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Comparison between flapless and flap dental implant surgery: A clinical and radiographic study

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Abstract

Background and objective: Flapless implant surgery has been suggested as a suitable treatment technique for implant placement, but limited information exists regarding the clinical conditions after flapless implant surgery. This study aimed to compare flapless implant surgery with traditional flap implant surgery clinically and radiographically.

Methods: Sixty patients (23 males and 37 females) participated in the present study. The patients were divided into two groups, in the Group 'A' 30 implants were placed by traditional flap surgery and in Group 'B' 30 implants were placed by flapless implant surgery (punch technique). Clinical and radiographic examinations were carried out to assess the implants condition. Clinical examination included implant mobility which was assessed by using universal torque ratchet at the end of healing period (6 months). The periapical radiograph was carried out to assess marginal bone loss around the implants at three and six months after implantation.

Results: Two implants failure were reported; one implant for each of the Group 'A' and 'B'. There was no significant difference between the two groups with regard to the marginal bone resorption (P = 0.487). The success rate for both groups was 96.6%. The study showed a non-significant relation of age and gender with the success rate.

Conclusion: The flapless implant surgery could offer advantages over the classic protocol and should have the potential to increase the patients' acceptance of the procedure.

Keywords: Flapless implant surgery; Flap implant surgery.

Introduction

Today surgery aims to exploit less invasive surgical procedures as much as is possible. There is need to reduce patient and surgeon discomfort, duration of surgery and hospitalization, unaesthetic outcome, pain and tissue trauma. A number of authors have demonstrated that this should be applicable.[1-3] Osseointegrated dental implantation is traditionally performed by a flap approach that makes necessary soft tissue flap reflection and suturing after implant placement.[4] Other techniques to the flap approach have been used in recent years. Flapless surgical approaches have been developed that can yield function, esthetics and comfort with minimally invasive surgery.[5,6] Although flapless surgery for implant placement has been gaining popularity among implant surgeons in our region, but there have been no study on flapless implant surgery by our researchers so that the study could fill in gaps in knowledge about an important subject concerning the dental implantology. This study aimed to compare flapless implant surgery with traditional flap implant surgery clinically and radiographically.

Methods

In a prospective clinical comparative study, 60 patients were randomly enrolled. All of the patients were operated from July 2010 to March 2011. The patients were divided into two groups; Group A: (Control group) involved implant placement with traditional 3-sided flap reflection (30 patients). Group B: (Study group) involved implant placement without flap reflection (flapless;

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punch technique) (30 patients). The surgical procedure for control group included full thickness three-sided flap was reflected for a clear surgical field. The incision line was extended through interproximal and sulcular tissues of the adjacent teeth with two vestibular incisions. Periosteal elevator was used to reflect a full-thickness flap and expose the alveolar bone. Implant bed was prepared (sequential increase in diameter). The implant fixture was inserted by wrench to the level of the margin of the implant bed in the ridge. The healing screw was installed to the implant. The flap was replaced back in place and fixed in position by sutures. For the study group the soft tissue of the proposed implant site was punched with a soft tissue punch until bone contact and as a result, a circular incision in the gingival part of the alveolar crest was performed. Then, a core of soft tissue was removed from over the crestal bone (Figure 1). Implant bed was prepared (sequential increase in diameter). The implant fixture was inserted by wrench to the level of the margin of the implant bed in the ridge. A permucosal healing abutment (gingival former) was inserted. Clinical and radiographic examinations were carried out to assess the implants condition. Clinical examination included implant mobility which was evaluated by using universal torque ratchet at the end of healing period (6 months). The periapical radiograph was taken to assess marginal bone loss around the implants at three and six months after implantation, the distance between the fixture shoulder and the apical level of the marginal bone that in contact with the implant was measured. The measurements were made at the medial and distal aspects of each fixture and the mean values for each case was calculated. This study was approved by the Research Ethics Committee at the College of Dentistry at Hawler Medical University. Patients' consents were obtained before involving them in the study. The statistical package for the social sciences (version 11.5) was used for data entry and analysis, and student's t-test was used to compare between two means. Chi-square test of association was used to compare between two proportions. A *P* value of ≤0.05 was considered as statistically significant.

Results

Sixty patients participated in the present study. The age of the patients ranged from 19 to 75 years. Twenty three patients (38.3%) were males and 37 patients (61.7%) were females. The final torque of each implant in both groups was measured (Table 1).

Table 1: Final torque of the implants.

