

Comparison of Wound Healing Using Envelope and Triangular Flap for Impacted Mandibular Third Molar Surgery

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ABSTRACT

Objective: To compare the wound healing with triangular flap versus envelope flap techniques among patients undergoing surgical removal of the impacted mandibular third molar (IMTM).

Study Design: An open label randomized controlled trial.

Place and Duration of the Study: The Department of Oral & Maxillofacial Surgery, Bakhtawar Amin Medical and Dental College, Multan from January 2021 to June 2021.

Material and Methods: A total of 70 patients (35 in each group) of both genders aged 20 to 50 years requiring surgical removal of IMTM were included. Patients were asked to follow up on third and seventh day while observations regarding wound healing and pain were noted on 7th day among all cases completing the final follow up. Chi square was applied to compare data between both study groups taking p-value below 0.05 as significant.

Results: In a total of 70 patients, there were 42 (60.0%) female and 28 (40.0%) male. Majority of the patients, 36 (51.4%) were above 30 years of age while mean age was noted to be 32.4±9.1 years. Sixty two patients completed the follow up so they were included in the final analysis for the assessment of wound healing and pain. Overall, wound healing was observed to be in 55/62 (88.7%) patients while wound healing was found to be 30/32 (93.8%) patients in envelope flap group in comparison to 25/30 (83.3%) in triangular flap group (p=0.1953). Overall, there was no statistically significant difference in between both study group with regards to evaluation of pain (p=0.3271)

Conclusion: Both envelope flap and triangular flap techniques resulted in similar outcomes regarding wound healing among patients undergoing surgical removal of IMTM. Both flap techniques resulted in relatively similar degrees of post-surgery pain.

Keywords: Third molar, pain, wound healing.

INTRODUCTION

Surgical removal of the impacted mandibular third molar (IMTM) is known to be one the most frequently done minor oral surgeries.¹ Optimal understanding of the surgical principles is essential to perform surgical removal of IMTM. Mandibular 3rd molars are estimated to occur in around 90% of the general population whereas 1/3rd of the population have a least 1 impacted molar.^{2,3}

Incisions are made to achieve proper access and visibility to the surgical site for performing a clean surgical procedure. Envelope flap or triangular flap are 2 most commonly adopted techniques for surgical removal of IMTM. Various approaches are proposed for the extraction of the IMTM involving numerous flap techniques but no consensus is found regarding the best flap technique as conflicting results are reported in the literature.^{4,5} A study from Iran comparing envelope flap with triangular flap revealed that on follow up at 7-days, healing degree in envelope flap group was noted to be 0.89±0.73 in comparison to 0.037±0.6 in triangular flap group (p=0.005).⁶ Xie Q et al from China reported swelling and mouth opening scores to be much better in envelope flap group when compared to triangular flap group (p<0.05).⁷ A study done by Jakse N and Colleagues found envelope flap

technique for surgical removal of IMTM resulted in wound healing among 90% of cases in comparison to 43% in triangular flap group (p<0.05).⁸

In Pakistan, not much work is seen about the comparison of wound healing with different flap techniques for the surgical removal of the IMTM so the present study was aimed at comparing wound healing with triangular flap versus envelope flap among patients undergoing surgical removal of the IMTM. The findings of this study were thought to help provide some valuable insights about the comparatively better surgical approach in terms of post-operative wound healing following surgical removal of IMTM.

MATERIAL AND METHODS

This randomized controlled trial was conducted at Department of Oral & Maxillofacial Surgery, Bakhtawar Amin Medical and Dental College, Multan from January 2021 to June 2021. Approval from "Institutional Ethical Committee" was taken while informed and written consent was also acquired. Considering 95% confidence level, power 80%, wound healing with envelope flap technique as 90% and 43% in triangular flap group,⁸ a minimum sample size of 38 cases (19 in each group) was calculated.

Inclusion criteria was cases of both genders aged 20 to 50 years requiring surgical removal of IMTM. Diagnosis of IMTM was confirmed by correlating 3rd molar crown on occlusal plain and depth in alveolar bone on Orthopantomogram (OPG). Patients having chronic liver disease, diabetes mellitus, systemic illnesses or hematological disorders were excluded. A total of 70 patients (35 in each group) were included. Pre-surgery OPG radiographs were evaluated in all cases. In all cases, medical history was noted and clinical examination was performed. Randomization to both groups was performed through lottery method. Patients in envelop flap group were done by sulcular incision that extended from first to second molar while distal relieving incision was made to the mandibular ramus. A sulcular buccal incision was made in the center of the first molar. The mucoperiosteal flap was raised completely to buccal surface. Superficial retraction of lingual tissues was performed. In the triangular flap group, anterior incision curves forward from distobuccal corner of the crown of the crown of the second molar and finishing at mesiobuccal cup was made. Distally, the horizontal incision was stretched along buccal side to the external oblique ridge. Wound healing was described as unsatisfactory, satisfactory or excellent healing as stated by Landry RG criteria that involves tissue color, bleeding response to palpitation, presence of granulation tissue and incision margin. Wound healing as satisfactory and excellent were considered as “yes” while unsatisfactory was labeled as “no”. Pain was labeled according to a visual analog scale (VAS) scoring from 1 to 4 where 1 was “no pain”, 2 as “mild pain”, 3 “moderate pain” and “4 severe pain”. Patients were asked to follow up on third and seventh day while observations regarding wound healing and pain were noted on 7th day among all cases completing the final follow up.

