

A Comparative Study of Primary and Secondary Closure of the Surgical Wound after Removal of Impacted Mandibular Third Molars by Lingual Split Technique

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Abstract

Background: Mandibular third molar is the most commonly impacted tooth in the oral cavity. Various techniques are used for removal of third mandibular molar such as bur technique, chisel and mallet technique with lingual bone split or buccal bone split technique. The lingual split technique is one of the commonly used methods because of its quickness.

Materials and method: 100 patients were divided into two groups of 50 each to undergo primary and secondary closure following removal of impacted mandibular third molar to compare post-operative pain, mouth opening and facial swelling.

Result: Difference in terms of facial swelling and mouth opening was statistically insignificant in the postoperative period. There was a statistically significant difference in the severity of pain between the two groups.

Conclusion: This study concluded that secondary closure technique gave more comfort than primary closure, after removal of impacted 3rd mandibular molar.

Keywords: Impacted third molar, lingual split, primary closure, secondary closure.

Introduction

Surgery of the impacted third molars is the most frequently performed procedure in the oral and maxillofacial surgical practice. This can lead to a variety

of immediate and late postoperative discomfort. The results of some studies have shown that the frequency of such postoperative problem is related to the type of wound closure. Mandibular third molar is the most commonly impacted tooth in the oral cavity. Kramer and Williams found the incidence of impacted mandibular third molars to be 41.13%.¹

Brown et al in their study found 15–30% of impacted teeth in black and white South Africans. The most common cause of failure for a tooth to erupt is a lack or loss of space in the overlying alveolar arch. A discrepancy between tooth size and jaw size is probably the result of combination of both genetic and environmental factors. Most of the patients with impacted mandibular third molars are asymptomatic from which some can cause pathoses.^{2,3}

These problems may vary, from as simple as dental caries to more serious conditions, such as cyst formation or the development of a neoplastic lesion in the surrounding follicular tissues.⁴ Removal of mandibular third molar also indicated to control of tooth crowding in the mandible, prevention of pathologic fractures, preparation of orthognathic surgery, management of preprosthetic concern, management of facial pain.⁵

Hence removal of impacted third molars is essential and is the most commonly performed procedure in oral surgical practice,⁵ in order to prevent pathoses arising from them. Various technique are used for removal of third mandibular molar such as bur technique, chisel and mallet technique with lingual bone split or buccal bone split technique. The lingual split technique is one of the commonly used method because of its quickness.⁵³ It is originally described by Sir William Kesley Fry in 1933 and later popularized by T Ward in 1956.⁵⁴ Third molar removal often causes considerable postoperative discomfort to the patient.⁵ The results of some studies

have shown that the frequency of such postoperative problem is related to the type of wound closure.⁵⁻¹⁰

Reduction of this discomfort become essential for the success of surgical practice. Many surgeons suggest primary wound closure after removal of impacted third molars,¹²⁻¹⁷ but others; however, prefer the wound to heal by secondary intention.¹⁸⁻²⁰ The use of drain is also suggested for the reduction of postoperative complications.^{6,18,20} Impacted third molar surgery with primary closure however, may cause postoperative pain, facial swelling and restricted mouth opening.^{6,9} Study of Rakprasitkul et al⁶, Holland & Hindle⁸ and Ayad et al.¹¹ using the rubber drain with the primary closure after the removal of impacted lower third molars showed fewer complications. The aim of this study was to compare primary and secondary closure of the surgical wound closure following removal of impacted mandibular third molars with lingual split technique in terms of postoperative pain, trismus, and swelling.

Materials and Methods

It was a prospective randomized study which included a total of 100 patients (57 males and 43 females) between 15 to 35 years of age without any medical comorbidities, non smoker & non alcoholic with impacted lower third molars completely or partially covered by mucosa/bone. Orthopantomogram was taken for all the cases. Impactions were classified based on WINTER'S classification. Determination of the complexity of the surgical procedure was based on the Pederson difficulty index i.e. angulation of the impacted tooth, the depth of the tooth in the jaw, the distance from the ramus to the second molar. All impacted third molars in the study were moderately difficult.

