Effect of 2 flap designs on postoperative pain and swelling after impacted third molar surgery

Dogan Dolanmaz, DDS, PhD,[a] Alparslan Esen, DDS, PhD,[b] Kubilay Isik, DDS, PhD,[c] and Celal Candirli, DDS, PhD,[d] Konya, Antalya, and Ankara, Turkey
SELCUK UNIVERSITY, ANTALYA ORAL AND DENTAL HEALTH CENTER, BASKENT UNIVERSITY, AND FATIH UNIVERSITY HOSPITAL

Objective. The aim of this study was to evaluate 2 flap designs (envelope and modified triangular flap) for postoperative pain and swelling after mandibular impacted third molar surgery.
Study Design. Thirty patients who had symmetric bilateral fully impacted mandibular third molars were selected. Left teeth were approached with an envelope flap, and right teeth were removed using a modified triangular flap. Postoperative pain and swelling were evaluated until the seventh day by using 2 verbal rating scales.
Results. Statistical analyses showed that there were no significant differences between the 2 incision techniques regarding postoperative pain and swelling ($P > .05$).
Conclusions. There is no significant difference between the envelope and modified triangular flap regarding postoperative pain and swelling after impacted third molar surgery. (Oral Surg Oral Med Oral Pathol Oral Radiol 2013;116:e244-e246)

Surgical removal of impacted third molars is a commonly applied oral surgery operation. It can be quite discomforting for the patients because of postoperative complications, such as bleeding, pain, swelling, trismus, and alveolar osteitis.[1] Many attempts have been made to reduce those complications and use of various flap designs have been investigated.[2-7]

The envelope flap with a distal relieving incision to the ramus[4] and the triangular flap, which was first described by Szmyd,[6] are the most common approaches in impacted third molar surgery. Several studies have been conducted to compare the effect of those flaps on pain, swelling, trismus, and primary wound healing in the postoperative period.[2-5] Although it has been reported that the influence of flap design is of importance on wound healing after third molar surgery,[4] there is not an agreement. Whereas some authors reported that flap design had no clinical significance in point of postoperative pain and trismus,[2] others[4] stated that triangular flap is more advantageous for primary wound healing and wound dehiscence was less when a triangular flap was used.[4]

[a]Professor, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Selcuk University, Konya, Turkey.
[b]Oral Surgeon, Antalya Oral and Dental Health Center, Antalya, Turkey.
[c]Oral Surgeon, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Baskent University, Ankara, Turkey.
[d]Oral Surgeon, Fatih University Hospital, Dental Clinic, Ankara, Turkey.
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The aim of this study was to compare the effect of envelope and triangular flap designs on postoperative pain and swelling in impacted mandibular third molar surgery.

MATERIAL AND METHODS

This study was approved by the ethical committee of Selcuk University, Faculty of Dentistry. Thirty patients (14 males and 16 females, aging between 17 and 31) who had symmetric bilateral full bony impacted, vertical or slightly mesioangular mandibular third molars were selected. The patients had no preexisting medical conditions that could influence the surgery or wound healing and there were no significant pathologies associated with the teeth. All surgeries were done by the same surgeon under local anesthesia. The left or right impacted mandibular third molar was removed in a randomized order. Second surgeries were performed 2 weeks after the first operations. Left teeth were approached with an envelope flap, and right teeth were removed using a modified triangular flap.

For the envelope flap, a sulcular incision from the first to the second mandibular molar and a distal relieving incision along the external oblique ridge to the ramus were made (Figure 1). A lingual flap distal to the second molar was also gently elevated to avoid lingual nerve damage. The modified triangular flap was prepared as described by Jakse et al.[4] An incision was made from the distobuccal edge of the second molar dropping into the vestibule and a relieving incision from the ramus to the distobuccal aspect of the second molar (Figure 2). The periodontium of the second molar was touched only at the distolabial edge. A lingual

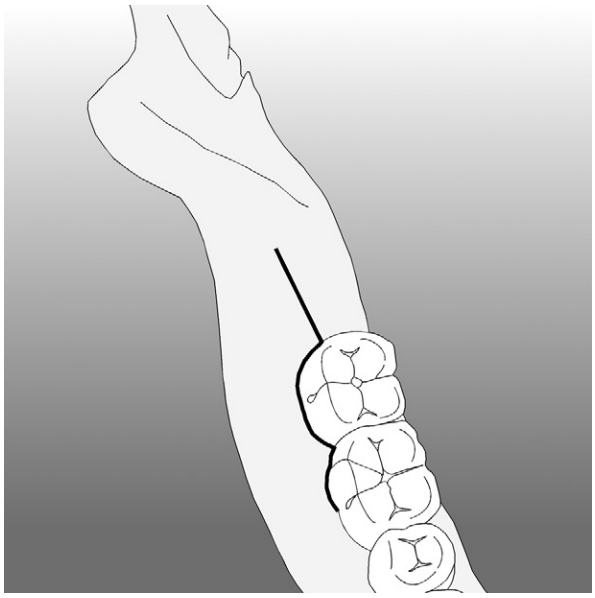

Fig. 1. The envelope flap.

