

# A Comparative Study of Primary Versus Secondary Closure After Removal of Lower Third Molar

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## Abstract

**Introduction:** The purpose of this study was to clinically compare the post-operative sequelae of wound healing and patient response after primary and secondary closure. The effectiveness of the technique was evaluated relative to the degree of patient comfort and the post-operative condition of the surgical site.

**Method:** This prospective study was conducted on 50 patients. The patients were selected randomly from the outpatient department needing surgical removal of impacted mandibular third molars. The patients were then randomly allocated to any of the two groups- the primary closure and the secondary closure group. In the primary closure group, after removal of third molar flap was hermetically sutured and in secondary closure group, a wedge of mucosa of 5-6 mm was removed distal to second molar for secondary healing. Maximum mouth opening and facial swelling were measured at preoperatively, 6 hours and at days 2, 4 and 7 postoperatively. Pain was objectively measured using a visual analogue scale at above time points. The data collected was subjected to students unpaired 't' - test.

**Results:** The secondary closure of the wound proved more successful in preventing post-surgical sequelae of impacted third molar removal. Post-operative analysis showed increased amount of swelling, pain and trismus in primary closure group as compare to secondary closure group and the difference was statistically significant.

**Conclusion:** The results of this study suggest that the secondary healing after impacted lower third molar removal may have considerable contributions to reduce the post-operative swelling, pain and trismus.

**Keywords:** Third molar surgery, Primary closure, Secondary closure

## Introduction

The surgical removal of an impacted mandibular third molar is considered as one of the most frequent minor procedures performed in oral and maxillofacial surgery.<sup>1</sup> Many studies have been done with regard to surgical technique, antibiotic therapy and post operative evaluation to assess patient comfort and wound healing, but still there exist a diverse opinion with third molar. One such difference of opinion is regarding the technique of wound closure after removal of impacted mandibular third molar.

Over the years, there have been different opinions regarding merits and demerits of primary versus secondary closure techniques. However, in recent years, Bourgoyne,<sup>13</sup> Blair and Ivy,<sup>14</sup> Mead,<sup>15</sup> and Padgett,<sup>16</sup> have suggested that primary closure of the wound prevents drainage - thereby worsening the postoperative pain and the swelling. The above mentioned authors have recommended the possibility of healing by secondary intention of the wound, after observing an improved postoperative course in these patients compared with individuals subjected to primary closure. Therefore, this study is an attempt to compare the post-operative sequelae of wound healing and patient response after primary versus secondary closure. The effectiveness of the technique was evaluated relative to the degree of patient comfort and the post-operative condition of the surgical site.

This study aimed to, Compare the post-operative sequelae of impacted mandibular third molar surgery in relation to pain, swelling, trismus and wound healing after primary and secondary closure.

The objectives of the study were,

- To evaluate the effectiveness of secondary healing in preventing the usual complications after impacted mandibular third molar surgery.
- To clinically compare the effectiveness of secondary closure after impacted mandibular third molar surgery with primary closure.

**Materials and Method**

In this study, 50 patients (age range 18-40 years) requiring surgical removal of impacted mandibular third molar teeth under local anesthesia were included. Panoramic radiographs or I.O.P.A. were taken to assess third molar eruption and angulations versus the adjacent second molar. The study protocol was explained to the patients in detail and informed consent was obtained. Inclusion criteria are unilateral or bilateral mandibular third molar impactions irrespective of their angulations and were free from any inflammation, however few patients in both the groups reported mild pain preoperatively; no systemic disease and good general health; no contraindication to the drugs or anaesthetic in the surgical protocol.

