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## Review article on Different types of flap designs in third molar extraction

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### Abstract

Third molar impaction is one of the routine procedures performed by Oral and Maxillofacial Surgeons. The correct method of mucoperiosteal flap reflection is essential for proper wound healing. This article comprise of reviews from various flap designs.

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### Introduction

Flaps are designed to reflect the soft tissue for mechanical access of impacted teeth. The type of flap determines the duration of wound healing and other post-operative complications such as pain, trismus, dry socket and wound dehiscence. The flap must have enough space to allow placement of instruments for bone and tooth removal. The accurate flap reduces the degree of difficulty of extraction by gaining good purchase point for tooth elevation. This article discusses principles of flap design.

### Flapdesigns

Mucoperiosteal flap for third molar surgery is of different types. The base of the flap should be broader than the free end to ensure adequate blood supply. Full thickness flaps is most commonly elevated. Flap approximation should be achieved at end of the procedure. Incision made through mucosa and periosteum to the bone through a smooth Stroke by pen grasp.

The basic flap design where, an anterior incision that curves forward from distobuccal aspect of second molar till mesiobuccal aspect of the same tooth. The incision Is extended distally towards external oblique ridge in the buccally. Posteriorly the incision should slope outwards and backwards. It provides excellent access and wound closure [1].

Envelope flap is elevated by placing a sulcular incision from first molar to second molar continuing distally along the mandibular ramus. Posteriorly the incision should extend laterally. It provides excellent vascularity up to margin [2] Incision done medial to external oblique ridge extending to distal lower

angle of mandibular second molar following which a sulcular incision is made from distobuccal angle of mandibular second molar to mesiobuccal angle of mandibular first molar[3].

Koener's incision is a modification of envelop flap that is placed as a distal extension beginning near the external oblique ridge in the lateral side of mandible. The incision should be extended forward and medially towards the mid-portion of the distal surface of mandibular second molar terminating at the mesiobuccal angle of mandibular second molar [9 7].

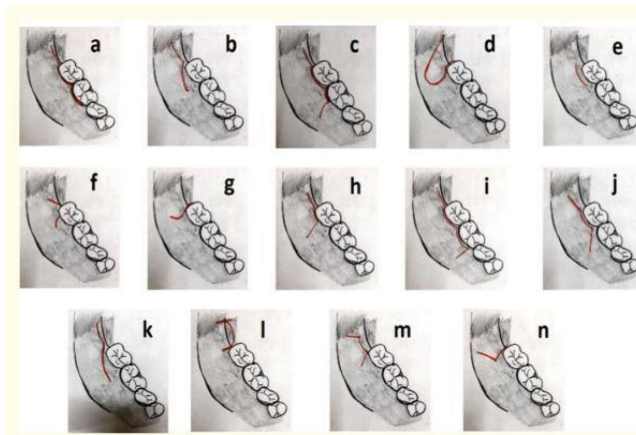
A triangular flap which is also called as vertical flap. The incision is placed distal to ramus of mandible to distobuccal aspect and a sulcular incision in mesiobuccal aspect with a releasing incision in distal aspect of mandibular second molar towards the mandibular vestibule. It is a preferred when access to apical areas of tooth is required . It provides a tension free wound closure. Loose adaptation is seen in Apex which allows easy relief of hematoma. [3]

Pedicle flap is elevated by making a distal incision which helps soft tissue advancement and rotation for complete closure of the surgical wound. It has buccal envelope flap. The buccal gingival sulcus incision is placed from the mesio-buccal line angle of mandibular first molar to the visible part of distal most of mandibular third molar. The lingual Flap is elevated in a manner with lingual nerve protection. The releasing incision is extends to the external oblique ridge.

A distolingual flap, a buccal comma shaped flap . The incision placed at a point below mandibular second molar and it is curved upwards to meet the gingival crest at the distobuccal line angle, from there it continues as a crevicular incision around the distal aspect of mandibular second molar. It overcomes the drawbacks of commonly used conventional incisions where there will be dissection of temporalis muscle tendon and flap which lies over the boney defect [4] (Figure 1).

The incision for a bayonet flap is placed on ascending ramus, following the mid-portion of mandibular third molar shelf and then extended as a sulcular incision up to midpoint of buccal sulcus of mandibular second molar, followed by an oblique vestibular releasing incision [5]

The Szmyd flap is vertical incision which leaves the collar of gingiva intact on the disto-buccal aspect of mandibular second molar [6]. This will minimize bone resorption. It is a type of marginal flap and heals with primary healing.



**Figure 2:** (a) An envelope flap; (b) Ward's incision; (c) Modified ward's incision; (d) Berwick's tongue flap proposed in 1971; (e) Henry's incision (1969); (f) Killey and Kay incision (1979); (g) Nageshwar's Comma shaped incision; (h) Bayonet flap; (i) Flap design by Mead, 1930; (j) Flap design by Cogswell, 1933; (k) Flap design by Avellanal, 1946; (l) Flap design by Berzaghi, 1989; (m) Flap design by Suarez, 2003; (n) Flap design by Heitz, 2003.

## Discussion

Tissue handling is an essential aspect, that comes with proper incision and flap design techniques.

Kumar BS., et al. conducted a split mouth study on influence of Post-operative complications after impaction surgery comparing standard incision and comma shaped incision. The pain score and other postoperative complications were less in comma shaped incision when compared to standard incision [8,9].

Desai A., et al. compared the Koener's triangular incision and Ward's envelop incision with access, healing of wound, dry socket and found that there was significant difference between both the groups with hematoma formation, wound gaping and distal pocket being more in Koener's triangular incision [11].

Stephens., et al. concluded that there is no difference in the periodontal health when different flaps were compared. But sometimes when the periodontal defects are severe, a secondary procedure may be utilized to close them such as a lingual gingival finger flap [8].

Baquain HZ., et al. study showed that probing depth was found to be greater in patients where envelop flap was used. Trismus was common in patients who received triangular flap [12].

A study by Sandhu A., et al. comparing the envelope and bayonet flap in a split mouth study concludes that the pain and wound dehiscence is greater in envelop flap compared to Bayonet flap. They concluded that bayonet flap is superior to envelop flap in terms of post-operative Pain and wound dehiscence [8 10]. **Conclusion**

A variety of techniques have been described about various flaps for impacted mandibular third molar extraction but envelop flap and triangular flap is common. There is no significant difference of postoperative pain, primary wound healing, swelling, and trismus and periodontal health. The difference is in the extent of surgical site exposure and damage to the flap. An oral surgeon must have a thorough knowledge of the different type of flaps and should do the procedure uneventfully as each flap design has its own advantages and disadvantages.

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