



Tunneled Envelope Flap—Novel Flap Modification for Removal of Impacted Lower Third Molars

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Abstract

Introduction Although surgical extraction of retained lower third molars is one of the most frequently undertaken surgical interventions in oral and maxillofacial surgery, presented in numerous scientific publications every year, there is no unanimous standpoint on the type of flap providing optimal results. This article presents a technique, modified through tunneling involving an envelope and triangular flap.

Clinical Case This article presents a clinical case of extraction of tooth 48 describing step by step in details the implementation of a tunneled envelope flap.

Discussion Each of those two techniques—envelope flap and triangular flap—has its advantages and disadvantages. The presented technique aims to combine the positive features of those two frequently implemented techniques, adding a novel tunneling element.

Keywords

- oral surgery
- third molar flap
- third molar extraction

Conclusion This article aims to demonstrate and describe in details the technique, developed by the author. Further studies are necessary to analyze the results of its implementation.

Introduction

About 90% of the people have third molars and various literature sources reveal that 33 to 57% of the population have at least one fully impacted third molar.^{1,2} Several different flaps have been implemented in the practice to provide access at their surgical removal. Triangular and envelope flaps have been among the most frequently used. Other described techniques were the paramarginal and “comma” flap, Szmyd’s flap, lingual triangular and rectangular flaps as well as their several modifications. In spite of its type, the flap must provide sufficient access and field of vision for the removal of the molar. The minimal trauma at its dissection causing also alleviated postoperative swelling and pain was the target of all techniques. Greater attention has been given in the recent years to the sequences of the extraction of the neighboring

seventh teeth and their periodontium. Although the extraction of wisdom teeth is one of the oldest and most frequently undertaken interventions in the domain of oral and maxillofacial surgery, there is no unanimous agreement on which one of them is optimal. Meta-analyses and review papers have demonstrated contradictory results concerning postoperative swelling, pain, and aggravations rate.³ The multitude of research works published globally revealed that the topic was relevant and novel techniques had their place in the daily practice of oral surgeons.

The authors of this article present a novel flap design at removal of retained lower third molars, describing a modification of the classic envelope flap. Its dissection includes elements of triangular flap and tunneling technique. This technique is described as “tunneled modified envelope flap.”

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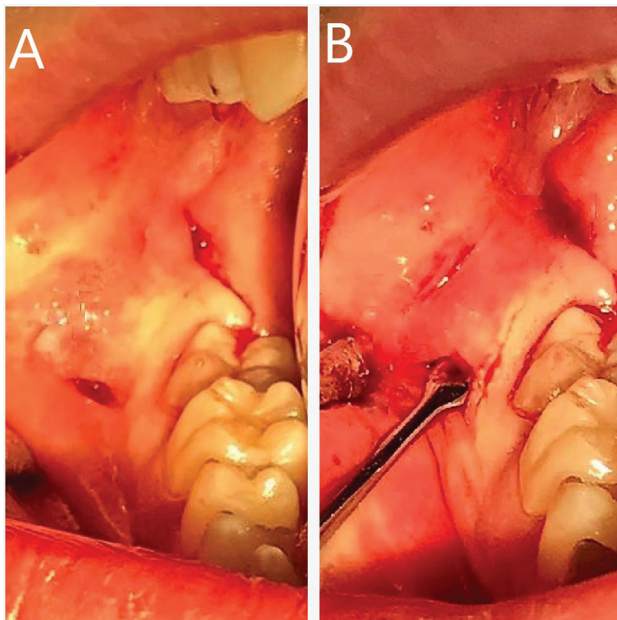


Fig. 1 (A) The main incision and the second "key" incision. (B) The insertion of periosteal elevator into the "key" incision.

Clinical Case/Presentation of the Technique

The clinical case showed the implementation of the technique at operative extraction of tooth 48.

The first step was to make a distolateral incision from tooth 47 in full depth, also called main incision. The second "key" incision was made down to contact with the bone (►Fig. 1A), starting apically from the mucogingival border of the 7th tooth, almost parallel to the main incision. Its length did not exceed 5 mm and it should be sufficient to insert a small periosteal elevator (►Fig. 1B).

The second step realized a lifting of the full thickness of the mucoperiosteal flap itself. A small periosteal elevator was used for this purpose, in this case Hirschfeld P20 manufactured by Hu-Friedy Mfg. Co., LLC, Chicago, IL, United States. The tool was placed in the buccal cut and was moved subperiosteally, at constant contact with the bone surface toward the main incision (►Fig. 2A). This was the tunneling enabling fast elevation of the flap without shearing the tissues. The keratinized gingiva buccally from tooth 47 remained intact.