All the patients randomly divided into two groups:  
 Group A – 25 patients those who underwent primary healing  
 Group B – 25 patients those who underwent secondary healing

**SURGICAL PROTOCOL:**

Pre operatively oral rinsing was done with 5% povidone iodine solution. Local analgesia was obtained by inferior alveolar, lingual and long buccal nerve block injections using 2% lignocaine with 1:80,000 adrenaline. Wards’ or Modified Wards’ incision was placed as required. A full thickness mucoperiosteal flap was then raised. Bone was removed with burs with a clinical straight hand piece with copious saline irrigation. The delivery of the tooth was accomplished by the tooth splitting technique, as and when needed. In the patients of Group-A, the flap was repositioned and sutured hermetically using 3-0 black braided silk in interrupted pattern.(FIGURE 1-4)

In the patients of Group-B, or a wedge of mucosa, width 5-6 mm, was removed distal to second molar and the flap was repositioned and sutured using 3-0 black braided silk in interrupted pattern.(FIGURE 5-8)

Post operatively all the patients advised ice pack application extra orally on operated side and warm saline water gargles 24 hours after the surgery. Immediately after the surgery, all patients were prescribed Amoxicillin 250mg + Dicloxacillin 250mg (Saginox® by Cascade India, India) and Ibuprofen I.P. 400mg + Paracetamol I.P 500mg + Serratiopeptidase 10mg (Serylid Plus® by

Cascade India, India) for 3 days. All sutures were removed on the 7th post-operative day.

**EVALUATION CRITERIA:**

Criteria assessed in the study were pain, swelling, mouth opening, sensitivity, suture integrity, wound healing and patient’s comfort.

A comparison was made in all the above criterions in between the preoperative measurements and subsequent 6 hours, day 2, day 4 and day7 post-operative measurements. Observation for the wound healing was also made on day 14 and day 30 post operatively.

As no published method satisfies all criteria for assessing facial swelling, we decided to use a measuring tape to measure facial width and swelling in one dimension only. The distance from the tragus to the pogonion, from the tragus to corner of mouth and from the lateral canthus of eye to angle of mandible over the maximum convexity of the soft tissues was measured (in mm) and added.

The same operator, repeating the procedure three times on each patient, made the measurements. Pain intensities were evaluated by a visual analogue scale (Table-1) from “no pain” (score 0) to “extremely severe pain” (score 5). The patients recorded this measurement themselves in triplicate and the average recorded.

**Table-1: VAS scale to evaluate pain**

0	No pain	The patient feels well
1	Slight pain	If the patient is distracted he/she does not feel the pain
2	Mild pain	The patients feels pain even after concentrating on other activity
3	Severe pain	The patient is very disturbed but nevertheless can continue with normal activities
4	Very severe pain	The patient is forced to abandon normal activities
5	Extremely severe pain	The patient must abandon all the activity and feels the need to lie down

A Vernier-calibrated sliding caliper was used to measure the maximum interincisal distance between the maxillary and mandibular right central incisors. The reference points used were the midpoints of the incisal edges of the teeth at the maximum comfortable mouth opening possible.

**STATISTICAL METHOD**

The numerical values recorded were showed as mean values, standard deviation and standard error of mean (SEM). The comparisons between groups were made by applying Unpaired ‘t’ test and obtaining ‘t’ value at 1% level of significance i.e.  $\alpha=0.01$ . Differences with  $P < 0.01$  were considered statistically significant.