SPSS version 24.0 was used for statistical analysis. Qualitative data was represented as frequencies and percentages whereas mean and standard deviation (SD) were calculated for quantitative data. Chi square was applied to compare data between both study groups taking p-value below 0.05 as significant.

RESULTS

In a total of 70 patients, there were 42 (60.0%) female and 28 (40.0%) male. Majority of the patients, 36 (51.4%) were above 30 years of age while mean age was noted to be 32.4±9.1 years. There were 42 (60.0%) patients who belonged to rural areas. Educational status of 14 (20.0%) patients was illiterate. Table 1 is showing comparison of characteristics of patients in both study groups (p>0.05).

Table 1: Comparison of Characteristics of Patients in Both Study Groups

Characteristics		Envelope Flap (n=35)	Triangular Flap (n=35)	P-Value
Gender	Male	15 (42.9%)	13 (37.1%)	0.6256
	Female	20 (57.1%)	22 (62.9%)	
Age in Years	<30	18 (51.4%)	16 (45.7%)	0.6324
	>30	17 (48.6%)	19 (54.3%)	
Residential Status	Rural	23 (65.7%)	19 (54.3%)	0.3291
	Urban	12 (34.3%)	16 (45.7%)	
Educational Status	Illiterate	6 (17.1%)	8 (22.9%)	0.5501
	Literate	29 (82.9%)	27 (77.1%)	

Table 2 is showing comparison of wound healing and pain on 7th day among patients of both study groups. Sixty two patients completed the follow up so they were included in the final analysis for the assessment of wound healing and pain. Overall, wound healing was observed to be in 55/62 (88.7%) patients while wound healing was found to be 30/32 (93.8%) patients in envelope flap group in comparison to 25/30 (83.3%) in triangular flap group (p=0.1953). None of the patients from any groups reported severe pain while there were 35/62 (56.4%) patients who were observed to have no pain on the 7th day follow up. Overall, there was no statistically significant difference in between both study group with regards to evaluation of pain (p=0.3271)

Table 2: Comparison of Wound Healing and Pain on 7th Day among Patients of Both Study Groups

Outcome Variables		Envelop Flap (N=32)	Triangular Flap (n=30)	P-Value
Wound Healing	Yes	30 (93.8%)	25 (83.3%)	0.1953
	No	2 (6.2%)	5 (16.7%)	
VAS Scoring for Pain	1	19 (59.4%)	16 (53.3%)	0.3271
	2	13 (40.6%)	12 (40.0%)	
	3	0	2 (6.7%)	
	4	0	0	

DISCUSSION

In the modernized world, choosing the right flap approach is the basic step towards achievement of satisfactory outcomes in the oral and maxillofacial surgeries. Different flap techniques are employed depending upon the types of impaction, accessibility and personal preference and convenience of the surgeons.^{9,10} Our aim in the present study was to compare envelope flap against triangular flap technique in terms of wound healing among patients undergoing surgical removal of IMTM.

In the present study, we noted relatively better outcomes with envelop flap technique in comparison to triangular flap (93.8% versus 83.3%) but the difference was not statistically significant (p=0.1953). Envelope flap has been described in the past to have better adaption of gingival margins, no pocket formations distal to mandibular 2nd molar, avoid difficult suturing in vestibule, no risk of facial artery or vein injuries and has no food lodgment which means that risk of infection is minimized. On the other hand, triangular flap has better access and visibility in deep seated impaction. Triangular flap is also considered to have easiness to retract flap margins away from the surgical site.¹¹ Our results are consistent with those found by Desai A and Colleagues where they noted no significant difference in terms of wound healing among patients with IMTM who underwent surgical removal by either triangular flap or envelope flap designs.¹¹ Baqain et al noted triangular flap design to have better post-surgery outcomes in terms of reduced facial swelling and improved mouth opening.¹² A study from Iran analyzing outcomes of envelope flap technique versus triangular flap found envelope flap design to accompany significantly better degree of healing degree (p=0.005).⁶ A study done by Jakse N et al noted significantly better wound healing among patients with envelop flap technique versus triangular flap (90% versus 43%, p<0.05).⁸ Another study noted no significant differences among patients undergoing envelope flap approach versus triangular flap in terms of

post-surgery pain and swelling.¹³ No consensus is seen about the best approach regarding surgical removal of IMTM as variation exist in post-operative findings linked with different flap approaches. As shown in the present study that flap design did not seem to have lasting effects on the health of the tissues so opting a flap design pretty much depends upon the need of the case undergoing surgery and personal preferences of the surgeon.

Out study also had some limitations. As this was a single center our findings cannot be generalized. Although, envelope flap design resulted in better wound healing in comparison to triangular flap design but the findings did not reach statistical significance which could have been due to the small sample size of patients in both study groups.

CONCLUSION

Both envelop flap and triangular flap techniques resulted in similar outcomes regarding wound healing among patients undergoing surgical removal of IMTM. Both flap techniques resulted in relatively similar degrees of post-surgery pain.

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