►Fig. 2B shows the opened retromolar space enabling the implementation of osteotomy and removal of the third molar. If necessary, the main incision could be prolonged distolaterally to increase the surface and for better visibility. The elevation through tunneling from apical to the main incision was facilitated, compared with the classic dissection from the crestal incision into apical direction. The frequent accretions of the mucosa and underlying connective tissue around the molar in the area of the retromolar incision impeded the dissection through a retromolar cut only. Tunneling enabled also the creation of a subperiosteal channel to drain the liquid from the bone defect without direct communication with the oral cavity, at the same time disabling the introduction of food residues in the wound.

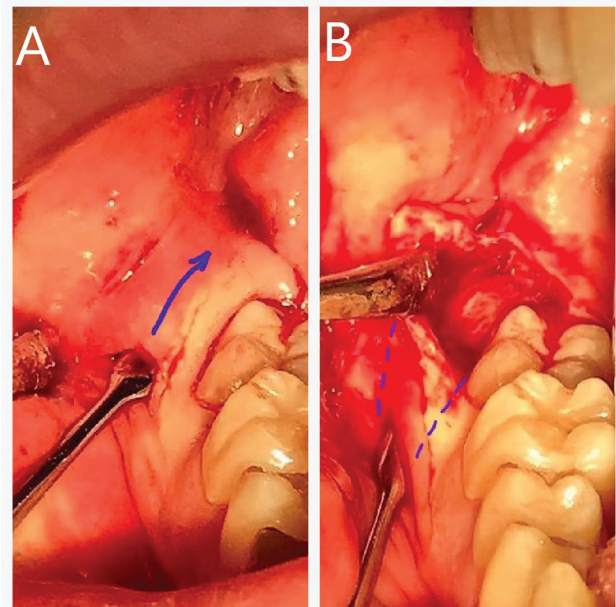


Fig. 2 (A) The blue arrow indicates the direction of subperiosteal elevation of the flap. (B) The dotted lines mark the full-thickness tunneled area.

In ►Fig. 2B, the dotted line shows the tunneled area in full thickness.

►Fig. 3A shows the flap, repositioned and stitched by two sutures. Like a standard envelope flap, there was no need to make buccal stitches and there was no risk of development of buccal recession. On the other hand, the secondary buccal incision remained unstitched and enabled wound drainage.

A gauze or rubber drainage could be installed if considered necessary (►Fig. 3B).

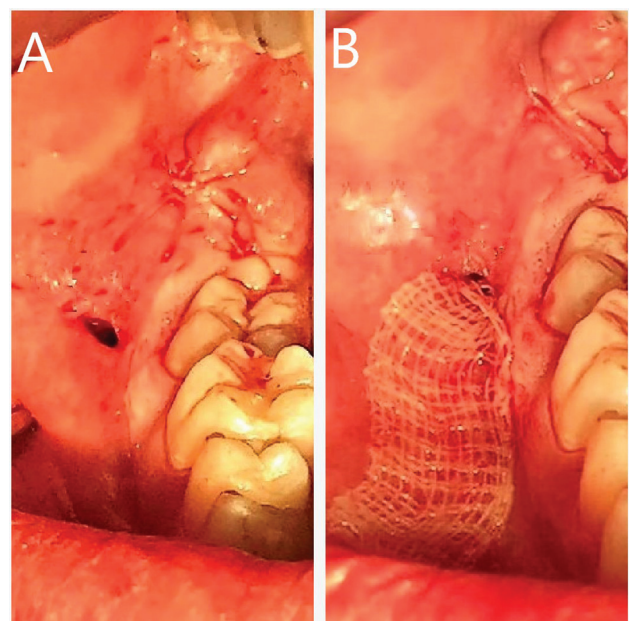


Fig. 3 (A) Surgery site after final suturing. (B) Inserted gauze drain (nonmandatory).

Discussion

The scientific community is not unanimous on the optimal flap type for extraction of retained lower third molars. The flap design is important not only for provision of access and visibility to the surgical field but it is also critical for the postoperative healing of the wound.⁴ The triangular and the envelope flap are the most frequently applied ones. Each one of them has its own specifics, as well as advantages and disadvantages.^{5,6} The minimal soft-tissue trauma is important for the reduced postoperative swelling and pain.

Erdogan et al in a study of 2011⁷ supported the implementation of an envelope flap and the study concluded that the visibility of the operative field was better, the blood supply to the flap was optimal, and the postoperative pains and edema were smaller than those with a triangular flap. Those results were confirmed also by Baqain et al⁸ and Kirk et al.⁹

Zhu et al.¹⁰ also associated the implementation of an envelope flap with better postoperative results concerning the level of edema and pain.

