

Effects of Tube Drain with Primary Closure Technique on Postoperative Trismus and Swelling after Removal of Fully Impacted Mandibular Third Molar

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ABSTRACT

Background: The surgical removal of impacted third molars is a common procedure associated with a diversity of technique and anecdotal opinion. surgical removal of impacted third molar result in, postoperative pain, facial swelling, and trismus. Many authors suggest the use of drains with primary closure. A randomized cross over design was carried out in 20 patients of bilateral fully impacted third molars. patients were evaluated on 1st, 3rd and 7th day post operatively to determine the effects of tube drain on postoperative trismus and swelling. It was observed that facial swelling and trismus was more in non-drain group as compared to non-drain group. However, there was no statistically significant change between two groups on facial swelling. The present study showed that use of surgical tube drains after removal of impacted third molar is a effective method for reducing postoperative trismus and swelling. Mean value of horizontal and vertical facial swelling ($p>0.01$) non-significant and trismus was significant on 1st and 3rd day ($p<0.01$).

Keywords: Tube drain, Impacted tooth, Primary closure, Trismus, Swelling.

INTRODUCTION

The dental arches must undergo considerable antero-posterior growth to accommodate all permanent teeth ¹. Because the mandibular third molar tends to erupt relatively late and slowly, disturbances associated with its eruption and position e.g., pericoronitis and impaction, are common. These disturbances and their prevention are major reasons for early removal of mandibular third molar.² The surgical removal of impacted third molars can cause considerable postoperative pain, swelling and trismus.³

Impacted mandibular third molar surgery with primary closure, however, may cause postoperative

edema, pain, facial swelling, patient discomfort and restriction of mouth opening¹¹. In an attempt to overcome these problems, both steroids ⁴ and nonsteroidal anti-inflammatory agents⁵ as well as enzymes ⁶and antihistamines⁷ have been tried. An ideal agent for use after lower third molar surgery should alleviate pain, reduce swelling and keep trismus to a minimum & promote healing with no unwanted effects. As such an agent does not exist, oral surgeons have devised several other methods to minimize postoperative sequelae to a tolerable level ^{8,9}. Studies of Ayad et al⁸ and Rakprasitkul et al¹⁰ using the rubber drain with primary closure

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Fig 1: The standard butterfly catheter. Used as Tube Drain.



Fig 2: Placement of Tube Drain.



Fig 3: Meaurement Reference Points for Mouth Opening Assessment.

after removal of impacted mandibular third molars showed fewer complications. Study of Ali Alp Saglam¹¹, showed the use of tube drain with primary closure technique after removal of fully

impacted mandibular third molars which reduces the postoperative problems, especially facial swelling or edema, and trismus remarkably.



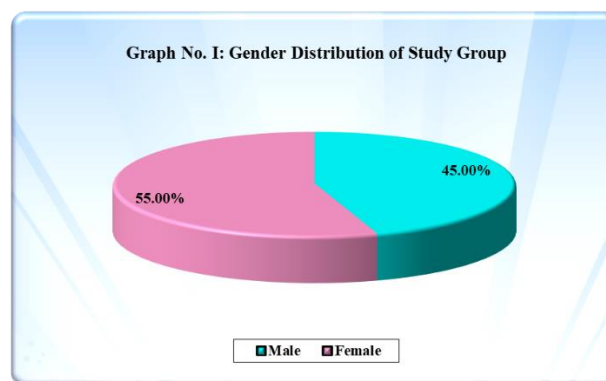
Fig 4: Measurement Reference Points for Horizontal Facial Swelling.



Fig 5: Measurement Reference Points for Horizontal Facial Swelling.

Table 1: Gender Distribution of Study Group.

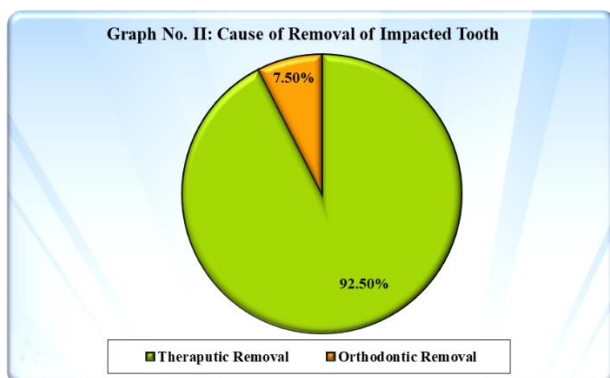
Gender	No. of Patients	Percentage
Male	9	45.00%
Female	11	55.00%



Graph 1: Gender Distribution of Study Group.

Table 2: Cause of Removal of Impacted Tooth.

Cause	Number of Tooth	Percentage
Therapeutic Removal	37	92.50%
Orthodontic Removal	3	7.50%



Graph 2: Cause of Removal of Impacted Tooth.

