

A Comparative Study of the Effect of Primary and Secondary Closure Technique Following Removal of Impacted Mandibular Third Molars

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ABSTRACT

Introduction: Surgical removal of the impacted mandibular third molar is one of the most frequently performed surgical procedures in oral and maxillofacial surgery. The purpose of this study was to compare the primary and secondary wound closure after surgical removal of impacted mandibular third molars by evaluating the extent of facial swelling, the severity of pain and degree of trismus.

Material and Methods: A prospective, randomized, clinical trial was conducted in 80 patients. The patients were randomly divided into two groups of 40 each. In Group 1: patients underwent primary closure of the wound and in Group 2: patients underwent secondary closure of the wound. Postoperative pain, swelling, and trismus were evaluated on the 2nd and 7th day postoperatively.

Results: Statistically significant difference was observed for facial swelling and trismus on 2nd postoperative days between both groups. Postoperative pain was less in the secondary closure group.

Conclusion: From the outcome of the above study we can conclude that the secondary wound closure technique has a significant advantage over primary wound closure concerning swelling and trismus.

Keywords: Facial Swelling, Impacted Third Molar Surgery, Postoperative Pain, Primary Wound Closure, Secondary Wound Closure

INTRODUCTION

The incidence of the impacted mandibular third molar is 20% to 30% in population and it can be symptomatic and asymptomatic.¹ The surgical objective is to quickly and carefully remove the impacted tooth with reduced complications.² In spite of various precautions taken, the post-operative period following surgical removal of the impacted third molar is frequently associated with pain, swelling, and trismus along with decreased masticatory capability.³ The postoperative complication reduces the quality of patients life and may interfere with normal activities. Therefore, reducing the post-operative complications of impacted mandibular third molar surgery has always been an issue in oral and maxillofacial surgery.¹ Studies show that the amount of post-operative discomfort is also related to the type of wound closure. One of the factors most closely linked to the intensity of postoperative pain and swelling is a type of healing of the surgical wound.⁴ Primary and secondary closure is used for wound management after extraction of impacted lower third molars.⁵ In primary healing, the socket is covered and sealed hermetically by a mucosal flap, whereas, in secondary healing, the socket remains in

communication with the oral cavity.⁴ Conflicting opinions have been expressed in the literature concerning these two types of healing. Some authors are in favor of closed healing, whereas, other authors report that primary healing frequently causes more pain and swelling than the secondary healing and the post-operative progress does not differ in the two types of healing.⁶

The present study compares the primary and secondary wound closure after surgical removal of the impacted mandibular third molars by monitoring the extent of facial swelling, the severity of pain and degree of trismus.

MATERIAL AND METHODS

A prospective, randomized, clinical trial was conducted. A total of 80 patients both male and female within the age group of 18-35 years, who were referred for removal of impacted mandibular third molar were included in the study. The patients were randomly divided into two groups of 40 each. In Group 1: Patients underwent primary closure of the wound and in Group 2: Patients underwent secondary closure of the wound. Written informed consent was taken from all the patients before the procedure. Exclusion criteria were: 1) Patients using antibiotic premedication or using medication that would affect wound healing. 2) Patients with acute pericoronitis or severe periodontal disease. 3) Patients were allergic to lidocaine or drugs used in dentistry. 4) Pregnancy. 5) Uncontrolled underlying systemic disease like liver or renal disease, hyperthyroidism, diabetes mellitus,

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immunosuppression, etc. 6) Smoker. 7) Patients with Pell and Gregory class 3 C tooth impaction, where there was an intrabony presentation.

OPG radiograph was taken to assess third molar angulations to the long axis of 2nd molars. Surgical extraction was done under local anesthesia; patients were given an inferior alveolar nerve block and a long buccal nerve block using 3ml 2% lidocaine HCl with 1:80000 adrenaline. Before surgery, all patients were given .2% chlorhexidine mouth rinse for 30 seconds. All impacted mandibular 3rd molar surgeries were performed with Ward's incision. The surgical incision was started from the rising edge of the anterior border of mandibular ramus to the distal surface of the distobuccal cusp of the mandibular second molar. The incision was then continued along the sulcus of the buccal side of the mandibular 2nd molar. In the last step, a vertical incision was made in order to relieve the flap. The mucoperiosteum flap was elevated with periosteal elevators and the alveolar bone around the impacted molar was removed by guttering technique with round bur under irrigation. Sectioning of the impacted tooth was done with fissure bur wherever required and extracted using Coupland elevators. After achieving hemostasis a primary or secondary closure was done. Primary closure was achieved by suturing that was hermetically carried out, sealing off communication with the oral cavity. This was achieved by 5 interrupted sutures: 1 each placed mesial and distal to the lower second molar, 1 each placed across the relieving incisions, and another 1 placed across the socket. Secondary closure suturing was carried out leaving a window communication with the oral cavity. For this 4 interrupted suture were used: 1 each placed mesial and distal to the lower second molar, 1 each placed across the relieving incisions. (Figure-1)

