

Comparison of Pain and Mouth Opening in Primary versus Secondary Closure after Surgical Removal of Impacted Mandibular Third Molar

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ABSTRACT

Aim: To compare pain score and trismus in primary and secondary closure of surgical wound after removal of impacted mandibular third molar.

Study design: Randomized controlled trial.

Place and duration of study: Bacha Khan Medical Complex, Gajju Khan Medical College, Shah Mansoor Swabi Pakistan from 1st May 2020 to 30th June 2021.

Methodology: Fifty patients were divided into two groups i.e group A (Primary closure) and group B (secondary closure). Demographic data (name, age, gender and contact number) was recorded. Pre-operative mouth opening was measured as maximum interincisal distance in millimetres. Pre-operative variables were again re-evaluated on 3rd post-operative day for pain on Visual analogue scale (VAS 0-10) and for mouth opening.

Results: Thirty one (62%) patients were males and 19(38%) were females. Overall mean pain score was 2.48±1.90 on visual analogue scale (VAS). Mean age was 30.24±7.64 years while mean post-operative interincisal distance was 43.5±4.717 mm. The difference between Group A and B for both mouth opening ((P=0.03; 95% CI = 0.135, 0.434) and pain (P=0.006; 95% CI = 0.426, 2.453) were statistically significant.

Conclusion: When intra operative parameters of impaction difficulty are the same, secondary closure ensures minimal morbidity of pain and trismus as compared to primary wound closure.

Keywords: Flap closure; Primary closure; Secondary closure; Impacted third molar

INTRODUCTION

By definition impacted tooth is a tooth that has failed to reach its normal position in dental arch with in specific time. It is most common pathological condition frequently encountered in daily dental and maxillofacial practice¹. Out of all teeth, third molar is most common impacted tooth and is usually due to lack of space. Usually these teeth are asymptomatic but may cause damage to the adjacent tooth, cause caries or root resorption in adjacent tooth, and may result in pericoronitis, cyst and tumor formation. Prevalence of impacted third molar is 68% at age of 72 years and is more common in Nigerian population². In Pakistani population aged between 15-25 years, the prevalence was 84% which was quite high to the fact that initial presenting complaints are usually encountered between this age groups³.

Common causes of the third molar impaction are lack of space, abnormal position of tooth bud, primary tooth ankylosis, ankylosis of third molar, supernumerary tooth, increased density of the bone, thickened overlying soft tissues and systemic diseases such as osteopetrosis and Paget disease.³ Common causes as a result which patients seek treatment are pain, swelling, re-current pericoronitis, trismus, abscess formation and carries in the adjacent tooth. The decision of removal of impacted third molar is based upon clinical and radiological evaluation, although some clinicians also debate on periodic evaluation as well as early removal. Most common complications after third molar removal documented in the literature are pain, swelling, limited mouth opening, dry socket, nerve injury and hemorrhage⁴.

To get access to the impacted lower third molar different type of flap designs are used. There are also different flap closure techniques used for repositioning of flap. Primary and secondary closure techniques are two different flap closure techniques used in third molar impactions surgery. Some are in the favour of the primary closure with different suture technique while others are in

opinion of secondary healing⁵. To minimize pain, swelling and trismus researchers used different strategies to minimize post-operative complications by modifying flaps designs with minimal osteotomy, allowing healing by primary or secondary intention, application of the cold therapy and use of medications⁶.

The purpose of this study was to compare pain and trismus after primary and secondary closure of surgical wound after removal of impacted mandibular third molar.

MATERIALS AND METHODS

This study was conducted at Bacha Khan Medical Complex, Gajju Khan Medical College, Shah Mansoor Swabi Pakistan from 1st May 2020 to 30th June 2021. Ethical approval from Institutional Review and Ethical Board (IREB) was taken. Surgical procedure was explained to each patient in detail. Verbal and written informed consent was taken from each patient. Fifty patients meeting the selection criteria were assessed in this study. They were divided into two groups i.e. group A (Primary closure) and group B (secondary closure). In group A primary closure was done to reposition the flap while in group B about 5mm space was left distal to 2nd molar for secondary healing. Randomization was done by lottery method. Demographic data was recorded as name, age, sex and contact number. Patients included were having class A1 impaction according to Pell and Gregory classification, in age range between 20 to 55 years, both genders, and medically fit with no systemic co-morbidities and no acute infection at impacted molar area. Patients having preexisting infection (pericoronitis), systemic disease which contraindicate surgical procedure (uncontrolled Diabetes mellitus, blood dyscrasias, drug allergy to local anesthesia, cyst or tumors in third molar area, pre-existing bone disease (Paget disease osteomyelitis or malignancy etc), history of systemic drugs which contraindicate surgery (as Aspirin, bisphosphonates etc.) and unwilling to participate were excluded.

