Int. J. Oral Maxillofac. Surg. 2015; 44: 1390–1397
http://dx.doi.org/10.1016/j.ijom.2015.07.007, available online at http://www.sciencedirect.com

International Journal of Oral & Maxillofacial Surgery

Clinical Paper
Oral Surgery

Comparison of a new flap design with the routinely used triangular flap design in third molar surgery

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Ü. Yolcu, A.H. Acar: Comparison of a new flap design with the routinely used triangular flap design in third molar surgery. Int. J. Oral Maxillofac. Surg. 2015; 44: 1390–1397.

Abstract. The aim of this study is to introduce a new flap design in the surgical removal of impacted mandibular third molars – a lingually based triangular flap – and to compare this flap design with the routinely used triangular flap. This randomized, prospective, split-mouth study involved 22 patients with impacted bilateral mandibular third molars that were symmetrically positioned, mesially angulated, and retained in bone. The impacted teeth were removed in two sessions, using two different flap designs: the new alternative flap and the traditional triangular flap. Postoperative complications (pain, swelling, trismus, alveolar osteitis, and wound dehiscence) were recorded on days 2, 7, 14, and 21. The data obtained were analysed using the χ^2 test, the Mann–Whitney *U*-test, and Pearson's correlation. In terms of the severity of postoperative facial swelling and trismus, there were no statistically significant differences between the flap designs ($P > 0.05$). The alternative flap exhibited higher pain scores at 12 h post-surgery ($P < 0.05$). In addition, the alternative flap group exhibited less wound dehiscence, although this was not statistically significant. Moreover, all wound dehiscence in this group occurred on sound bone. In conclusion, these results show that this new flap design is preferable to the routinely used flap for impacted third molar surgery.

Key words: impacted third molar; triangular flap; primary wound healing.

Accepted for publication 14 July 2015
Available online 5 August 2015

The mandibular third molars, or wisdom teeth, are present in 90% of the population, with 33% exhibiting at least one impacted third molar. Owing to the high incidence rate of impacted third molars, their surgical excision is probably the most frequently performed operation in oral and maxillofacial surgery.[1–6] Morbidities associated with the surgical removal of an impacted third molar, such as pain, swelling, trismus, alveolar osteitis (dry socket), nerve damage, and compromised periodontal status of the adjacent second molar, still pose a major problem for surgeons and patients. Postoperative morbidity has important medical, legal, and economic implications.[7] Consequently, many surgical approaches have been tried to minimize these complications, such as the use of surgical drains, different wound closure techniques, and various flap designs.[2,6,8–11]

In oral surgical procedures, it is desirable to place the mucoperiosteal incision on sound bone. Many flap designs used in

0901-5027/01101390 + 08

impacted third molar surgery do not follow this rule, as they involve incisions that are placed on the extraction socket, resulting in a high incidence of mucosal dehiscence, followed by secondary wound healing. In secondary healing, the buccal flap is often tucked into the socket region and organization of the coagulum in the socket region may be disrupted. In addition, the surgical area is left unprotected against oral pathogens and food residue. This condition leads to delayed wound healing and increases the risk of developing alveolar osteitis. Hence, existing wound dehiscence at the distofacial edge of the second molar probably extends the postsurgical treatment period. This may lead to an elevated level and duration of postoperative pain and discomfort. Furthermore, potential periodontal complications distal to the preceding second molar may also occur.[2,8–10,12] Numerous investigators advocate using primary wound closure after mandibular third molar surgery to obtain quicker mucosal healing and superior amounts of bone regeneration.[8,13,14]

Various incision and flap techniques, each with variations, have been performed for third molar surgery. The envelope flap and triangular flap are the most commonly use and preferred flap designs in impacted third molar surgery.[9,11] The aim of this study was to compare a new flap design with the routinely used triangular flap design in the surgical removal of impacted mandibular third molars.

Materials and methods

This randomized, prospective, split-mouth study was performed at the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Inönü University. It involved 22 patients with impacted bilateral mandibular third molars that were symmetrically positioned, mesially angulated, and retained in bone. The exclusion criteria were the following: history of systemic disease, use of medications, poor oral hygiene and compromised dental and periodontal status, smoking habit, allergy or contraindications to the drugs or anaesthetics used in the study, pregnancy or lactation, and a noticeable local inflammation or pathology in the oral cavity that would influence the surgical procedure or postoperative wound healing.