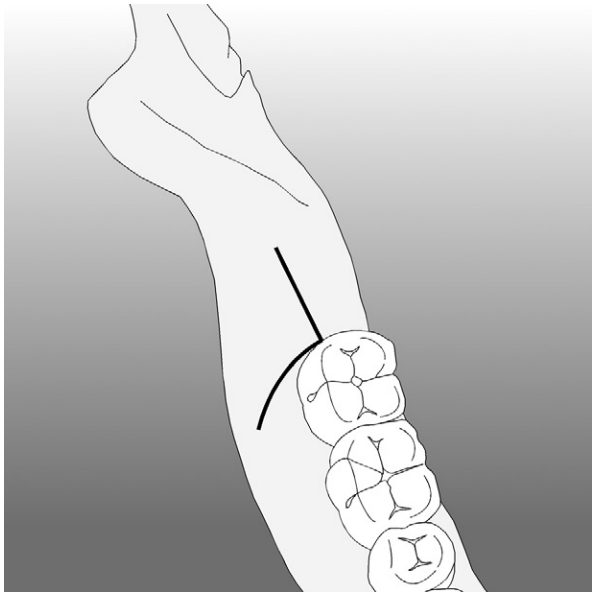

Fig. 2. The modified triangular flap.

mucoperiosteal flap similar to the one used with the envelope flap was raised as well.

After the surgical site was seen, removal of the impacted tooth was completed in the usual way. Overlying bony tissue was removed with burs under copious saline irrigation, and the tooth was sectioned if needed. Following removal of the tooth and dental follicle remnants, the wound was thoroughly irrigated. The envelope flaps were closed with interrupted sutures. For the triangular flap, the same suturing technique was used distally, whereas the perpendicular incision was only adapted with a single coronally placed suture as described by Jakse et al.[4] The loose adaptation of the apical portion is claimed to allow for easy relieving of a hematoma.

All patients were given the same standard postoperative instructions: 5 days of antibiotics (amoxicillin, 2 g/d), analgesics (naproxen, 1.1 g/d), and mouthwash (0.12% chlorhexidine, twice a day). The sutures were removed after 7 days.

All the patients were given a form containing 2 verbal rating scales ranging from 0 to 5, showing the degree of pain and swelling, respectively. Patients were asked to fill in the form daily, starting from the operation day until the postoperative seventh day, in which operation sites were examined for hematoma formation as well. Pain and swelling scores were analyzed with Wilcoxon signed-rank test by using SigmaStat v3.5 software (SysStat Software, Richmond, CA). Hematoma rates between the 2 sides of the patients were statistically analyzed with 1 sample binomial test using SPSS 14 (SPSS Inc., Chicago, IL).

RESULTS

One patient had a postoperative infection on the left side. Another patient had severe trismus on the right side, and 6 patients had hematomas (5 on the right side and 1 on the left the side).

Statistical analyses showed that there were no significant differences between the 2 incision techniques regarding postoperative pain and swelling ($P > .05$). The hematoma rates were not statistically different between 2 sides either ($P > .05$).

DISCUSSION

Impacted third molar surgery is a very common procedure. A variety of factors, such as the duration of the operation, difficulty of the surgery, magnitude of the ostectomy, lack of oral hygiene, or the surgeon's experience, affect the severity of postoperative complications and morbidity.[8] It has also been proposed that the flap design is effective on postoperative course and, therefore, results of different flaps have been evaluated.[2-7]

The 2 flap designs used in this study are both frequently used and have acceptance among oral surgeons. The envelope flap has a broad base and, consequently, a good blood supply. The surgical site can be adequately exposed, and the sulcular incision can be extended if needed.[2,4] It has some disadvantages, however. A larger flap also means more osteoclastic activity and more bone loss. The sulcular component of the incision is an intervention to the periodontal ligament of the second and first molars, and this may lead to periodontal damage. Wound dehiscence distal to the second molar is said to be another shortcoming of

envelope flap design. These gaps are generally located adjacent to the second molar, serve as a trap for foods, and may be a good environment for bacteria, which may lead to alveolar osteitis and soft tissue abscesses.[4]

Because less tissue is elevated and the buccal aspect of the second molar is protected, the modified triangular flap has been asserted to be a more conservative technique.[2] The difficulty in extending the incision may be a significant problem, however, especially when the tooth is found in a different position from what was expected.

The periodontal status of the second molar is another area of interest. Schofield et al.[9] reported that flap design was not important on the periodontal health of the second molar, and when bone was not removed distal to the second molar, flap design did not have a permanent effect. Thus, the effects of flap design have more relevance to the immediate postsurgical period rather than as a long-term concern.[2]

Unlike for the periodontal status of the second molar, it was reported that flap design significantly affected primary wound healing.[2,4] Jakse et al.[4] state that the modified triangular flap design, when compared with the conventional sulcular incision, definitely facilitates primary wound healing.

Based on the limitations of this study of minimum patient numbers and nonrandomized side of the patients, there were no significant differences between the envelope and the triangular flap in point of postoperative pain and swelling. Based on our study design, we did not make an estimation on wound healing or the second molar's periodontal health because we did not evaluate those parameters.

Healing of the surgical wound and status of adjacent teeth are surely important, but generally patients' chief concern is pain. Hence, we do not agree with the authors[4] who state that flap design is more important than the degree of impaction, the duration of the surgery, and nicotine habits.

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Reprint requests:

Dr. Kubilay Isik, DDS, PhD
Baskent Universitesi
Konya Uygulama ve Arastirma Merkezi
Konya, Turkiye
kubilay@kubilay.org