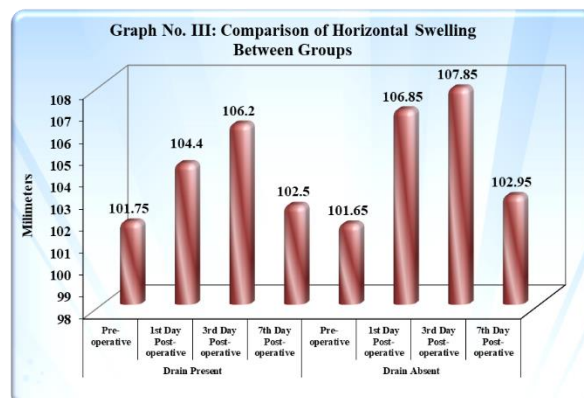
Table 3: Comparison of in Horizontal Swelling Between Groups.

Time of Examination	Drain	N	Mean	SD	't' Value	'p' Value*
Pre-operative	Present	20	101.75	6.21	0.051	0.959NS
	Absent	20	101.65	6.08		
1 st Day Post-operative	Present	20	104.40	6.12	- 1.280	0.208NS
	Absent	20	106.85	5.98		
3 rd Day Post-operative	Present	20	106.20	5.69	- 0.893	0.378NS
	Absent	20	107.85	5.99		
7 th Day Post-operative	Present	20	102.50	5.59	- 0.257	0.799NS
	Absent	20	102.95	5.49		

The purpose of this study was to compare the effect of placement of surgical tube drain before primary closure against the effect of primary closure alone after removal of fully impacted mandibular third molars.

MATERIALS AND METHODS

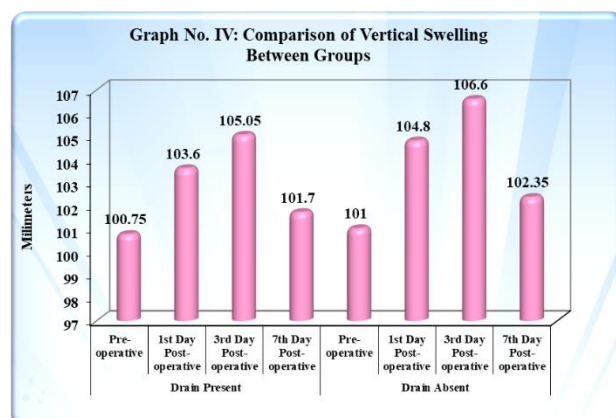
Patients of this study were selected from outpatient department of oral and maxillofacial surgery, NIMS



Graph 3: Comparison of Horizontal Swelling Between Groups.

Table 4: Comparison of in Vertical Swelling Between Groups.

Time of Examination	Drain	N	Mean	SD	't' Value	'p' Value*
Pre-operative	Present	20	100.75	5.14	- 0.153	0.879NS
	Absent	20	101.00	5.18		
1 st Day Post-operative	Present	20	103.60	5.14	- 0.765	0.449NS
	Absent	20	104.80	4.77		
3 rd Day Post-operative	Present	20	105.05	4.68	- 1.122	0.269NS
	Absent	20	106.60	4.03		
7 th Day Post-operative	Present	20	101.70	5.45	- 0.417	0.679NS
	Absent	20	102.35	4.34		



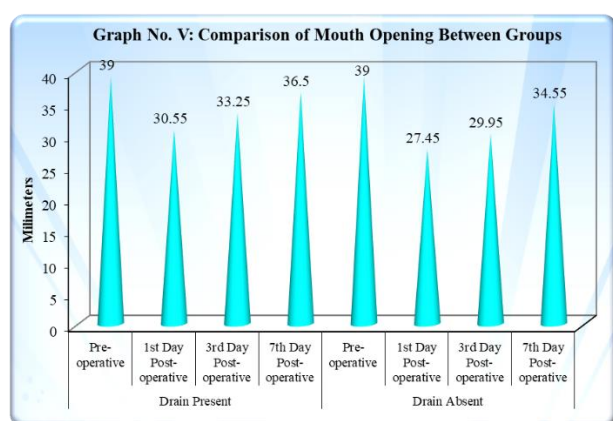
Graph 4: Comparison of Vertical Swelling Between Groups.

dental College and Hospital, Shobha Nagar, Jaipur during the period of November 2012 to May 2014.

The study group included 20 patients aged between 18 to 40 years with bilateral fully impacted mandibular third molars. Patients were divided into two groups; Test Group 1: Primary closure with tube drain was done after removal of impacted third molar. Control Group 2: primary closure without tube drain was done after removal of impacted third molar. Patients of group 1 were compared against group 2 in a randomized cross over design Study. Patient were evaluated on pre operatively, 1st, 3rd and 7th days post operatively for trismus and swelling. The second surgery is performed two months after the first surgery.

