



Comparison of postoperative complications of envelope flap and triangular flap in surgical removal of mandibular third molar teeth, a double blind split-mouth study

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ABSTRACT

Introduction: Surgical removal of third mandibular molar is a common procedure in oral surgery. This procedure may have some complications. The aim of the present study was evaluation of the complications of envelope flap and triangular flap in surgical removal of mandibular third molar teeth.

Materials and Methods: this study was a double blind split mouth randomized technique. Sixty eight lower wisdom teeth from 34 patients were surgically removed. The triangular and envelope flaps were applied for each side and pain, edema and wound healing were assessed in second and seventh days after surgery. Data were analyzed by SPSS 21 software using non-parametric Wilcoxon Signed Ranks and t-test. P value less than 0.05 was considered significant level.

Results: There were no statistically significant differences between these two type of flaps in present of pain, edema and wound healing after surgery.

Conclusions: According to the results of the present study, selection of flap design depends on many variables like surgeon's preference and skill.

Key words: Third Molar, Pain, Swelling, Surgery, Wound Healing.

Introduction

Surgical removal of third mandibular molar is a common procedure in oral surgery. This procedure may have some complications. These complications include pain, swelling, hematoma, trismus, dry socket and periodontal damage to adjacent teeth. Post-operative

complications are inevitable after surgical procedures but reducing these sequelae is possible [1-4]. Many factors have influence on these complications. One of the most important factors is the surgical approach. Different surgical approaches are available to access to the lower 3rd

mandibular molar. In the surgical technique, many variables should be taken into consideration like the amount of ostectomy, tooth sectioning as needed and the flap design. In the literature, advantageous and disadvantageous of various flap design are discussed [4-6]. Wound healing after surgery is depended to surgery technique and surgeon experience, and also periodontal pathology and patient age. In all of surgery techniques injury to anatomical structures should be avoided [7].

Flap design is one of the factors influencing the severity of postoperative complications such wound dehiscence, trismus, pain and swelling [8]. Envelope flap with a distal releasing incision is the most common approach for lower third molar surgery mesioangular impaction is the most prevalent type of impaction in the lower jaw [9,19]. Baqain and et al showed no significant differences in pain, between enveloped and triangular flap design after removal mandibular third molar surgery, but swelling was significantly greater with triangular flap in early postoperative period [11].

In the Erdogan and et al study, much pain was in triangular flap based on VAS scale, and no significant differences between trismus and triangular flap and enveloped flap was seen [12]. In this double blind split mouth study, we compared the envelope and triangular flaps and their post operation complications such as pain, swelling and wound healing in 3rd mandibular surgical extraction.

Materials and Methods

Thirty four patients (21 women and 13 men) admitted to the oral and maxillofacial department of dental school of Tehran University of medical sciences were randomly selected. Including criteria were patients with no history of systemic disease, bilateral impacted teeth with the same position and difficulty as possible, no associated pathology to surgical site and not taken any NSAIDs or antibiotics in 2 weeks prior to surgery. All of them were healthy young people, without past medical or dental history. None of the patients had peri-coronitis or periodontal disease preoperatively. After obtaining informed consent from all the participants, bilateral surgical removal of mandibular 3rd molar teeth was carried out in one visit. All the operations were performed by the first author, underlocal anesthesia with lidocaine 2% and epinephrine 1:80000. Before operation, all the patients used mouthwash of chlorhexidine 0.2% for a minute. The flap design was selected randomly for each side of the patient's mouth

(coin randomization). In the envelope flap, the sulcular incision started from themesiobuccal papilla of first molar and extended to the distal of second molar and finally ended with a releasing incision towards the external oblique ridge of mandible. In the triangular flap, an oblique releasing incision was made in mesiobuccal part of second molar to the mandibular vestibule and the incision ended in distobuccal aspect of second molar with a releasing incision to the mandibular ascending ramus. In the end, the flap was closed with 4-0 silk sutures.

Pain, swelling and wound healing were evaluated for each patient in second and seventh days after surgery. Pain was evaluated by the patient using a visual analog scale (VAS) which was scaled from 0 to 10. 0 showed no pain, 1 to 3 mild pain, 4 to 6 moderate pain, 7 to 9 severe pain and 10 unbearable pain [8]. The size of swelling was evaluated with the help of a thread and ruler, measuring the distance from lateral canthus of the eye to the angle of the mandible for vertical dimension of swelling and also from commissure of the lip to the angle of the mandible for horizontal dimension of swelling. Wound healing was evaluated with a healing scale which is categorized the healing of oral mucosa into the 5 degrees. Zero shows good healing, 1 shows erythema in part of surgical site, 2 shows erythema in whole of the surgical site, 3 means dehiscence of the wound without pus discharge and finally 4 means dehiscence of the wound with pus discharge.

