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# COMPARISON OF PRIMARY AND SECONDARY WOUND CLOSURE OUTCOME AFTER MANDIBULAR 3RD MOLAR IMPACTION SURGERY

[1]SABEEN FAZAL, [2]RABIA NASEER, [3]NADIA MANSOOR, [4]KHALID MAHMOOD SIDDIQI, [5]KANWAL SOHAIL, [6]RESHAM HAFEEZ

## ABSTRACT

*The postoperative complications associated with mandibular third molar impaction surgery include pain, swelling, trismus along with reduced masticatory capability. One factor associated with these complications is the technique of surgical wound closure. The aim and objective of the present study was to compare the primary and secondary wound closure outcomes (mean trismus) after mandibular 3rd molars impaction surgery.*

*A Quasi experimental study was conducted in the department of Oral and Maxillofacial Surgery, Nishtar Institute of Dentistry, Multan over a perivd of six months. A total of 70 patients were equally divided into "Group A" (Primary closure) and "Group B" (secondary closure). Data was collected on prescribed Proforma and entered in SPSS version 20. Qualitative data like gender was presented as frequency and percentages. Quantitative data like age and trismus were presented as means and standard deviations. An Independent Sample T-test was applied to compare trismus among study groups.*

*In the present study, the mean age of participants in groups A and B was 32.49+6.77 and 32.77+7.37 years respectively. In Group A 51.43% were males as compared to Group B in which 57.14% were males. Mean trismus after mandibular 3rd molar impaction surgery with primary and secondary closure was 0.43+0.50 mm and 4.29+0.83 mm respectively. The p-value (p-value=0.001) showed a statistically significant difference between the two groups. Mean trismus is significantly less in patients treated with secondary wound closure after surgery for impacted mandibular 3rd molars.*

**Keywords:** *Impacted mandibular 3rd molars, trismus, wound healing, surgical closure technique*

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## INTRODUCTION

Impaction of mandibular third molars is common in about 90% of the population.[1] Impacted third molar fail to erupt to its anatomic position in the dental arch. It may be due to adjacent teeth, thick and dense bone, or excessive soft tissue.[2] Environmental and genetic factors may play role in the high prevalence of impactions.[3]

Surgical removal of impacted mandibular 3rd molars is a frequently performed surgery in dentistry. Surgical extraction usually results in post-extraction pain, swelling, dry socket and trismus. Closure of surgical wound created for the removal of the impacted tooth affects the wound healing and so the postoperative sequelae.[4]

Surgical extraction of impacted third molars is a high volume procedure both in dental hospitals as well as in private dental clinics so there is a need to reduce the incidence of postoperative complications.[5] Different anti-inflammatory and antibacterial drugs

[1] Sabeen Fazal, Assistant Professor Oral medicine, Army Medical College, National University of Medical Sciences, Rawalpindi E-mail: Sabeen_fazal@yahoo.com
[2] Rabia Naseer, Assistant Professor Oral and maxillofacial Surgery, Armed Forces Institute of Dentistry, National University of Medical Sciences, Rawalpindi E-mail: dr.rabia786@hotmail.com
[3] Nadia Mansoor, Assistant Professor Oral medicine, Army Medical College, National University of Medical Sciences, Rawalpindi E-mail: nadommj@gmail.com
[4] Khalid Mahmood Siddiqi, Professor Oral and Maxillofacial Surgery, Islamabad Medical and Dental College, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad E-mail: khalid.siddiqi@iideas.edu.pk
[5] **Corresponding Author:** Kanwal Sohail, Demonstrator, Oral Medicine, Army Medical College, National University of Medical Sciences, Rawalpindi E-mail: drkanwalsa@gmail.com Cell: 03030427737
[6] Resham Hafeez, Assistant Professor, Periodontology, Army Medical College, Rawalpindi E-mail: dr.reshamhafeez@gmail.com

and placement of cones or drains coated with antibiotic drugs have been used by dentists for pain control.[6]

The postoperative sequelae of complications vary from patient to patient so this period is hardly predictable in every patient. Certain factors like gender and bodyweight of the patient may affect the resulting postoperative swelling. Similarly, duration and difficulty of surgery, amount of ostectomy required and the experience of the surgeon may also contribute to the development of post-operative complications.[7,8] Few studies have shown that postoperative edema also depends upon the type of wound closure (i.e. primary closure versus secondary wound closure).[6] Primary closure of the wound (suturing the wound and healing occurs with primary intention) is routinely practiced by dentists. However, it is seen that it worsens the edema by applying sutures and prevents the drainage of edema fluid so it lets the edema worsen. Secondary closure (leaving the wound open and healing by secondary intention) may prevent these complications.[8]

Khande et al[9] performed a study on 60 patients with surgery for impacted mandibular 3rd molar. Thirty patients were treated with primary closure and 30 with secondary closure. They found that patients with primary closure had more postoperative swelling as compared to secondary closure (1.059 ± 1.05 versus 3.88 ± 1.81) and more trismus (3.48 ± 5.85 versus 18.95 ± 14.91). For day 2 and (0.119 +_0.64 v/s 4.87+_6.38) for day 7.

