A MEASURE OF CLINICAL OUTCOMES IN DENTAL IMPLANT FLAPLESS SURGERY VERSUS FLAP TECHNIQUE IN POSTERIOR MAXILLA OF POST MENOPAUSE WOMEN

N. Doan; [2,4]M. Nguyen; [1]Z. Du; [2]P. Reher; [3]Y. Xiao[2,4]

(1) Hue University of Medicine and Pharmacy, Vietnam

(2) Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, Australia

(3) School of Dentistry and Oral Health, Griffith University, Gold Coast, Queensland, Australia

(4) School of Dentistry, the University of Queensland, Brisbane, Queensland, Australia

Abstract

To examine the clinical outcomes of implants inserted using split mouth study and to measure patients' satisfaction using visual analogue scale in flapless and conventional flap techniques in post menopause women age 50 years or over. ***Materials and methods:*** This study is a retrospective split mouth study of flapless vs flap technique involving the study of dental records of 16 post-menopause of patients undergoing bilateral implant surgery in the posterior maxilla. A total of 45 implants with no augmentative procedures were selected from 16 patients for the study. The patients were divided into two groups: the control group had 21 implants placed by full flap technique, and the test group consisted of 24 implants inserted using flapless procedure. Only those patients with comprehensive clinical record were included in this study. The treatment outcomes were measured using key words: implant survival, Visual Analogue Scale (VAS), Periotest, x-ray assessment. ***Results and Discussion:*** The results showed that flapless surgery had comparable, similar results as compare to flap surgery: survival rate (95.8% and 95.2%), Using visual analogue scale (VAS=0 to 10), flapless surgery revealed to have less: pain, swelling, bleeding and speech impairment and had better overall satisfaction at one day and one week than flap technique than the flap counterpart (*p<0.05). No significant difference in bone resorption at 3 months. After one year, bone change in the flap group vs the flapless group was statistically significant [-0.53 (±0.57) vs +0.08 (±0.49), **p<0.005]. No significant difference in Periotest value (PTV). ***Conclusion:*** This study showed that implant flapless surgery is a minimal invasive, effective, and novel technique that can render a significantly better early stage satisfaction outcome as compare to the traditional flap method. Flapless implantation resulted in minimal bone loss, less pain, less complications, and comparable good PTV.

Keywords: Dental implants, flapless surgery; osseo-integration; post menopause; posterior maxilla

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1. INTRODUCTION

Osseo-integration is the process that occurs immediately after placement of a dental implant into the recipient bone, involves a number of events that can be affected by many factors such as patients' health status, location selection, surgical methods, systemic and local environments, and medication used [1, 2, 3]. There are plenty of suggestions that success rates of implant procedures greatly decreased with age and specific medical conditions, such as post menopause osteoporosis [4,5]. Inferior bone quality and quantity such as those discovered in post menopause women may leave a negative outcome on osseointegration [3]. Poor bone quality are normally discovered in post menopause women [5]. Generally, in early stage of osseointegration, radiographical imaging can detect a small amount of marginal bone loss surrounding dental implants, and this is considered to be acceptable [6]. A slight loss of the interface between implant and tissue starts at the crestal region irrespective of submerged or nonsubmerged techniques, and research has revealed that during the first year of function, it is normal to have a mean bone loss between 0.9 and 1.6 mm [2,9].

The review of the publications in the posterior maxilla areas shows that flapless surgery could be a viable and predictable treatment method for implant placement, indicating both efficacy and clinical effectiveness with some reservation[1,2].

- *Corresponding author: Nguyen Van Minh, email: minhnguyenrhmhue@yahoo.com.vn*
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Minimal invasive surgery has transformed modern-day surgery including dental implantology, especially flapless surgery [2].

Implants survival is an important means to quantify the survival of dental implants and it was recorded as the presence of the implants at the end of the studied [2].

To measure patient satisfaction, the study employs McGill questionnaire on a visual analogue scale (VAS) [7].

The Periotest device was employed to determine the stability of implants (Periotest Values or PTV) at implant placement stage [6]

Digital x-ray assessment is the most common means for bone level or marginal bone height assessment [2,8].

The aim of this study is to examine the clinical and radiographic outcomes of implants inserted using retrospective split mouth study and measure patients' satisfaction using visual analogue scale in flapless and conventional flap techniques in post menopause women age 50 years or over.

2. MATERIALS AND METHODS

This study was approved by the Ethic committee of the Queensland University of Technology, Brisbane, Australia.

The study was carried out in a private setting using a retrospective split mouth research of flapless vs flap technique involving the review of dental records of 16 post menopause patients undergone bilateral implant surgery in the posterior maxilla.