Table 5: Comparison of in Mouth Opening Between Groups.

Time Examination of	Drain	N	Mean	SD	't' Value	'p' Value*
Pre-operative	Present	20	39.00	3.63	0.000	1.000
	Absent	20	39.00	3.48		
1 st Day Post-operative	Present	20	30.55	4.56	2.172	0.036 S
	Absent	20	27.45	4.47		
3 rd Day Post-operative	Present	20	33.25	5.00	2.060	0.046 S
	Absent	20	29.95	5.12		
7 th Day Post-operative	Present	20	36.50	4.14	1.458	0.153 NS
	Absent	20	34.55	4.32		



Graph 5: Comparison of Mouth Opening Between Groups.

None of the patients has a significant medical history and none of patients were given anti-microbial drugs and any other medication

preoperatively. Pregnant women, patients with signs of pericoritis, TMJ disorders, Bleeding disorders and patients who were on steroid therapy were excluded in this study.

All patients were informed about the purpose of study. Ethical clearance was obtained. The surgery was performed by the same surgeon to remove any bias.

The standard butterfly catheter was used as a drain. (fig 1) Routine painting and draping of the patient's surgical area was prepared with Betadine scrub. The patients were administered inferior alveolar nerve block, lingual and a long buccal nerve block using, 2% lignocaine hydrochloride with vasoconstrictor [1:200000] With 15 no blade A standard Ward incision was used in all patients.

In control group mucoperiosteal flap was sutured with 3-0 black silk suture without tension. In test, after re-approximation, the standard butterfly catheter was cut and placed in the socket via stab incision in buccal aspect between first and second molar and closed primarily.(fig 2)

Post operative instructions was given to all patients. Patients were recalled on 1st, 3rd and seventh day post operatively. Patients were put on Amoxicillin 500 mg three time/day Ibuprofen 400mg three times/day for next 3 days and Chlorhexidine mouth wash was given to all patients. The maximum mouth opening between the maxillary and mandibular central incisors was taken to evaluate trismus which was measured with the help of divider, (fig3) pre operatively and evaluated at 1st, 3rd and 7th day post operatively. The evaluation of the swelling was performed pre operatively and on 1st, 3rd and 7th day postoperatively using a horizontal and vertical guide with a tape.

Facial swelling was measured using a tape measure. The horizontal measure corresponds to the distance from the corner of the mouth to the attachment of ear lobe. (Fig4) The vertical measure corresponds to the distance from the outer canthus of the eye to the angle of the mandible. (fig5) Both horizontal and vertical measurements for swelling were taken preoperatively and 1st, 3rd and 7th postoperative day. The surgical tube drain was removed on 3rd post-operative day and sutures were removed in both groups on 7th post-operative day.

RESULTS

Total 20 patients with 40 fully impacted third molars were included in this study. Of these, 9 were male (45%) and 11 female (55%) as shown in (Table I , Graph I) demonstrate the distribution of patients with regards to sex and treatment given. (Table II and graph II) shows that 92.5% teeth were removed for therapeutic causes and 7.5% for orthodontic causes.

On comparing horizontal and vertical facial swelling between drain and non-drain group, it was found that swelling was more in patients in whom No drain was placed for 1st, 3rd and 7th POD but the same was not statistically significant.

Horizontal facial swelling was less on 1st post operative day in drain group (Mean 104.40 $\pm$ SD 6.12) as compared to non drain group (Mean 106.85 $\pm$ SD 5.98) . On 3rd POD horizontal facial swelling was also less in drain group(Mean 106.20 $\pm$ SD 5.69) than non drain group(Mean 107.85 $\pm$ 5.99) and same was on 7th POD in drain group (Mean 102.50 $\pm$ SD 5.59) than non drain group (Mean 102.95 $\pm$ SD 5.49) but statistically more significant on 1st 3rd and 7th POD. (Table III and graph III)

It was also found less vertical facial swelling in drain group on 1st POD (Mean 103.60 $\pm$ SD 5.14) than non drain group (mean 104.80 $\pm$ 4.77) ,it was also less on drain group (mean 105.05 $\pm$ SD 4.68) as compared to non drain group (mean 106.60 $\pm$ SD 4.03) and same was less on drain group on 7th POD(mean 101.70 $\pm$ SD 5.45) than non drain group (mean $\pm$ SD 4.34) but also statistically more significant on 1st 3rd and 7th POD. (Table IV and graph IV)