Primary closure is routinely practiced by dentists. Although, healing by secondary intention has shown promising outcome.[9] None of the technique has been established as a gold standard. The aim of present study was to evaluate a better technique of wound closure with good outcomes that is beneficial for the patients. Moreover, no local data was available on this study. It is hypothesized that secondary wound closure will result in less trismus.

## MATERIALS AND METHODS

A Quasi experimental study was conducted in the department of Oral and Maxillofacial Surgery, Nishtar Institute of Dentistry, Multan over the six months. A sample of 70 was calculated using the WHO sample size calculator with 95% confidence interval. Group A: 35 patients. This group underwent primary wound closure and Group B: 35 patients. Underwent secondary wound closure. Nonprobability consecutive sampling was used. After ethical approval by the Ethical Review Board (ERB) of the Nishtar Institute of Dentistry, both genders with age 20-45 years and impacted mandibular 3rd molar (complete bony and mesioangular impaction, assessed on radiograph-periapical and OPG) were included in the present study. Patients with a history of dental surgery on the same site, patients who were immunocompromised (on steroids, or anti-cancer treatment) and patients with liver or renal failure were excluded from the study.

Participants fulfilling the inclusion criteria were recruited from the outpatient department of Nishtar Institute of Dentistry, Multan. Informed consent was taken from every patient. Demographic data along with preoperative mouth opening was collected. Group A (n=35) received treatment with primary wound closure by placing two sutures on the distal side of the incision and one suture on the mesial side while Group B (n=35) received treatment with secondary wound closure by removing a wedge of mucosa from the distal aspect of 2nd molar. One suture was placed on the mesial side of the incision and another on the distal side. Post-operative instructions were given. Postoperative mouth opening and trismus were measured on the second and seventh day of surgery.

Data was analyzed using SPSS version 20. Qualitative data like gender was presented as frequency and percentages. Quantitative data like age and trismus were presented as means and standard deviations. An Independent Sample t-test was used to compare trismus in both groups. Effect modifiers for example age and gender were controlled by stratified tables and a t-test was used to obtain their effect on the outcome. A P-value of ≤0.05 was considered significant with 95% confidence interval.

## RESULTS

A total of 70 participants were enrolled to compare the mean trismus in primary versus secondary wound closure after surgery for impacted mandibular 3rd molars.

Regarding the distribution of the patients according to age, 40% (n=14) participants in Group-A and 45.71% (n=16) in Group-B were in the range of 20-30 years while 60% (n=21) in Group-A and 54.29% (n=19) in Group-B were within 31-45 years, with the mean value of 32.49±6.77 and 32.77±7.37 years in group A and B respectively. According to the gender distribution of the participants, 51.43%(n=18) were males in Group-A and 57.14%(n=20) were males in Group-B. 48.57%(n=17) were females in Group-A and 42.86%(n=15) were females in Group-B as shown in Fig 1.

Mean trismus in primary versus secondary wound closure after surgery for impacted mandibular 3rd molars were recorded as 0.43±0.50 mm in Group-A and 4.29±0.83 mm in Group-B with the p-value of 0.001, demonstrating a statistically significant difference.

Stratification for age shows mean trismus of 0.29±0.46 mm in Group-A and 4.40±1.05 mm in

TABLE 1: STRATIFICATION FOR AGE AND GENDER TO

| Stratification | | Group A n=35 (mean±SD mm) | Group B n=35 mean±SD mm | p-value (Independent sample t-test) |
|---|---|---|---|---|
| Age | 20-30 years | 0.29+0.46 | 4.40+1.05 | 0.001 |
| | 31-45 years | 0.52+0.511 | 4.29+0.72 | 0.001 |
| Gender | Males | 0.53+0.51 | 4.27+0.96 | 0.001 |
| | Females | 0.35+0.49 | 4.30+0.73 | 0.001 |