A total of 45 implants with no augmentative procedures were selected from the records of 16 patients. The patients were divided into two groups: the control group had 21 implants placed by using a full flap technique and the test group (Fig. 4) consisted of 24 implants inserted using flapless procedure. All implants placed using non-submerged techniques (Fig.1). The inclusion criteria includes: good dental records with adequate treatment and feedback information, dental implants placed in posterior maxilla of post menopause women with one side used flap technique and the other side used flapless method.

The opposing jaw was either with fixed prosthesis or natural dentition. The implant placed on both side of the jaw was aided by the same designed surgical stent. In the flapless side no flap was raised while the contralateral side flap was used. Clinical evaluations were carried out using the following measures:

A. Implant survival

Implants survival was recorded as the presence of the implants at the end of the studied period (1 year).

B. Visual Analogue Scale (VAS) assessment

To measure patient satisfaction, the study employs McGill questionnaire on a visual analogue scale (VAS) ranges from 1 to 10 of which 1 as having no pain and 10 is the worst pain (Fig. 2). The patients were asked to record their overall satisfaction on sensation of discomfort on a visual-analogue-scale with 0% being totally unsatisfied and 100% being completely satisfied (Fig.3). The VAS scores were recorded for both sides at one day, one week, one month and three months follow up. The VAS scores obtained were analyzed for statistical significance.

C. Periotest values (PTV)

The Periotest device was employed to determine the stability of implants at implant placement stage as well as at subsequent recall appointments at one month and three months. The Periotest's scale varies from -8 to +50. The lesser the Periotest value, the greater is the stability / hampering effect of the test object (tooth or implant). At these assessing visits, healing posts were connected to the implants, and the patient was positioned so that the maxilla is in a horizontal position. The periotest probe was pushed flat upright to the implant post, and it was made to touch base as close to the alveolar crest as possible. The total implants involved in the study were evaluated in lateral directions. Acceptable readings were obtained only when the device registered the comparable values in three consecutive values.

D. X-ray assessment for bone level

A digital periapical x-ray was carried out for each implant using identical holders to assess marginal bone height at the time of surgery, at one month, three months, and one year. The digital x-rays were calibrated to calculate the differences in bone height and bone loss.

The pertinent implant features such as: site, sizes, design, and other relevant characteristics were recorded. The x-rays were appraised by two experienced and unbiased assessors by means of a grid to determine the dimension of the implant and the proportion of bone loss in millimeters.

E. Statistical analysis

One way analysis of variance was performed for statistical significance.

Figure 1. Dental Implant Surgery Flapless Surgery versus Flap Technique in Posterior Maxilla of Post Menopause Women

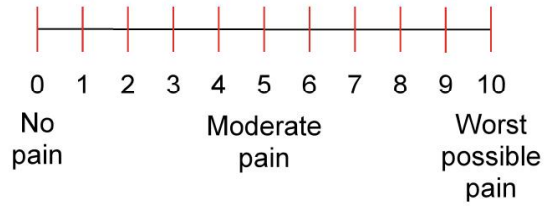

Figure 2. Pain assessment using Visual Analogue Scale

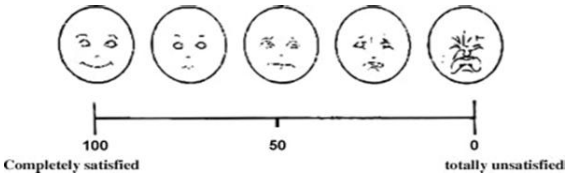

Figure 3. A measure of overall satisfaction

3. RESULTS

From all the dental implant records at 2 private dental practices, a total of 16 patients 45 implants were selected. The first post menopause split mouth posterior implant patient was found in 2004 and the last of these implants patient was recorded at the end of 2013. Of 45 implants inserted, 21 were flap and 24 flapless. All the placed implants were of conventional/delayed (3-4 months) loading. The restored implants consisted of 35 definitive crowns and 4 bridges.

Survival rate for the two techniques showed a 95.2% (1 lost) for flap and 95.8% (1 lost) for the flapless technique.

Using *visual analogue scale (VAS=0 to 10)*, flapless surgery revealed to have less: pain, swelling, bleeding and speech impairment and had better overall satisfaction at one day and one week than flap technique than the flap counterpart [Fig. 4, (*P<0.05)]. The experienced pain was significantly lesser in the flapless-group compared to the full flap group with [1.2 (±1.65) vs 4.6 (±1.94) (*P<0.05)]. The patients reported an overall pain of 2.9 (±1.79). Compare the flap vs flapless group, Percentage (%) of Overall Satisfactions were statistically significant at 1 day [(32.5 (±27.5) vs 93.2 (±8.70), *P<0.05] and 1 week [55.3 (±20.4) vs 83.2 (±9.10), *P<0.05] but not at 1 month [80.9 (±12.2) vs 88.1 (±8.90)] and 3 months [81.2 (±15.3) vs 87.3 (±16.2)] (Fig. 4).

