temporary interruption of the blood supply to the outer layers of the bone could possibly cause increased alveolar ridge resorption [1-5]. Maier reported a prospective cohort study for measurement of a mean cumulative crestal bone loss after one year of implant placement with flapped or flapless surgery. It was reported that flapless implant insertion caused less peri-implant loss than implant insertion with flap preparation. Therefore, the flapless procedure represents a protective and promising method in implant surgery [1,6,7]. Laleman et al. [8] reported a systemic review for guided implant surgery in the edentulous maxilla, nevertheless, almost all implants included in this review were placed without flaps.

Theoretically, this could have several advantages: the procedure is less time consuming, bleeding is minimal, implant placement is expedited and there is no need to place and remove sutures [8-10]. Prati et al. [10] reported a 3-year prospective cohort study to evaluate the survival rate and marginal bone loss (MBL) of 132 calcium phosphate-blasted implant inserted by a flap or flapless technique and to study the morphochemical characteristics of the implant surface. It concluded from Prati's study that flapless

and flap technique demonstrated similar results of MBL at the preloading healing period and at the months to 3 years post-loading periods. Both surgical procedures induced an early MBL during the preloading stress-free period. Implant diameter, mandibular/maxillary location, preloading stress-free period, and smoking habits affect MBL more than the type of surgery after both short and long-term follow-up [9,10].

Hsu et al. [11] reported a study for a comparison of clinical and radiographic outcomes of platform-switched Implants with a rough collar and platform-matched implants with a smooth Collar as one year randomized clinical trial. Our concern in this study is the suggestion of the feasibility and predictability of single implant placement with a flapless approach and an early loading protocol in the esthetic zone [11]. The overall implant survival rate was comparable with those seen in previous studies using either the flapless technique or an early loading protocol [12]. With the limitation of Hsu et al study, they concluded the computer-aided flapless surgery in conjunction with an early loading is a feasible and predictable approach, with a 100 % survival rate after 1 year of function in this population, and the flapless approach helped to maintain soft tissue profile in the esthetic region. The mean marginal bone loss was less than 1 mm in both groups, and soft tissue profiles remained stable for up to 1 year of function. Additionally, all patients in both groups expressed high satisfaction [12].

Review of Literature

Pub Med databases were used to search for published articles about flapless implant technique. The search term “flapless implant,” sorted by “publication date “ for the last 5 years was used to capture all relevant articles [13] Additional hand searching was performed to examine five main journals in the field: The International Journal of Maxillofacial Implants, Journal of Oral Implantology, Implant Dentistry, European Journal of Oral Implantology, and Clinical Oral Implant Research. Clinical studies, clinical trial, systemic reviews and case series using this technique were included. Letters to the Editor, animal studies, non-English publications, and unpublished articles were not sought. Some articles were directly excluded after reading only their titles. At this stage there were 42 articles included, and the inclusion and exclusion criteria were defined. These articles were included in introduction and discussion in addition to that, more reviews of literature had been included regarding flapless implant technique.

Main Outcomes of Selected Studies

In recent implant dentistry, computer-assisted surgery (CAS) is becoming more popular and achieves prosthetically driven implant placement [14] CAS was first introduced by Van Steenberghe et al. [15,16] The key to computer planning is transferring the planning to the patient using a surgical template that allows placement of the implant directly through the tissue without the reflection of the flap [17-19] Furthermore, immediate restoration is possible because of precise fit, excellent primary stability achieved, and the ability to make a pre-implant model [20] This procedure allows restoratively driven implant placement and restoration to provide a more natural environment for soft tissue formation [21,22]. Nevertheless this approach will be promising future for esthetic zone areas without any intervention for alveolar bone exposure or soft tissue reflection. Recent studies reported identified risk factors for flapless implant surgeries such as type 4 bone, smoking, periodontal disease, the immediate loading only in the flapless group in some studies is a confounding factor, the use of grafts, the use or not use of surgical guides, different prosthetic configurations, and the insertion of implants from different brands and surface treatments [23-26].

Discussion

El Chaar and Castano were conducted a retrospective review of patient records in a single private practice to evaluate the efficacy of immediately placing a novel implant design in posterior jaw locations using a flapless technique [27]. Within the Limitation of this study, it was concluded Implants immediately placed into fresh extraction sites and definitively restored with single-tooth restorations no sooner than 4 months after implant placement achieved survival and success outcomes greater than 95%, which is equivalent to reported outcomes for implant-supported, single-tooth restorations subjected to conventional delayed placement and loading protocols. Periodontitis and other co-morbid conditions did not influence the outcome [27] therefore, the use of flapless implant placement as a “routine” procedure in daily practice need more expertise and professional surgeons, nevertheless during implant surgeries, surgical trauma and patient morbidity should

be confined to a minimum [28,29] Overall, to accurately assess the merits of the flapless technique, more studies with similar loading protocols that objectively compare conventional surgery with a flapless approach are needed. Importantly, the available short-term data demonstrate that flapless surgery, initially recommended for novice surgeons, requires more experience and presurgical planning than was originally assumed. Furthermore, this technique is often more demanding than the conventional surgical approach [30]

(Recent studies) Romero-ruiz et al reported different advantages which increase the demand by clinician and patients [31,32]:

- a. Faster healing of soft tissue [1].
- b. Minimal interference on the blood supply.
- c. Reduction of bleeding.
- d. Reduced surgical time [2].
- e. Lower morbidity and an increase on patient comfort [3].
- f. High survival rates [33].

Meanwhile, as noted from the revision of the scientific evidence, flapless technique presents certain limitations [34]:

- A. A blind technique which lead to 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.
- B. Risk of damaging anatomic structures.
- C. Difficulty of keratinized gum which is lack of keratinized gum does not influence on the success of implants in the long term, 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 [5].
- D. Impossibility of flap handling for aesthetic reasons which explain, 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. 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 peri-implantary soft tissues [35].
- E. Impossibility of evaluating and treating bone defects which leads to low visibility which 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 [36].
- F. 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.

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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