The patients were randomly subdivided into two groups of 50 each. group 1 underwent primary closure and group 2 underwent secondary closure. The surgical procedures were performed by single operator from the oral surgery

unit who was blinded about in which group the patient was assigned until suturing.

Procedure

Patient's oral cavity was rinsed with 5% betadine solution for 1 min prior to procedure. The patients were given an inferior alveolar nerve block, lingual nerve block and a long buccal nerve block using 1.8ml of 2% lignocaine hydrochloride with vasoconstrictor [1:200000].

A full-thickness incision was made to prepare a trapezoid flap. The flap was reflected with help of periosteal elevator and the impacted third molar was removed with lingual split technique/modification of it. In this technique tooth removal was done with the help of a sharp, 8mm wide bladed chisel and mallet. Chisel was first placed distal to third molar, perpendicular to internal oblique ridge/parallel to external oblique ridge to split distolingual portion of alveolar bone of third molar than anterior cut is made distal to second molar, than chisel is placed slightly buccal to third molar site and a firm blow is provided and lingual plate is fractured away between the stops and tooth is come out with lingual plate.

Following removal of the impacted tooth bony socket was irrigated with sterile saline solution. In group 1 (primary closure) the flap was next repositioned and sutured hermetically (Trusilk, 3-0silk SN 5028). In group 2 (secondary closure) a wedge of mucosa, width 5-10 mm, was next removed from second molar and wound remained open and sutured (Trusilk, 3-0silk SN 5028). NO dressing was applied to the open socket. The mean duration of surgery, from incision to suturing, was between 5 and 10 minutes. All patients received postoperative instructions (ice packs for 6hrs after surgery, alternating 30 minute Of application with 30 minute Pause, soft warm diet for the first 24 hrs, warm saline rinse after first 24 hrs, normal oral hygiene from the day after surgery). Patient were given antibiotics (tab. Amoxicillin

500mg tds for 5 days) and analgesic drugs (tab. diclofenac sod. 50mg+paracetamol 325mg tds for 3 days after that sos). Patients were examined immediately postoperatively, second, seventh, tenth postoperative days. Pain was evaluated in the postoperative period using visual analogue scale (VAS).

The maximum mouth opening was measured between the maxillary and mandibular central incisors, preoperatively and evaluated at 2nd, 7th, 10th and up to normal mouth opening postoperatively. The evaluation of the swelling was performed preoperatively and on 2nd, 7th, 10th day postoperatively using a horizontal and vertical guide with a thread/tape. The horizontal measure corresponds to the distance from the corner of the mouth to the tragus. The vertical measure corresponds to the distance from the outer canthus of the eye to the angle of the mandible. The stitches removal done at 7th postoperative day and Return of normal mouth opening was also evaluated. All the patients were treated and observed by the same surgeon preoperatively and on 2nd, 7th and 10th postoperative day.

Statistical Analysis

It was done using SPSS software. Proportions were compared using Chi-Square test. The results were averaged (mean + standard deviation) for each parameter between the groups. Student's 't' test was used to find a significant difference between the two means.

Result

In our study 37% of the teeth were mesioangular, 11% were vertical, 19% were horizontal and 33% were in distoangular position and all teeth were moderately difficult.

In both primary closure and secondary closure groups horizontal and vertical component of the facial swelling reached peak on the 2nd postoperative day and on 10th postoperative day it was near normal. Difference in terms

of facial swelling dimensions was statistically insignificant in postoperative period.

However there was statistically significant difference in the severity of pain between the two groups. The p value was < 0.001 on each postoperative day. Pain was most severe on second postoperative day in both groups and intensity of pain was greater in primary closure group patients on all postoperative days.