After the surgery, all the patients were prescribed tablet of ibuprofen 400 mg every 6 hours and capsule of amoxicillin 500mg every 8 hours and also mouthwash of chlorhexidine 0.2%, all of them for 1 week. Post operative considerations like using icepack within the first 24 hours after surgery, not to spit or smoke were instructed to all the patients. Assessment of pain, wound healing and edema was carried out in a blind manner. This means that the person who measured these variables were not aware of type of flap for each side. The non-parametric Wilcoxon Signed Ranks and t-test were used to analyze data. The result would be significant if P.value was less than 0.05. Ethical code was 4911.

Results

Thirty four people with the mean age of 22 years were enrolled in this study. None of them were excluded from the study. Sixty two percent of patients were female and 13 patients (38% of them) were male (Table 1). The average of surgery time in envelope flap

was 27 minutes and in triangular flap was 25 minutes. The difference in the time of surgery was 2 minutes with standard deviation of 8.6 which was no significant (p . value=0.15). The amount of swelling in second and seventh day of surgery was respectively 2.61 ± 0.34 % and 0.15 ± 0.07 % in envelope flap group and 2.73 ± 0.42 % and 1.05 ± 0.23 % in triangular flap (Table 2). Pain assessment with VAS in two days after surgery in envelope flap was 4.34 and in triangular flap 4.69 and in seven days after surgery was 0.77 in envelope flap and 1.35 in triangular flap (Table 3). None of the patients showed wound dehiscence or pus discharge during post operative clinical examination. Wound healing score for envelope flap and triangular flap is demonstrated in table 4. There were no statistically significant difference between these two flaps in pain, swelling and wound healing in days 2 and 7 after surgery ($P > 0.05$).

Discussion

There are different flap designs to access to the impacted lower mandibular third molar. We compared the envelope flap and the triangular flap because of the wide-spread use of these two flap designs. Most of the complications in third molar surgery are due to elevation of the mucoperiosteal flap in order to have a good access to the surgical site. Post-operative complications such as pain, edema and wound healing were evaluated. There were no statistically significant differences between these two flap designs in postoperative pain. Kirk et al believed that envelope flap give us good access to the surgical site [13]. Adequate blood supply and easy suturing are another advantageous of this technique. Periodontal damage to the teeth in surgical site, bone loss and wound dehiscence are the possible complication of this flap [5,14]. Triangular flap can be consider a more conservative approach because of smaller site of reflected mucoperiosteal flap. The surgeon may encounter some difficulties in extension of this flap unlike envelope flap. Review of literature shows that the flap design does not affect the health of second molar periodontium and does not influence the attachment loss [15,16]. In many studies primary or secondary closure of the surgical site were compared but in this study all the wounds were treated by primary closure. Sandhu et al found that pain in envelope flap is higher than bayonet flap [8]. Kirk et al found no difference in post-operative visits in both groups like this study [13]. There was not any statistical significant difference between two groups by consideration of swelling. Maximum swelling occurred in 24 to 48 hours after mandibular third molar surgery [17]. Sandhu et al had

reached to the same results but Kirk et al found more swelling in modified triangular flap in comparison of the envelope flap [8,13]. Wound healing in both groups was good and there was not a significant difference but in some literature the envelope flap was followed with higher rate of wound dehiscence [6,11,18]. The position and angulation of impacted teeth may have influence on post-surgical swelling [17].

According to the results in Rahpyma and et al study triangular transposition flap may prevent postoperative wound dehiscence more probably than the envelope flap [19]. Results of Yolcu and Acar study show that a new flap design is preferable to the triangular transposition flap for impacted third molar surgery [20].

In this study, the impacted teeth were in the same angulation to reduce the bias. All the patients received same drug regimen and the sutures were removed after a week. All the conditions for both groups were similar to each other.

Conclusion

The results revealed no difference in complications between triangular flap and envelope flap. Envelope flap showed less pain and swelling and shorter surgery time but it was not statistically significant. The flap design's selection is based on surgeon's preference and skill.

Variable	Patients
<i>Gender</i>	
Male	13 (38%)
Female	21 (62%)
<i>Age</i>	
Range	18-31 years
Mean	22 years

Table 1. Patients' data including age and sex.

Post-op day	Envelope flap(mean±SD)	Triangular flap(mean±SD)	P.value
2nd day	2.61±0.34	2.73 ±0.42	>0.05
7th day	0.15±0.07	1.05±0.23	>0.05

Table 2. Comparison of post-op swelling (%).