FIGURE- 1 Flap Raised



FIGURE-4 Primary Closure

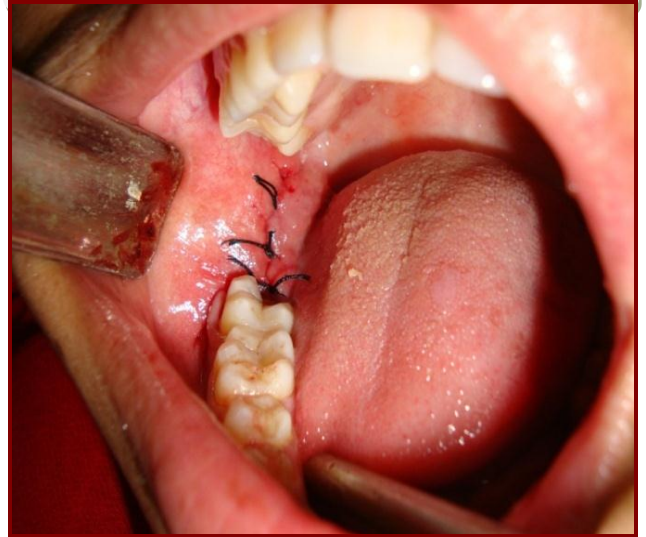


FIGURE- 2 Bone Cutting Done

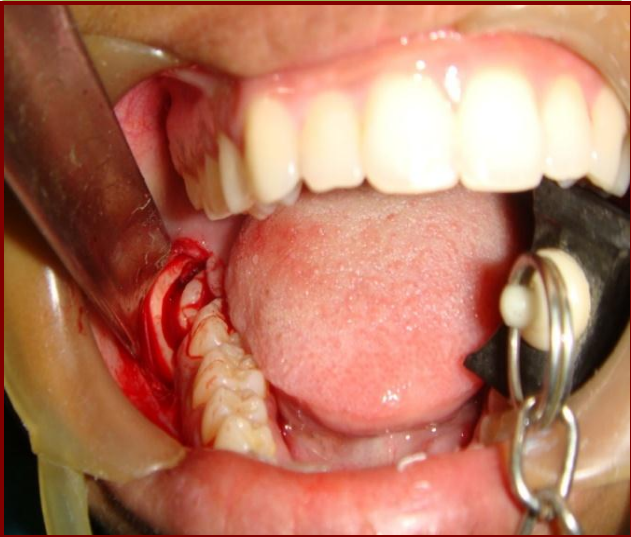


FIGURE- 5 Flap Raised

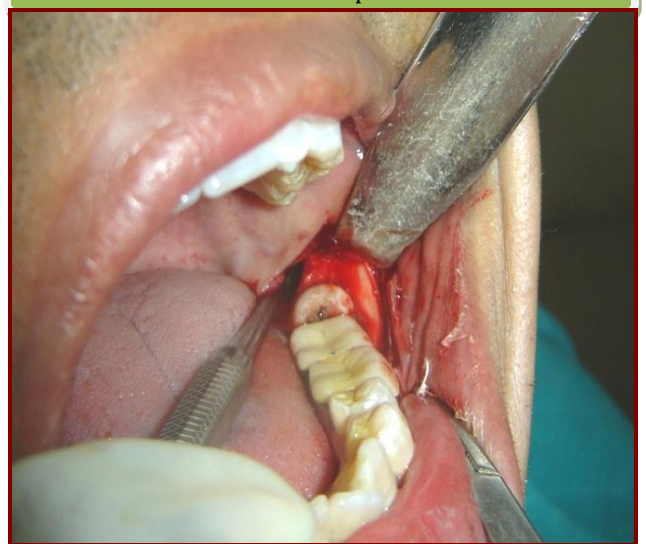


FIGURE- 3 Tooth Delivered



FIGURE- 6 Bone Cutting Done





FIGURE-7 Tooth Delivered