Pre-operative mouth opening was measured with help of sterile stainless steel graduated ruler between tips of upper central incisors and lower central incisors as maximum interincisal

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distance in millimetres. Before caring out surgical procedure each patient was asked to rinse oral cavity with chlorhexidine mouthwash. Surgical extraction was done using local anaesthetic solution consisting 2% lidocaine with 1:100000 adrenaline by single surgeon. Mesial to second molar, crestal incision with posterior releasing incision was given crossing the mucogingival line extending 12mm or greater in the posterior direction. Full thickness mucoperiosteal flap was raised and using slow motor hand piece with copious irrigation bone cutting was done to expose tooth. After extraction wound was irrigated with 0.9% saline. In group A, wound was approximated, extra mucosa was trimmed with scissors and whole length of the incision was closed including the releasing incision. The gap created by the removal of third molar was completely closed distal to the second molar. In group B, flap was repositioned in such a way to leave a 5mm space between flap and mucosa adjacent to second molar. Black silk of 3/0 size was used to reposition the flap. Post-operative instructions were given to patients and medicated for pain relief. Researcher was blinded about patient groups and pre-operative variables were noted and again re-evaluated on 3rd post-operative day for pain on Visual analogue scale (VAS 0-10) and inter incisal distance was measured by graduated scale in mm.

Data obtained was entered and analysed using SPSS version 20.0. Descriptive statistics were calculated for quantitative variables like age, pain and trismus. Mean and standard deviation was calculated. Normality was assessed by Kolmogorov-Smirnova test (P=0.200). The data was normally distributed so we used parametric tests. Independent sample t-test was used to compare mean pain and trismus between two groups. P value < 0.05 was considered significant.

RESULTS

Among total fifty patients, there were 31(62%) males and 19(38%) females. Overall mean pain score was 2.48±1.90 on visual analogue scale (VAS). Mean age was 30.24±7.64 years while mean post-operative mouth opening was 43.5±4.717mm 0(Table 1). Most common age group was third decade, 28(56%) followed by fourth decade, 17(34%). Rests of the details of age distribution are shown in Table 2.

Mean mouth opening±SD in primary closure (Group A) was 42.4±5.18 (SD) mm while in secondary closure (Group B) was 48.6±4.01 (SD) mm. The difference was statistically significant (P=0.03; 95% CI = 0.135, 0.434) (Table 3). Mean pain in primary closure (Group A) was 3.2±1.58 while in secondary closure (Group B) was 1.76±1.96. The difference was statistically highly significant (P=0.006; 95% CI = 0.426, 2.453).

Table 1: Mean and standard deviation of pain, age and post operative pain

Variable	Range	Mean±SD
Pain (VAS score)	0.0-5.0	2.48±1.90
Age (years)	21.0-55.0	30.24±7.64
Post operative mouth opening (mm)	32.0-53.0	43.5±4.717

Table 2: Age distribution

Age	No.	%
20-30	28	56.0
31-40	17	34.0
41-50	4	8.0
> 50	1	2.0

Table 3: Comparison of post-operative mouth opening (MO) in primary and secondary closure after 3rd molar impaction removal on 3rd day

Closure	MO (mm)	P value	95%CI
Primary	42.4±5.18	0.03	(0.135,0.434)
Secondary	48.6±4.01		

Table 4: Comparison of postoperative pain in primary and secondary closure after 3rd molar impaction removal on 3rd day

Closure	Pain	P value	95%CI
Primary	3.2±1.58	0.06	(0.426,2.453)
Secondary	1.76±1.96		