Facial swelling and mouth opening were evaluated before the surgical procedure. A baseline measurement was taken just before surgery. (Figure-2) All patients underwent postoperative follow-up visits at 2nd and 7th days after surgery and the following variables were registered: severity of pain, facial measurement, mouth opening. The pain was evaluated using the Visual analog scale (VAS) range from 0 to 10. All patients were asked about their overall pain perception and recorded on 0 to 10 cm visual analog scale according to the perceived degree of pain. Trismus was measured as maximum interincisal distance using vernier calipers. The facial swelling in cm was determined by measuring the distance from the corner of the mouth to the attachment of earlobe following the bulge of the cheek, and the distance from the outer canthus of eye to the angle of mandible and distance from the attachment of earlobe to soft tissue pogonium. The arithmetic average of the three distances on the face was calculated. The swelling was then calculated as a percentage: (postoperative values – preoperative values) x 100. The data were analyzed using the Statistical Package for social sciences (SPSS) version 13. A p-value less than 0.05 was considered significant for the result.

RESULT

On 2nd postoperative day, the mean pain score in group 1 was 2.6 and the mean pain score in group 2 was 2.5. On the 7th postoperative day, the mean pain score was 1.8 and 1.6 in group 1 and group 2 respectively. No significant difference was found to be related to pain ($p < .06$) between group 1 and group 2. (Table-1)

On 2nd postoperative day, mean facial swelling in group 1 was 11.37 with a standard deviation of 6.32 and mean facial

Type of closure	(mean pain) 2 nd day	(mean pain) 7 th day
Group1(Primary closure)	2.6	2.5
Group 2 (Secondary closure)	1.8	1.6

Table-1: Mean pain score on Visual Analog Scale

	2 nd day	7 th day
Group1	11.37	3.38
Group 2	5.43	1.20
p value	<.001	.001

Table-2: Mean Facial swelling (mm)

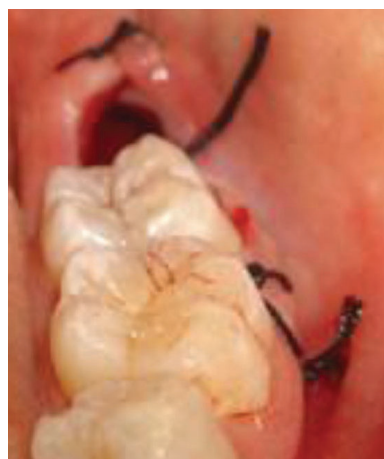


Figure-1: Secondary closure

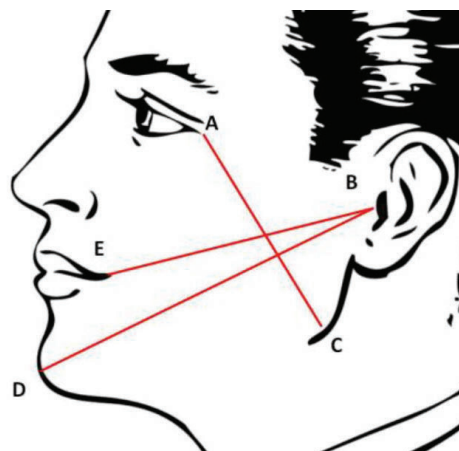


Figure-2: Measurement of clinical swelling of the face (A: Lateral canthus of the eye, B: Midline of the tragus, C: Most inferior point on the angle of mandible, D: Soft tissue pogonium, which is most prominent point at midline on chin, E: Most lateral point on corner of mouth)

swelling in group 2 was 5.43 with a standard deviation of 4.74. On the 7th postoperative day, mean facial swelling in groups 1 and 2 was 3.38(standard deviation 3.18) and 1.20(standard deviation 2.21) respectively. A significant reduction in facial swelling was found in group 2 in comparison to group 1($p<.001$) on 2nd postoperative day. (Table-2)

On 2nd postoperative day, the mean value of trismus in group 1 was 1.1 (standard deviation .057) and in group 2 was 1(standard deviation 0.061). On the 7th postoperative day, the mean value of trismus was .2 (standard deviation .063) and .2 (standard deviation.101) in group 1 and group 2 respectively. A significant difference was observed in the amount of trismus on 2nd postoperative day between group 1 and group 2.