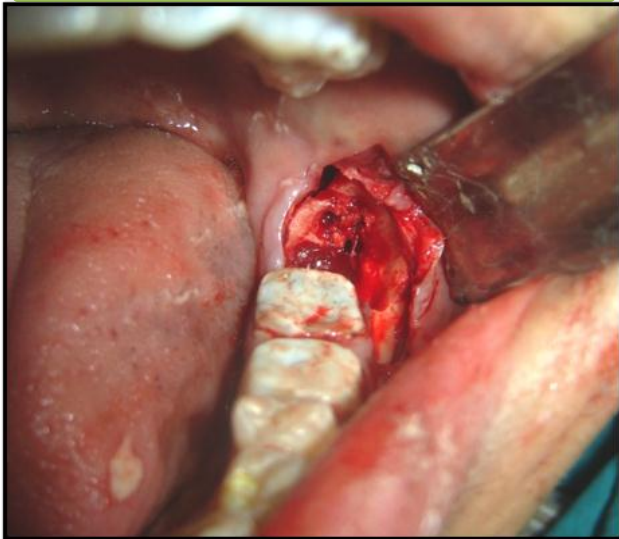
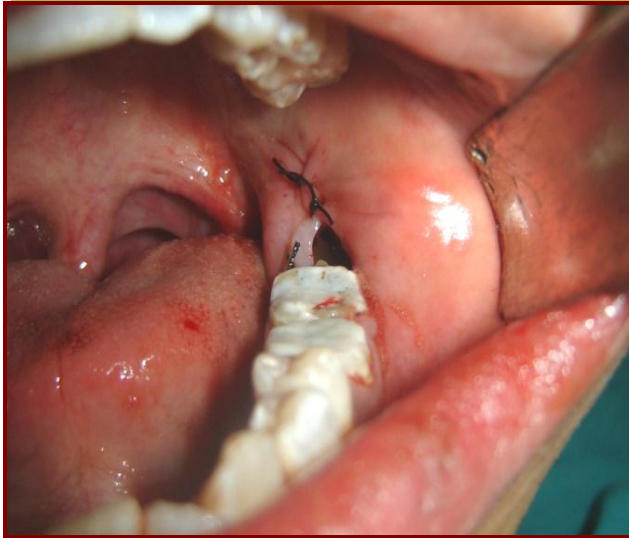
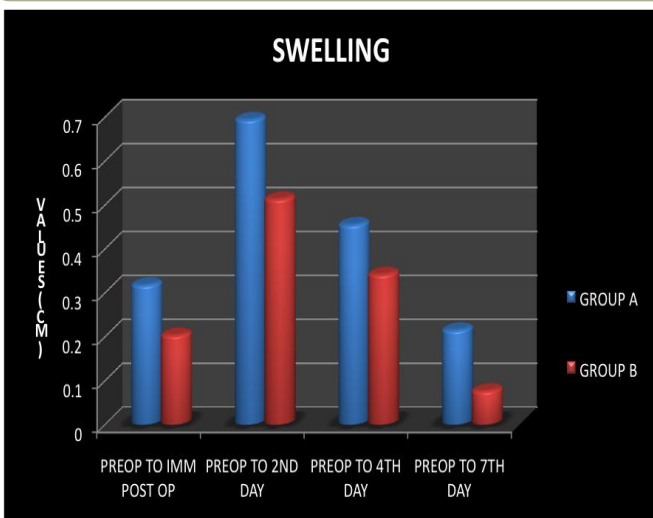


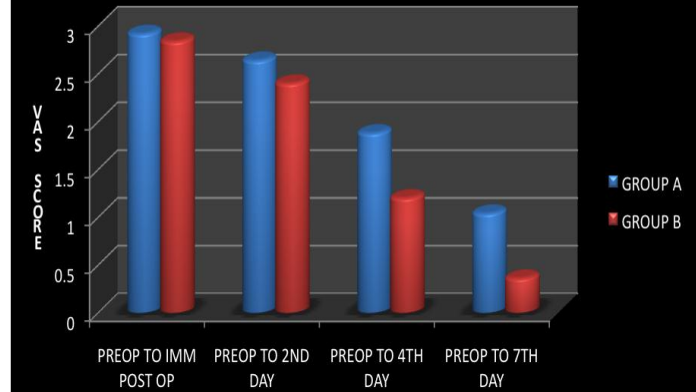
FIGURE- 8 Secondary Closure



Graph-1. Bar graph showing the data on comparison between both groups for swelling measured on different days