Post-op day	Envelope flap(mean±SD)	Triangular flap(mean±SD)	P.value
2nd day	4.32±1.98	4.69 ±1.79	>0.05
7th day	0.77 ±0.73	1.35 ±1.21	>0.05

Table 3. Comparison of post-op pain.

Post-op day	Envelope flap(mean±SD)	Triangular flap(mean±SD)	P.value
2nd day	1.59 ±1.23	1.47 ±1.31	>0.05
7th day	0.59 ±0.43	0.76 ±0.69	>0.05

Table 4. Comparison of post-op wound healing.

Conflict of Interest

There is no conflict of interest to declare.

Reference

- [1] Koerner KR, Medlin KE. Clinical procedures for third molar surgery. 2nd ed. South Sheridan: Penn Well; 1995.
- [2] Szymd L. Impacted teeth. Dent Clin North Am 1971; 15:299-318.
- [3] Kugelberg CF. Periodontal healing two and four years after impacted lower third molar surgery. A comparative retrospective study. Int J Oral Maxillofac Surg 1990; 19(6):341-5.
- [4] Nageshwar. Comma incision for impacted third molars. J Oral Maxillofac Surg 2002; 1506-9.
- [5] Donlon WC, Truta MP. Minimally invasive third molar surgery. J Oral Maxillofac Surg. 2007; 65(2):359;
- [6] Suarez-Cunqueiro MM, Gutwald R, Reichman J, Otero-Cepeda XL, Schmezeisen R. Marginal vsparamarginal flap in impacted third molar surgery: a prospective study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2003; 95:403-8.
- [7] Monaco G, Staffolani C, Gatto MR. Antibiotic therapy in impacted third molar surgery. Eur J Oral Sci 1999; 107:437.
- [8] Sandhu A, Sandhu S, Kaur T. Comparison of two different flap designs in the surgical removal of bilateral impacted mandibular third molars. Int J Oral Maxillofac Surg. 2010; 39(11):1091-6
- [9] Karaca I, Simşek S, Uğur D, Bozkaya S. Review of flap de-sign influence on the health of the periodontium after man-dibular third molar surgery. Oral Surg Oral Med Oral Pa-thol Oral Radiol Endod 2007; 104:18-23. Allen RT,

Witherow H, Collyer J, Roper-Hall R, Nazir MA, Mathew G.

Flap. J Dent Res Dent Clin Dent Prospects. 2015 Summer; 9(3):175-80.

[10] The mesioangular third molar--to extract or not to extract? Analysis of 776 consecutive third molars. Br Dent J 2009; 586-7.

[20] Yolcu Ü, Acar AH. Comparison of a new flap design with the routinely used triangular flap design in third molar surgery. Int J Oral Maxillofac Surg. 2015 Nov; 44(11):1390-7.

[11] Baqain ZH, Al-Shafii A, Hamdan AA, Sawair FA. Flap design and mandibular third molar surgery: a split mouth randomized clinical study. Int. J. Oral Maxillofac. Surg. 2012; 41:1020-1024.

[12] Erdogan O, Tatlı U, Ustün Y, Damlar I. Influence of two different flap designs on the sequelae of mandibular third molar surgery. Oral Maxillofac Surg 2011; 15(3):147-52.

[13] Kirk DG, Liston PN, Tong DC, Love RM. Influence of two different flap designs on incidence of pain, swelling, trismus and alveolar osteitis in the week following third molar surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2007; 104: e1-e6.

[14] Wood DL, Hoag PM, Donnenfeld OW, Rosenfeld LD. Alveolar crest reduction following full and partial thickness flaps. J Periodontol 1972; 43(3):141-4.

[15] Quee TAC, Gosselin D, Millar EP, Stamm JW. Surgical removal of the fully impacted third molar: the influence of flap design and alveolar bone height on the periodontal status of the second molar. J Periodontol 1985; 56:625-30.

[16] Schofield IDF, Kogon SL, Donner A. Long-term comparison of two surgical flap designs for third molar surgery on the health of the periodontal tissue of the second molar tooth. J Can Dent Assoc 1998; 54:689-91.

[17] Gool AV, Bosch JJ, Boering G. Clinical consequences of complaints and complications after removal of the mandibular third molar. Int J Oral Surg 1977; 6:29-37.

[18] Jakse N, Bankaoglu V, Wimmer G, Eskici A, Pertl C. Primary wound healing after lower third molar surgery: evaluation of two different flap designs. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2002; 93:7-12.

[19] Rahpeyma A, Khajehahmadi S, Ilkhani S. Wound Dehiscence after Wisdom Tooth Removal in Mandibular Mesioangular Class IB Impactions: Triangular Transposition Flap versus Envelope

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