Alqahtani et al¹¹ supported that the more frequent wound dehiscences were a disadvantage of the envelope flap. The authors attributed that to the lack of buccal incision and unavailable drainage options causing elevated pressure in the wound due to the hematoma. Ahmad et al⁶ launched a similar theory supposing that the increased pressure at the envelope flap caused nonoptimal wound healing and respectively a greater probing depth of the 7th tooth up to 6 months after the surgery.

Baqain et al⁸ did not state a particular cause but also derived the conclusion that the envelope flap caused increased probing depth and disordered supporting apparatus of the next 7th tooth.

Swelling and postoperative pain were a result of the tissue trauma and the inflammatory reaction caused by the trauma.⁵ In an article of 2017,¹¹ the authors revealed that the complaints after the implementation of a triangular flap were due to the long buccal incision in the area of the 7th tooth, causing the inflammatory reaction.

Referring to osteitis rate, the priority belonged to the triangular flap.¹⁰ The observed incidence of this complication was higher with envelope flap.

The meta-analysis of Glera-Suárez et al of 2020³ could be stated as a counterpoint to the above cited data. The authors concluded that up to that moment there was no ultimate evidence in the analyzed references supporting the advantage of one or the other technique.

For the described particular clinical case, the authors demonstrated an access flap combining the two most popular and scientifically studied techniques. The tunneling at elevating the tissue was added as an additional innovative element aiming at maximal preservation of its integrity, minimal trauma, and speed of the procedure.

Conclusion

The authors raised the hypothesis that the combination and modification of the two techniques would have optimal

clinical results with the positive characteristics of each technique and elimination of their disadvantages. The minimal secondary incision buccally from the 7th tooth enables the preservation of the area with keratinized gingiva. This eliminates also the need to make a suture in this area. As the additional incision lies apically from the main one, typical for the envelope flap, the blood and secretion drainage of the wound are provided by the key incision. The placing of a drain in spite of closing the wound in the osteotomy area is optional and depends on the surgeons' desire. The preserved buccal tissue strip of the 7th tooth enables the healing without gingival recession.

This article aims to demonstrate and describe the technique, developed by the author. Further studies would be necessary to analyze the results of its implementation. Split mouth studies would be also necessary to compare it with flaps used up to now and their modifications.

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All authors declare that the manuscript has been read and approved and the manuscript represents honest work.

Authors' Contributions

I.H.A contributed to conceptualization of the technique, first implementation of the technique, investigation, literature research, and writing of the original draft. C.N. helped in methodology, resources—equipment, organization, materials, writing—review and editing, and supervision.

The clinical research was conducted in accordance with the World Medical Association's Declaration of Helsinki.

Conflict of Interest

None declared.

References

- 1 Rosa AL, Carneiro MG, Lavrador MA, Novaes AB Jr. Influence of flap design on periodontal healing of second molars after extraction of impacted mandibular third molars. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002;93(04):404–407
- 2 Hashemipour MA, Tahmasbi-Arashlow M, Fahimi-Hanzaee F. Incidence of impacted mandibular and maxillary third molars: a radiographic study in a Southeast Iran population. *Med Oral Patol Oral Cir Bucal* 2013;18(01):e140–e145
- 3 Glera-Suárez P, Soto-Peñaloza D, Peñarrocha-Oltra D, Peñarrocha-Diogo M. Patient morbidity after impacted third molar extraction with different flap designs. A systematic review and meta-analysis. *Med Oral Patol Oral Cir Bucal* 2020;25(02):e233–e239
- 4 García García A, Gude Sampedro F, Gallas Torrella M, Gándara Vila P, Madriñán-Graña P, Gándara-Rey JM. Trismus and pain after removal of a lower third molar. Effects of raising a mucoperiosteal flap. *Med Oral* 2001;6(05):391–396
- 5 Kumar BS, Sarumathi T, Veerabahu M, Raman U. To compare standard incision and comma shaped incision and its influence on post-operative complications in surgical removal of impacted third molars. *J Clin Diagn Res* 2013;7(07):1514–1518
- 6 Ahmad M, Khan ZA, Khan TU, et al. Influence of surgical flap design (envelope and Szmyd) for removal of impacted mandibular third molars on clinical periodontal parameters: a clinical trial. *Int J Environ Res Public Health* 2021;18(09):4465. Doi: 10.3390/ijerph18094465

- 7 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(03):147–152
- 8 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 Implants* 2012;41(08): 1020–1024
- 9 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(01):e1–e6
- 10 Zhu J, Yuan X, Yan L, Li T, Guang M, Zhang Y. Comparison of postoperative outcomes between envelope and triangular flaps after mandibular third molar surgery: a systematic review and meta-analysis. *J Oral Maxillofac Surg* 2020;78(04):515–527
- 11 Alqahtani NA, Khaleelahmed S, Desai F. Evaluation of two flap designs on the mandibular second molar after third molar extractions. *J Oral Maxillofac Pathol* 2017;21(02):317–318