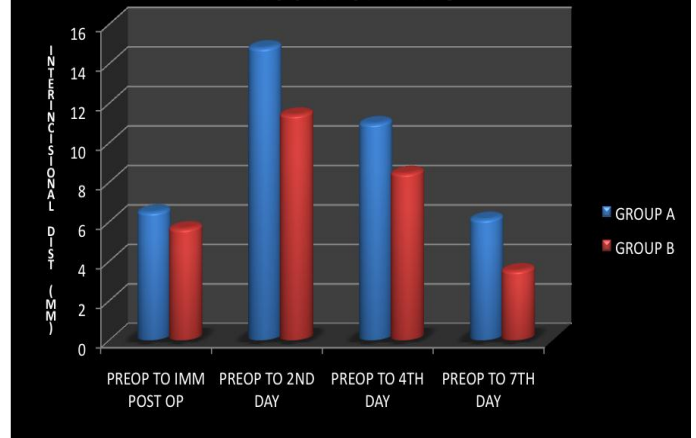


PAIN



Graph-2. Bar graph showing the data on comparison between both groups for pain measured on different days

MOUTH OPENING



Graph-3. Bar graph showing the data on comparison between both groups for mouth opening measured on different days

### Results

The significant differences between two techniques that is primary and secondary closure were calculated by using Unpaired "t" test for pre-operative to 6 hours, 2nd day, 4th day and 7th day post operatively, a significant difference was observed in swelling, pain and mouth opening at 1% level of significance. i.e.  $p < 0.01$

There was a statistically significant difference in swelling between the two groups at all times recorded. The data in reduction of swelling in our study (graph-1) show that, in both the groups, pattern of post-operative swelling was same. Swelling increased post operatively and reached its peak level on 2nd day and then decreased gradually by 7th day. At all time, patients in Group-A showed statistically significant swelling as compared to Group-B.

Results for the pain (graph-2) at 6 hours postoperative period showed peak level of pain in both groups with more pain in Group-A as compared to Group-B but the

difference was not statistically significant which also same for the post-operative day 2. On the day 4 and day 7 post operatively, the pain perceived by the Group-A was more and highly different from the Group-B statistically.

The data for mouth opening (graph-3) showed that, the Group-B patients showed a less reduction in the amount of mouth opening immediately postoperatively but it was not statistically significant. However, on the postoperative day 2, day 4 and day 7, the data collected reveals statistically significant difference favoring Group-B.

In observation of complications, suture integrity was lost over the socket in 7 of the 25 patients of Group-A. Dehiscence of the wound was seen in 4 cases in patients of Group-A, while the food lodgement was observed in 3 patients in Group-A and 8 patients in Group-B. Infection was found in 1 case of Group-A which required further incision and drainage intra orally under local anesthesia. Lingual nerve paresthesia was present in 3 patient, 2 in Group-B and 1 in Group-A; however in all the cases sensation were recovered within 3 months. Sensitivity was found in only one patient in Group-B distal to second molar. Bleeding was reported in 3 of the Group-B and 1 of the Group-A patients, which did not require any treatment and stopped within 8 hours postoperatively.

## DISCUSSION

Inflammatory process is an essential part of postsurgical healing after oral and maxillofacial surgical procedures, however, many times once initiated it may exceed the necessary physiological limits leading to swelling, pain, and trismus.

There is a diversity of opinion among authors of oral surgery regarding the technique of wound closure after removal of impacted mandibular third molars. A primary closure is preferred by many authors.<sup>31-36</sup> However, others prefer the wounds heal by secondary intention.<sup>13-16</sup> The use of drain also suggested, on the other hand, Clark<sup>37</sup> and Winter<sup>38</sup> indicate that it may be treated by either methods, and Woodward<sup>39</sup> advocates the use of a small V-opening posterior to second molar to facilitate post-operative irrigation of wound.

In primary closure site, the wound did not open/infected and therefore healed more rapidly. Even a pin point opening that develops in the primary closure sites, may compromise the self-cleansing effect, food debris accumulates and cause infection. Although the incidence of infection was minimal, when a primary healing site developed low-grade infection, the surgeon was required to perform a minor surgical procedure to establish the drainage and allow for local irrigation of the wound. This procedure was never required when a secondary closure site developed low-grade infection.<sup>17</sup>