Before the procedure, each participant was informed about the surgical and postoperative study protocol. Signed consent indicating their agreement to participate in the study was obtained. The study was approved by the relevant ethics committee.

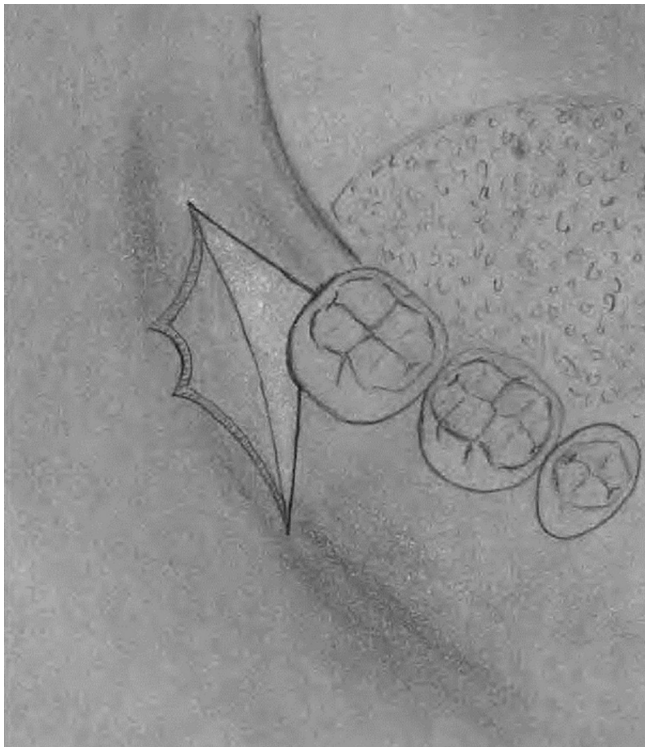

Fig. 1. Incision for the buccally based triangular flap.

All surgical procedures were carried out by the same surgeon (UY), who has more than 10 years of experience as a specialist in oral and maxillofacial surgery. For each patient, the impacted teeth were removed in two sessions using the two different flap designs. The time interval between the two sessions was at least 4 weeks. The flap design and operated side of the mouth were assigned randomly for each patient using envelopes prepared in advance. The side of the first operation was defined by the patient.

Before starting the procedure, the oral cavity was rinsed thoroughly with diluted povidone iodine solution for 30 s. Three millilitres of articaine HCl 4% with 1:200,000 epinephrine (Ultracaine D-S Ampul; Sanofi Aventis, Istanbul, Turkey) was used as the local anaesthetic agent for inferior alveolar and lingual nerve block (2 ml), along with vestibular infiltration (1 ml).

Flaps were made using two techniques. For technique A ($n = 22$ teeth), the impacted teeth were removed using a buccally based triangular flap, as first described by Szymd.[15] An incision was made from the anterior border of the mandibular ramus to the distal surface of the distobuccal cusp of the mandibular second molar. It was extended along the sulcus to the distobuccal corner of the second molar crown. The incision was continuous, with a relieving vertical incision, oblique into the mandibular vestibular fornix, aligned with the mesiobuccal cusp of the second molar (Fig. 1).

For technique B ($n = 22$ teeth), a lingually based triangular flap was used to remove the impacted mandibular third molar on the contralateral side of the patient. An incision was made adjacent to the distal surface of the mandibular second molar, and extended along the sulcus to the distobuccal corner of the mandibular second molar. An oblique vestibular incision was made and extended into the vestibular fornix of the mandible, aligned with the mesiobuccal cusp of the second molar. It was continued posterosuperiorly towards the anterior border of mandibular ramus (Figs 2 and 3).

A mucoperiosteal flap was raised (Fig. 4). Bone was removed with a round bur under copious irrigation with 0.9% sterile saline, following which the tooth was extracted. When necessary, the tooth was sectioned with a fissure bur. Primary wound closure was accomplished using 4–0 silk sutures. The buccally based triangular flap was closed with three single sutures distal to the second molar and three single sutures in the perpendicular incision line (Fig. 5). For the lingually based triangular flap, the same suturing