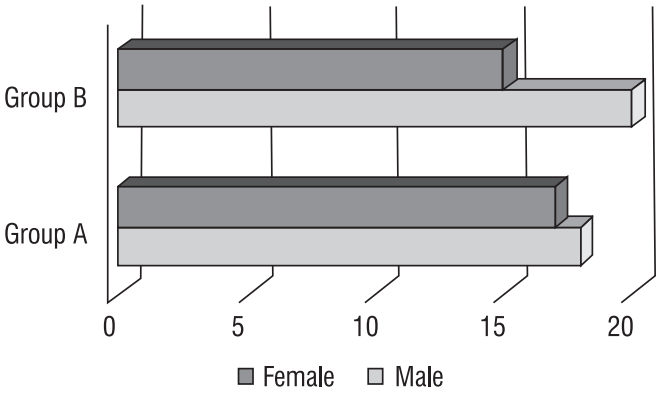


Fig 1: Gender distribution between the two groups

Group-B between 20-30 years of age with the p-value of 0.001 while the age group between 31-45 years demonstrated mean trismus of 0.52±0.511 mm in Group-A and 4.29±0.72 mm in Group-B, p-value 0.001. Stratification for gender shows mean trismus in males measuring 0.53±0.51 mm in Group-A and 4.27±0.96 mm in Group-B, with a p-value of 0.001. While in the female it was recorded as 0.35±0.49 mm in Group-A and 4.30±0.73 mm in Group-B, with a p-value of 0.001 as shown in Table 1.

## DISCUSSION

Surgical removal of impacted mandibular 3rd molars is related to different degrees of difficulty in the surgical procedure as well as the risk of complications which may also include iatrogenic trigeminal nerve injury.[10] The postoperative complications of impacted mandibular 3rd molars surgery is distressing for the patients.[11] The post-operative inflammatory response of the body to surgery results in pain, trismus and swelling which are frequently reported. These complications affect the quality of life of the patient by three-folds as compared to those who remain asymptomatic.[12] Therefore better pain management along with swelling and trismus control are emphasized by all clinicians. Several techniques were employed from time to time to control complications associated with the 3rd molar surgery which include different surgical closure techniques with or without placement of drains and use of analgesics, corticosteroids and antibiotics.[5,13-15] Cryotherapy and the use of lasers were also reported for controlling post-operative complications as laser light has bio-stimulating, analgesic and anti-inflammatory effects.[16,17]

Trismus being the most common complication of 3rd molar surgery has a devastating effect on a patient's general health as it causes difficulty in eating, speech and oral hygiene. It may also have had esthetic problems due to facial swelling. Trismus being distressing and painful for the patient, it may also limit the dentist to perform any required oral examination or provide treatment that required proper access within the oral cavity. Trismus may also result in an increased risk of aspiration.[4]

Being an oral surgeon it was seen that surgical removal of mandibular 3rd molar impactions contribute to the main workload of a surgeon. Most dentists take precautionary steps during the surgical procedure to prevent any post-operative sequelae. Despite that, the postoperative period was frequently accompanied by pain, swelling and trismus resulting in reduced masticatory proficiency. The type of surgical wound healing is closely linked to the intensity of post-operative pain and swelling.[5]

In the present study, mean trismus as a result of primary closure versus secondary wound closure after surgical removal of impacted mandibular 3rd molars were recorded as 0.43±0.50 mm and 4.29±0.83 mm respectively, demonstrating a statistically significant difference (p value= 0.001).

The results of this study are in accordance with Khande K, et al[9] who performed a study on 60 patients. They found that patients with primary closure had more postoperative swelling and trismus as compared to secondary closure for day 2 and 7. Another study by David et al[18] revealed that the pain and swelling greatly increased in primary closure for the first five days after surgery as compared to secondary closure.

Wound closure techniques like primary closure are preferred in studies by Howe, Archer and Kruger however, some studies were also in favor of wound healing by secondary intention.[9, 19] In an attempt to reduce the post-operative complications researchers documented the use of a drain tube in the buccal fold following impacted third molar surgery.[20-23]

Open healing of the surgical wound associated with third molar impaction result in reduced post-operative pain and swelling as compared to closed healing of the surgical wound. It is recommended to adopt secondary closure while surgery of impacted 3rd molars as this will be responsible for more post-operative comfort to the patient.

## CONCLUSION

This study concluded that trismus was significantly less in patients treated with secondary closure of wound after surgery for removal of impacted mandibular 3rd molars.

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**CONTRIBUTIONS BY AUTHORS**
**All authors contributed substantially**