Final torque	Group A No. (%)	Group B No. (%)
< 20 nm	1 (3.34%)	1 (3.34%)
≥20 nm	29 (96.66%)	29 (96.66%)
Total	30 (100%)	30 (100%)

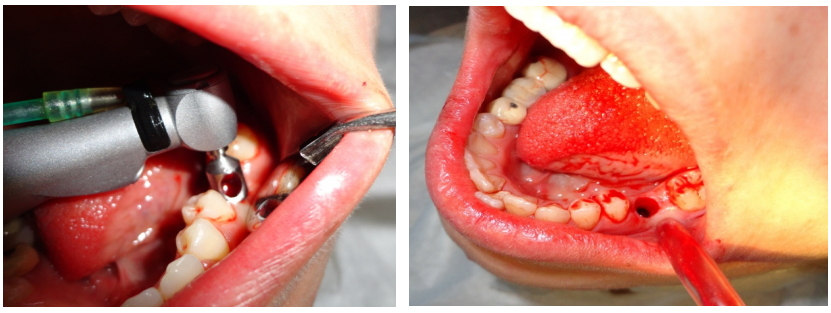

Figure 1: The soft tissue of the proposed implant site was punched.

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Two implants were failed; one for each group (Table 2). Age range distribution and its relation to the success rate were not significant statistically (*P* = 0.241) as shown in Table 3. The relationship of the gender with the success rate was insignificant statistically (*P* = 0.068) as shown in Table 4. The difference in the marginal bone resorption in the group A and B were not significant statistically (Table 5). The study showed the mean duration of surgery in the control group was 17.63 minutes and 5.90 minutes for the study group.

Table 2: Success rate in both groups.

Outcome	Group A No. (%)	Group B No. (%)
Failed	1 (3.34%)	1 (3.34%)
Successful	29 (96.66%)	29 (96.66%)
Total	30 (100%)	30 (100%)

Table 3: Age range distribution in relation to the success rate.

Implant outcome	Age group No. (%)			Total	*P* value
	<34 years	34-50 years	>50 years		
Failure	0 (0%)	1 (1.66%)	1 (1.66%)	2 (3.32%)	
Successful	17 (28.33%)	33 (55%)	8 (13.35%)	58 (96.68%)	0.241
Total	17 (28.33%)	34 (56.66%)	9 (15.01%)	60 (100%)	

Table 4: Relationship of gender with the success rate.

Implant outcome	Gender		Total	*P* value
	Male No. (%)	Female No. (%)		
Failure	2 (3.33%)	0 (0 %)	2 (3.33%)	
Successful	21 (35%)	37 (61.67%)	58 (96.67%)	0.068
Total	23 (38.33%)	37 (100%)	60 (100%)	

Table 5: Statistical analysis of the difference in marginal bone resorption between group A and B.

Type	Number	Mean	SD	t value	*P* value
Implants in group A	30	0.1643	0.13935	-0.70	0.487
Implants in group B	30	0.1967	0.20424		

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Discussion

In our study, the difference in the success rate between both groups was insignificant statistically, and this comes in agreement with Berdougo et al.,[7] Sanna et al.,[8] Shaifulizan et al.,[9] Oh et al.,[10] Rao and Benzi.[11] While other authors Jeong et al.,[12] Jeong et al.[13] and Choi et al.[14] showed more success rate in the flapless implant surgery. They related the cause to that the periosteum and peri--implant mucosa are more vascularized in the flapless group than in the flap group.[15] Our study showed non-significant effect of gender on dental implant success. Similar findings were reported by other authors.[7,16] But Zix et al.[17] showed a high success rate in male patients. They attributed this result to older age and postmenopause of the female patients (worse bone density). These findings are not applicable to all women in general,[17] and our results agree with this view. The age of the patients didn't show a direct relation to the success rate. Similar findings were reported by Campelo and Camera,[1] Becker et al.,[2] Berdougo et al.,[7] van Steenberghe et al.[18] However, other authors like Moy et al.[19] and Porter and Fraunhofer[20] showed a higher success rate of implants in younger age, and the results of the present study attributed to the young age of the patients; there were only 9 patients in which their age was more than 50 years, all the remaining patients were below 50 years and the mean age of all participated patients was 39.65 years. The difference in bone resorption between both groups was not significant (P = 0.487). Similar findings were reported by Becker et al.,[2] Sanna et al.,[8] Shaifulizan et al.,[9] Van der Zee et al.[21] While other authors like Jeong et al.,[12] Jeong et al.,[13] Choi et al.[14] found that there was a significant difference in bone resorption between both groups. More bone resorption in traditional implant surgery, because with flapless approach periosteum is not reflected. It maintains better blood supply to the site reducing the amount of bone resorption. An understanding of the causes of early crestal bone loss around the dental implants is critical. Several hypotheses have been suggested, ranging from reflection of the periosteum during surgery, prepara-tion of the implant osteotomy, bacterial invasion, the estab-lishment of a biological width, and the presence of stress factors.[22-25]

Conclusions

Dental implant placement with the flapless approach is a predictable procedure when patient selection and surgical technique are intended and it could offer advantages over the classic protocol and should have the potential to increase the patients' acceptance of the procedure.

Conflicts of interest

The authors report no conflicts of interest.

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