DISCUSSION

This study was aimed to evaluate pain and mouth opening in primary and secondary closure after surgical extraction of impacted mandibular third molar. Our findings showed that secondary closure ensures minimal morbidity of pain and trismus as compared to primary wound closure. In our study age group range was from 20 to 55 years. Most common age of presentation was between 20 and 30 years. Mahmood et al⁸ also observed that most common age of presentation was 3rd decade of life with sample size of 150 patients in their study. Kirtiloğlu et al⁷ also documented for high presentation in second decade which is in coherence with our study. Usually during age of 20 to 30 years symptoms of impacted molar frequently occurs due to which patients seek treatment and present to dentist. After age of 30, usually impacted tooth become asymptomatic and patient rarely present to dentist. Late presentation may occur due to lack of awareness.

In our study impacted tooth was predominantly common in males (68%) as compared to females (32%). In literature there is variation in male to female ratio. Amanat et al³ observed male predominance with 76.9 % males and 23.1% females. Gay-Escoda et al⁶ Mahmood et al⁸ and Afsar et al⁹ observed no difference in gender distribution in their studies. Punjabi et al¹⁰ observed in their study a female predominance with 61% females and 39% males presented for surgical extraction of 3rd molars.

The arguments about the removal of third molar impaction have been reviewed in the literature. Some researchers are in the opinion of removing asymptomatic tooth while others advise retention till removal is nessecary.¹⁰ Removal of third molar impaction and its complications are directly related to local and general factors which include age of the patients, medical condition of patient, and expertise of operating surgeon, position of the tooth and availability of the surgical instrumentation. Most common complication which may be encountered during its removal are pain, trismus, damage to nerve, infection, dry socket, haemorrhage and iatrogenic damage to adjacent tooth, and very rarely fracture of associated bone¹¹.

The study conducted by Shivpuri¹² compared the primary and secondary closure after third molar impaction surgery. He also compared pain severity and mouth opening after third molar impaction removal. Pain was significantly less in secondary closure as compared to the primary closure especially on the 7th post-operative day. We have also observed that pain score was much lower in secondary closure group. Mean pain score at 3rd post-operative day was 3.2±1.58 in primary closure while in secondary closure it was 1.76±1.96 with p value of 0.006 which is statistically highly significant, with a good pain control in secondary closure. In other study where 60 patients were taken to compare primary verses secondary closure after third molar impaction surgery. Pain and swelling were compared and this study also showed significant pain in primary closure as compared to secondary closure, discomfort was more in primary closure which is also in accordance with the literature though healing was slow in secondary closure group which didn't effected the overall progression of pain¹³. Due to surgical trauma inflammation occurs in local tissue which results in swelling at surgical site. In secondary closure there is decreased tension on tissue as compared to primary closure and also path is provided for tissue exudate to easily escape to the surgical site leading to less oedema and thus resulting in comparatively less pain¹⁴.

We also compared overall mouth opening in both the groups. In our study mouth opening was much improved in group B as compared to group A. The study conducted by Singh et al¹⁵ also shown over all improved mouth opening in secondary closure group. Similar observations were observed in other studies, favouring secondary closure with much lower morbidity, good control of post-operative pain and reduced trismus in removal of third molar impaction which is in agreement with our study¹²⁻¹⁶. The possible explanation of increased mouth opening is also

attributed to less oedema, less pain and less tension on flap repositioned in secondary closure group as compared to primary closure group. Brabander and Cattaneo¹⁷ conducted a study on the effect of secondary closure on trismus. Mucosa distal to third molar was removed in test group and vaseline gauze was placed to act as a drain and to act as a barrier to ensure to close the wound secondarily. Same procedure was utilized in the control group but without vaseline gauze. Secondary closure ensured good closure with minimal pain and effective mouth opening while vaseline gauze had no effect on these variables.

Limitations of study: In this study patients were only assessed on third post-operative day. Ideally patients should be assessed on 1st, 3rd, 5th and 7th post-operative day to assess in better way the post-operative outcome.

CONCLUSION

When intra operative parameters of impaction difficulty are the same, secondary closure ensures minimal morbidity of pain and trismus as compared to primary wound closure.

Conflict of interest: Nil

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