DISCUSSION

Following impacted mandibular third molar surgery, morbidities such as trismus, swelling, pain, and delayed wound closure are severe health concerns for the patients.¹ In this study, we investigated whether the suturing technique has any effect on reducing postoperative complications. Removal of the impacted third molar is a procedure that demands technical skill, sound judgment, sound knowledge of anatomy and surgical principles, the rationale of antibiotic therapy, good anesthesia, proper medication, nutritional balance, and total patient care.³ Thus, clinicians have focused on studies to reduce postoperative complications after impacted mandibular third molar surgery. Wound closure technique is an operative factor that could influence the immediate postoperative factors of pain, swelling, and trismus, as well as the pattern of complications.⁷ In the literature, there is a general belief that primary wound closure increases postoperative complications. The procedures for assessing the postoperative complications such as swelling, trismus, and pain have been reported in many studies. However, there is no guideline for how the evaluation of primary wound closure after third molar surgery should be done.¹

There is no evidence on which suture material is superior to another in terms of reducing the postoperative complications of impacted third molar surgery. In our study, 3.0 size silk suture material was used as several studies have demonstrated its use after third molar surgery. The simple interrupted suturing technique is most commonly used after any oral surgical procedures, including impacted mandibular third molar surgery.¹

According to Holland and Hindle, primary closure is preferred by Howe, Archer, Kruger, Thoma and Killey key whereas many other authors preferred the wound to heal by secondary intention.⁸ In secondary healing, the socket remains in communication with the oral cavity whereas in primary healing the socket is covered and sealed hermetically by a mucosal flap.⁶

Pain is a subjective experience that is influenced by many factors such as the patient's age, cultural background, educational level, previous experience of pain, pain threshold and tolerance, therefore, assessment of pain

may be difficult.⁹ Berge had done a thorough investigation of visual scale and other objectives of assessment of pain and swelling and concluded that pain, being an exclusive subjective experience, can be successfully assessed with the Visual Analog Scale. The VAS has also been established as a reliable and sensitive method for recording pain.¹⁰ Danda et al compared primary and secondary wound closures after mandibular third molar surgery. In the secondary wound closure group, the patients reported to have less postoperative pain and swelling compared to those in the primary wound closure group.¹¹ Khande et al found that there was a significant difference in the severity of pain between two groups. The intensity of pain was greater in the primary closer group.⁶ In this study, lesser pain was observed in the secondary closure group in comparison to primary closure. There was no significant difference found in pain between primary and secondary closure.

The craniometric method using a flexible tape was used to determine the facial swelling. Although, this method is not as accurate as computerized tomography (CT) scanning or magnetic resonance imaging (MRI) for making precise measurements of facial soft tissue volume, it is a simple cost-effective and time-saving method that provides numerical data for the determination of soft tissue contour changes.⁹ Bello et al recorded no significant difference between secondary and primary closure regarding pain, trismus, dry socket, and socket infection. However, a significant reduction in facial swelling was observed in secondary closure in comparison to primary closure.⁷ Holland and Hindle showed that post-operative swelling was more marked in "closed" than in "open" healing and that the technique of election should be "open" healing. In contrast to their findings, it was observed in the present study that, at 1 month from surgery the wound appeared to have healed better in "closed" healing.⁸ Facial swelling is a relatively constant postoperative finding which could be due to the accumulation of inflammatory exudate within facial tissues, hematoma collection or both. Partial wound closure, which ensures drainage, appears to minimize immediate postoperative edema, thereby contributing to a reduction in patient discomfort.⁷ In our study, a significant reduction in facial swelling was found in the secondary closure group in comparison to the primary closure group ($p<.001$) on 2nd postoperative day.

Escoda et al study shows that there are no statistically significant differences in trismus between the complete and partial closure.⁵ In this study, a significant difference was observed in the amount of trismus on 2nd postoperative day between primary and secondary closure.

CONCLUSION

We observed a significant reduction in postoperative swelling and trismus inpatient with secondary wound closure. From the outcome of the above study, we can conclude that the secondary wound closure technique has a significant advantage over primary wound closure concerning swelling and trismus. However, we think that further studies are required to be done to evaluate the effect of secondary wound

closure technique on postoperative morbidity after impacted mandibular third molar surgery.

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