A secondary closure appears to minimize immediate post operative edema and pain and thus enhances patient's comfort. Further, the post-operative care and hygiene of a secondary closure site is more easily managed by the patient than a primary closure site. However, the secondary closure sites healed with a

greater percentage of minor defects on the mucosal surface with lower level of healing.<sup>17,25,28,29</sup>

In our study, pain was measured with VAS score, which has long been described as a reliable and sensitive method for assessment of pain<sup>40</sup> and for the mouth opening ability inter incisal distance was measured. Postoperative facial swelling is hard to quantify accurately because it involves three dimensions of measurement with an irregular, convex surface and can manifest itself internally as well as externally. Most of the measurements are made directly on the skin surface. The swelling was measured using measuring tapes as described by Gabka and Matsumura.<sup>41</sup>

The data in reduction of swelling in our study are in accordance with the previous studies done by D. Pasqualini<sup>25</sup>, Anil Danda<sup>28</sup>, Felix Nzube Chukwunke<sup>3</sup>, S. Rakprasitkul<sup>5</sup>, J.M. Sanchis Beilsa<sup>27</sup>, while Dubios et al<sup>17</sup>, C.S. Holland et al<sup>18</sup> and Paulo Roberto et al<sup>1</sup> reported significant more swelling in primary healing group in immediate post-operative period only. Nanjappa Madan et al<sup>29</sup> noted more swelling in primary closure group at all the post-operative days but it was not statistically significant and Mohammad Zandi<sup>4</sup> observed no difference in swelling post operatively after using tube drain as compare to primary closure.

The pain perceived by the Group-A was more and highly different from the Group-B statistically. This observation can be attributed to the collection of the exudate in primary closure sites. The similar results regarding to pain was noted in their study by Pasqualini et al<sup>25</sup>, Anil Danda et al<sup>24</sup>, Paulo et al<sup>1</sup>, Holland et al<sup>18</sup>, J.M. Sanchis et al<sup>27</sup>, Felix<sup>3</sup> and Mohammad Zandi<sup>4</sup>. The results not in accordance with our study was reported by Dubios et al<sup>17</sup> who noted more pain in primary healing group in immediate post-operative period only. While, no significant difference was observed by Rakprasitkulet al<sup>5</sup> and Madan et al.<sup>29</sup>

For trismus, the same observations were found as our study by Felix Nzube Chukwunke<sup>3</sup>, S. Rakprasitkul<sup>5</sup>, J.M. Sanchis Bielsa<sup>27</sup>, and Mohammad Zandi<sup>4</sup>, however Paulo Roberto FC<sup>1</sup> reported lowest average of mouth opening at 24 and 72 hours in the group in which the drain was used for the distoangular position. Eric C. de Brabander<sup>19</sup> observed more amount of trismus in group of secondary healing with gauze drain as compare to only secondary healing group.

In observation of complications, these results were in agreement with study done by Dubios et al.<sup>17</sup> Overall results of our study noted, significant more than average values of swelling, pain and trismus in 9 patients of Group-A and 5 patients of Group-B. Detailed analysis of pre-operative and intra operative findings revealed that the reasons may be following,

- Distoangular or horizontal and deeply embedded in to the bone (position-C or Class II).
- Time required for surgery, sectioning and removal.
- Experience of surgeon
- Pre operatively symptomatic teeth or post-operative food lodgment in the socket region.

This data is in accordance with the previous reports published by Paulo Capuzzi et al<sup>20</sup>, Abel Garcia Garcia et al<sup>22</sup>, TrondInge Berge et al<sup>2</sup>, Paulo Roberto et al<sup>1</sup>, Eric C. de Brabander et al<sup>19</sup>, Peter D. Waite<sup>26</sup> and J.M. Sanchis Bielsa.<sup>27</sup>

In conclusion, results of our study suggest that the secondary healing after impacted lower third molar removal may have considerable contributions to reduce the post-operative swelling, pain and trismus.

In cases where the impaction procedure anticipated to take more of surgical time/exposure and hence, leaving to enhance inflammatory response should be considered for secondary healing. This has been found to be much more comfortable to patient in postoperative days.

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