The maximum mouth opening did not show statistically significant difference between the two groups. In both the groups, there was a decrease in mouth opening on the second postoperative day and increase thereafter. The primary closure group achieved normal mouth opening on 15th day whereas secondary closure group achieved on 13th day with p value 0.007.

Case – 1 Primary Closure



Figure 1: Pre-Operative



Figure 2: Swelling on 2nd day



Figure 3: Mouth Opening on 2nd Day

Normal Face after



Figure 4: Disappearance of swelling on day10



Fig.5: Normal Mouth Opening at 25th



Figure 3: Mouth opening on 2nd day

Case 2: Secondary Closure



Figure 1: Pre-operative

Normal face

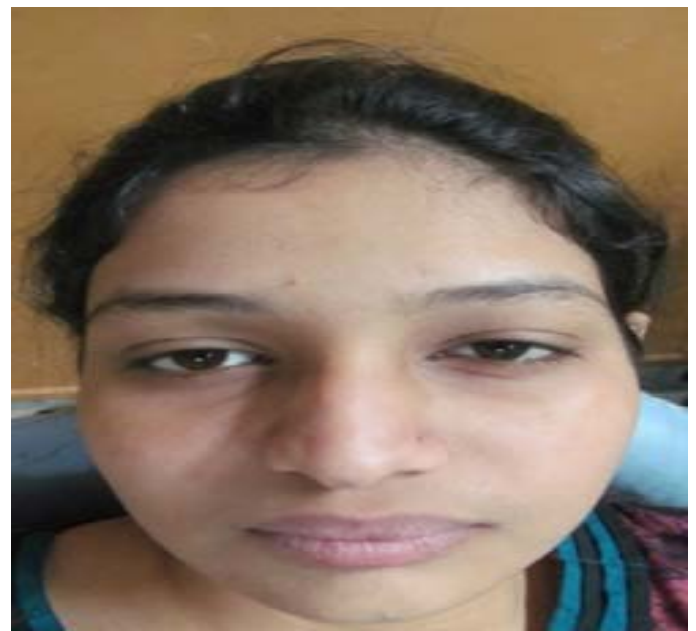


Figure 4: Disappearance of swelling on Day 10

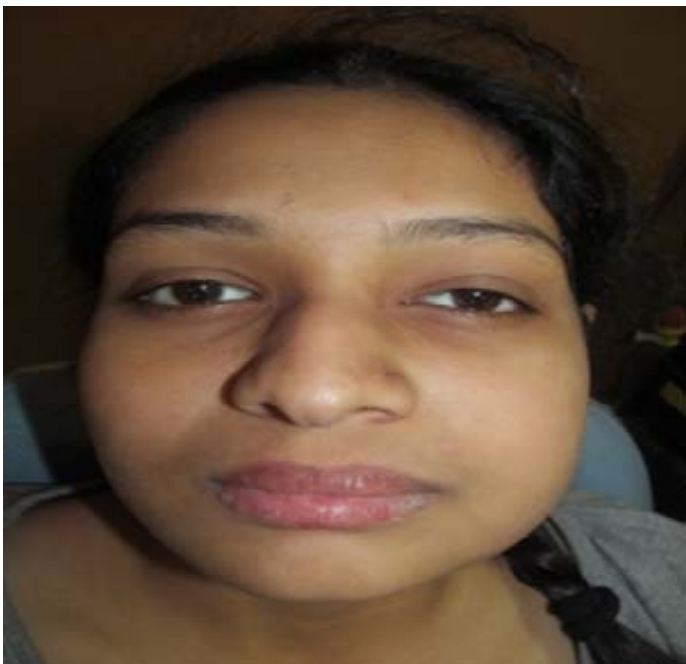


Figure 2: Swelling on 2nd day



Figure 5: Normal mouth opening on

Discussion

There is a diversity of opinion among the surgeons regarding the technique of wound closure after removal of impacted mandibular third molars⁷. A primary closure is preferred by Howe¹², Archer¹³, Killey & Kay¹⁴. However, some surgeons, Blair & Ivy¹⁸, Mead¹⁹ and Padgett²⁰ prefer the wounds to heal by secondary intention.