No significant difference in bone resorption at 3 months. After one year, bone change in the flap group vs the flapless group was statistically significant [-0.53 (±0.57) vs +0.08 (±0.49), **P<0.005]. An overall marginal bone loss of 0.23 mm (±0.61) was recorded in remodeling resulted in the flapless-group to a small growth in marginal bone height of 0.08 mm (±0.49) (Fig.4). No recessions were observed. No significant difference in Periotest value (PTV).

	Control group flap	Test group flapless	Overall results
Number of implants placed	21	24	45
Number of implants failed	1	1	2
Loading method	Conventional/ delayed	Conventional/ delayed	
Type of prostheses	15 crowns and 2 bridges	20 crowns and 2 bridges	35 crowns 4 bridges
Survival rate (1 year)	95.2%	95.8%	95.5%

Visual Analogue Scale (0 = lowest and 10= highest)	Pain	4.6 (±1.94)*	1.2 (±1.65)*	2.9 (±1.79)
	Swelling	9.1 (±2.16)*	2.1 (±1.59)*	5.6 (±1.88)
	Bleeding	7.8 (±1.75)*	1.4 (±1.65)*	4.6 (±1.70)
	Speech impairment	6.9 (±1.43)*	1.1 (±1.01)*	4.0 (±1.22)
Percentage (%) of Overall Satisfaction (Visual Analogue Scale 0 = lowest and 100 = highest)	1 day	32.5 (±27.5)*	93.2 (±8.70)*	62.9 (±18.1)
	1 week	55.3 (±20.4)*	83.2 (±9.10)*	69.3 (±18.1)
	1 month	80.9 (±12.2)	88.1 (±8.90)	84.5 (±10.6)
	3 months	81.2 (±15.3)	87.3 (±16.2)	84.3 (±15.6)
Bone resorption at 3 months in mm (+= gain and -= loss)		-0.75 (±0.55)	-0.63 (±0.67)	-0.69mm
Bone changes (1 year) in mm (+= gain and -= loss)		-0.53 (±0.57)**	+0.08 (±0.49)**	-0.23mm
Periotest value [-8 (least mobile) to +20 (most mobile)]	Day 0	-3.62 (±0.81)	-3.51(± 0.87)	-3.57 (±0.84)
	1 month	-3.83 (±1.21)	-3.42 (±1.62)	-3.63 (±1.42)
	3 month	-4.01(±1.37)	-4.14(±1.73)	-4.08 (±1.55)

Statistical significance: *P<0.05 and **P<0.005

Figure 4. Overall results

4. DISSCUSSION

This study has showed that flapless dental implant surgery is a minimal invasive novel technique that can deliver a fairly good survival rate in contrasted with other reports employing traditional flap methods. It has also underpinned the view that flapless surgery can render a predictable result with superior efficiency and efficacy even in poor quality bone such as those found in post menopause women in this study.

Visual analogue scales (VAS) are used widely for discomfort measurement, though it is subjective, but it remains useful tool for quantifying arbitrary data if it is used properly. In this study, it demonstrated the superior satisfaction of flapless technique to the conventional flap counterpart.

The evaluation of Periotest Value (PTV) pointed out that it is a most likely substitution for old-fashioned, unreliable dental implant strength diagnosis apparatuses. The Periotest possesses advantage of presenting consistent results by quantifying the degrees of subclinical movement utilising an ultrasonically pulsating probe. The Periotest is effective in measuring the firmness level of an implant. Though Periotest can detect terminal or failed implants, it has inherent disadvantage in identifying bone quantity in normal osseointegration. Therefore, digital radiography showed to be a more subtle technique of verifying peri-implant bone loss though digital x-rays used in the assessment in this study did not offer the possibility of a three-dimensional evaluation. Hence, digital periapical radiographs along with Periotest apparatus were discovered to give the highest dependable appraisal of an implant's condition.

About one implant failed in each group, the cause is the failure of osseointegration. We had remove implant after one week but there were not influenced the result of dental restoration.

In term of overall satisfaction, patients appeared to be more satisfied in the early stage of the treatment, and not at the later stage when the implants wound were almost healed then satisfaction rate appeared to be of no difference.

5. CONCLUSION

This study showed that implant flapless surgery is a minimal invasive, effective, and novel technique that can render a marginally better early stage satisfaction outcome as compare to the traditional flap method

in post menopause women. Flapless implantation resulted in minimal bone loss, less pain and fewer complications. Periotest is an effective alternative in measuring the firmness level of an implant, and digital periapical radiographs along with Periotest apparatus were discovered to give the highest dependable appraisal of an implant's condition.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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Corresponding author: Nghiem Doan, PhD

Institute: Institute of Health and Biomedical Innovation

& Science and Engineering Faculty, Queensland University of Technology

Street: 60 Musk Avenue, Kelvin Grove, Qld 4059

City:Brisbane

Country: Australia

Email: doanco@bigpond.com.au