On comparing mouth opening between drain and non drain groups, it was found that mouth opening was statistically significant better on 1st POD in drain group (mean 30.55 $\pm$ SD 4.56) than non drain group (mean 27.45 $\pm$ SD 4.47) and 3rd POD also found significant better mouth opening in drain group patients(mean 33.25 $\pm$ SD 5.00) than non drain group patients (mean 29.95 $\pm$ SD 5.12). Mouth opening was better even on 7th POD in drain group(mean 36.50 $\pm$ SD 4.14) than non drain group (mean 34.55 $\pm$ SD 4.32) but was not statistically significant (Table V graph V)

DISCUSSION

The surgical removal of impacted third molars is considered one of the most frequent procedures in oral and maxillofacial surgery.⁴ Removal of impacted third molars involve surgical manipulation of both hard and soft tissues as well as exposure of susceptible tissue to septic environment and can cause postoperative pain, swelling and trismus.²

These post-operative discomforts may be related to the surgical technique, type of impaction or as a result of the suturing procedure.¹² However several adjunctive methods such as steroids, anti-inflammatory drugs ⁵ lasers¹³ have been used to overcome this problem. Literature also supports placement of tube drain after surgical removal of third molar as one such method for reducing the post operative oedema.

Ayad W et al²¹, Cerqueira⁸, Ali Alp salgam¹¹, Rakprasitkul¹⁰ suggested the use of a small tube drain following third molar surgery to reduce the postoperative complications. It was also observed in their study by Cerqueira P R et al⁹ that the development of swelling started shortly after surgery and reached a maximum after 36 hours. In other studies, it was noted that the maximum swelling is expected within 72 hours of the surgical procedure.¹¹ The time relation of swelling subsequent to mandibular third molar surgery has also been examined in Milles, Desjardins PJ studies.¹⁴

Our study revealed that the mean values of postoperative oedema reached maximum on the third post operative day and gradually decreased there after reaching near normal on the seventh post operative day. Similar results were found in Selgam et al study.¹¹

Maximum swelling is seen at 3rd POD as seen in this study and as reported by previous stated studies can be explained by the fact that after surgical removal of impacted third molar there is hyperemia, vasodilation, increased capillary permeability with liquid accumulation in interstitial space, granulocyte & monocyte migration due to increased osmotic pressure in capillaries.⁵ Edema is the expression of exudates or transudate. In surgery, probably both events occur. Transudative

oedema is secondary to blood flow slowing i.e. hyperemia, vasodilation, stenosis etc, while a superimposition of infection is responsible for exudates.¹⁵

Swelling gradually starts decreasing from 3rd POD. Measurements of 7th POD swelling are less than that of 3rd POD though not statistically significant. This trend is also seen in the studies of Selgam et al¹¹, Rakprastikul.¹⁰ This can be explained by the reducing or minimizing of the inflammatory response or due to the effects of anti-inflammatory mediators, antibiotics or analgesics prescribed post operatively.¹⁵

Comparing both the techniques, primary closure with tube drain and primary closure without tube drain, we found better results in drain group as compared to non drain group. This study revealed that the mean value of the facial swelling was more in drain group as compared to non drain group but was not statistically significant. Similar results were also noted in the study of Brabander G¹², EC Cattaneo Rakprastikul¹⁰, Selgam et al.¹¹

Gool Van et al¹⁶ found that the post operative trismus developed more slowly than swelling, reaching maximum after 2-3 days. Brabander EC¹² Rakprastikul¹⁰ in their comparative study also found that the trismus reached peak on the 3rd postoperative day in both drain and no-drain groups. In our study it was observed that the trismus was greater on 3rd post operative day in both the groups.

Trismus or restriction of mouth opening capacity after surgical extraction of mandibular third molar is caused by combination of factors such as pain, hematoma, edema and trismus in muscle and tendons, handling of tissue, length of procedure. Trismus also reaches peak on 3rd POD due to increase in the level of inflammatory agents¹² progressively after the surgery.

In this study statistically significant difference was found in trismus between the two groups on the 1st and 3rd post operative day but not statistically significant on 7th post operative day. Rakprastikul et al¹⁰ also found a statistically significant difference between the two groups on 3rd and 7th day regarding post operative trismus. Contrastingly, Cerqueira PR⁹, Selgam et al¹¹ noted no statistically

significant difference in trismus on any of the postoperative days when both the groups were compared. This statistically significant variation in results may be because of change in sample size, technique, type of impaction, time, sex ratio.

In the present study, the degree of trismus was more in non drain group patients as compared to drain group. It was also noted that the operation time was slightly longer in drain group, due to the increased time required for insertion of the surgical tube drain. This prolonged operating time should have induced more post operative swelling and trismus, but in fact, both postoperative trismus and swelling were less in drain group patients. Similar results were observed by Rakprastikul et al.¹⁰

Overall results of our study showed that after surgical removal of mandibular third molar, post operative facial swelling and trismus were less in drain group than in no drain group. Placement of Tube drain is effective in reducing the post operative discomfort in terms of swelling and trismus.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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