Blair & Ivy and Padgett suggested the use of drain following removal of impacted mandibular third molars. Clark³⁵ and Winter³⁶ suggested that the wounds may be treated by either method. Woodward³⁷ advocates the use of a small opening posterior to the second molar to facilitate postoperative irrigation of the wound. Ayad w et al.¹¹ suggested the use of a small tube drain following third molar surgery to reduce on the postoperative complications. Cerqueira et al hypothesized that a drain allows the patient to experience a more comfortable postoperative period in relation to the pain, swelling and trismus, because it permits the drainage of the fluids collected in the tissue spaces.

The onset of pain begins as the effects of the local anesthetic agent subside. Unless treated, moderate to severe pain usually occurs during the first 12 hours, with peak intensity after about 6–8 hours when a conventional

local anesthetic is used.³⁸⁻⁴⁰ The pain then gradually disappears within a few days, provided if normal healing occurs. In the present study, pain was evaluated and recorded based on visual analogue scale (VAS) of pain. We found that the intensity of pain was highest on the second postoperative day and gradually diminished over the days in both groups. These results were similar to the studies of R.A. Seymour et al,⁴⁰ which states that the pain is more severe in the immediate postoperative period and its reduction occurs progressively.

Though the pain was less severe on the secondary closure group, and was found that on second postoperative day pain was moderate to severe, 7th day pain was mild to moderate and 10th day also found with mild pain in primary closure group it was statistically significant. This is in accordance with the study by Brabander & Cattaneo,⁵ Dubois et al⁷ Suddhasthira et al⁴¹ Holland and Hindle,⁸ Rakprasitkul et al,⁶ Ali Alp Saglam⁹ and Cerqueira.¹⁰ But Pasqualini D²⁴ found statistically significant difference in the severity of pain between the two groups.

The swelling followed by third molar surgery is caused by extravasation of fluids and involve both vascular and cellular events. The surgical wounding triggers the release of cascades of mediators that cause a transient vasoconstriction of arterioles followed by vasodilatation and increased blood flow and, thereafter stasis of the blood, increase in the permeability of the postcapillary venules and extravasation of fluids. The time relation of swelling subsequent to mandibular third molar surgery has been examined in a number of studies.^{38, 42-45} According to these studies it was observed that development of swelling started shortly after surgery and usually reached a maximum after 36 hours. In this study it is observed that the mean value reached maximum on the second postoperative day in both the groups and gradually

decreased there after, reaching near normal after seventh postoperative day .

However Dubois et al,⁷ Holland &Hindle,⁸ Rakprasitkul et al⁶ and Ali Alp Saglam,⁹ found statistically significant difference between the drain and no drain groups. Szmyd et al.³⁸ reported that trismus peaked on the day of surgery. However Gool Van et al,⁴⁶ Neupert et al,⁴⁷ Rood JP et al⁴⁸ found that the trismus developed more slowly than swelling, reaching maximum after 2-3 days. Rakprasitkul⁶ in his comparative study found that the trismus reached peak on the 3rd postoperative day in both drain and no-drain groups. In this study it is observed that the trismus was greater on the second postoperative day in both the groups. In comparing the two techniques there was statistically significant difference between the two groups on any postoperative days. These results are similar to the studies of Brabander⁵ found a larger amount of trismus in the drain group on 2nd day.

Conclusion

The present study was carried out to compare the effect of open wound in secondary closure and primary wound closure following removal of impacted mandibular third molars on postoperative pain, swelling, and trismus. Based on the present study, small opening of wound in secondary closure following mandibular 3rd molar surgery gave better results with respect to pain, swelling and trismus than cases with primary closure alone. This study concluded that secondary closure technique gave more comfort than primary closure, after removal of impacted 3rd mandibular molar.

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