

ORIGINAL RESEARCH

A Comparative Evaluation of Comma-shaped Incision with Standard Incision in Mandibular Third Molar Surgery: A Clinical Study

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ABSTRACT

Objectives: Many series of side effects will be produced with the extraction of impacted lower third molar which including pain, swelling, inflammation, and trismus. Flap design is important to allow good visibility, reach to the impacted tooth, and for healing of the surgically created defect. This study aims at the evaluation and comparison of standard flap design with comma type of flap design used in the surgical extraction of impacted mandibular third molar and to objectively evaluate the merits and demerits of individual flap design.

Study design: In this study, 200 patients with bilateral mandibular third molars impaction of age group of 18 to 30 years were selected for the study, To reflect the mucoperiosteal flap on one side standard incision and on other side comma incision were used and, after which the steps are common in the removal of impacted third molars. Immediately on the postoperative days 1, 3 and 7, the postoperative parameters (pain, swelling and mouth opening were recorded. And periodontal status were recorded preoperatively, 1st month and 2nd month respectively.

Results and conclusion: The pain and swelling scores were found to be significantly lower in the surgical area with comma incisions which was recorded on days 1, 3 and 7 as compared to the area where standard incisions were made. In mouth opening, there was a sufficiently great difference seen between the two incisions on first postoperative day, but though there was clinical difference between the two incisions on day 3 and 7 there was no statistical significance.

The results of the study shows no lingual nerve paresthesia or any other morbidity hence, the new incision design should probably be made the conventional method, considering the less degree of postoperative complications encountered. although it may require some practice initially.

Clinical implications: Third molar impactions are common and usually associated with postoperative complications, like pain, swelling, trismus and pocket formation. Incision and flap design is important in healing wound and minimizing postoperative complications. Comma incision design has shown less postoperative complication in compare to standard incision

Keywords: Comma incision, Disimpaction, Mandibular Impaction, Standard incision, Visual analog scale.

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INTRODUCTION

Impaction is defined as cessation of the eruption of a tooth caused by a clinically or radiographically detectable physical barrier in the eruption path or by ectopic position of the tooth at least one impacted third molar will be present in 33% of the population which requires surgical removal of impacted third molar hence, disimpaction is the one of the most frequently performed procedure.¹

Lower third molars constitute a major bulk of teeth that are impacted in the oral cavity.² Many series of side effects will be produced with the extraction of impacted lower third molar which including pain, swelling, inflammation, and trismus.³ Flap design is important to allow good visibility, reach to the impacted tooth, and for healing of the surgically created defect.

Many different incisions have been used to raise the flap, like ward's incision, modified ward's incision, envelope, 'S'-shaped incision (Bould Henry) etc.⁴ ward's and modified ward's incision are more commonly used and it was observed that ward's and modified ward's incision provide excellent visual and mechanical access and can be closed by means of a suture inserted between the buccal and lingual soft tissues alone.⁵ However, when a releasing incision is made a small buccal artery is sometimes encountered and this may be mildly bothersome during the early portion of surgery, and also the suture is usually placed on a bone defect and not on healthy bone this may cause additionally pain, delayed healing are also seen.⁶

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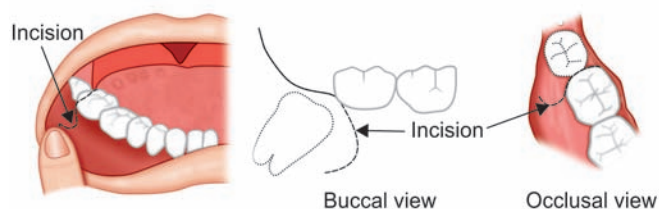


Fig. 1: Diagrammatic representation of comma-shaped incision¹

Nageshwar has tried a new type of incision—comma shaped incision and has compared it with the modified wards technique (Fig. 1). However, the number of cases in his study were very less ($n = 15$), hence, this study was undertaken to compare this new comma-shaped incision with wards incision using more objective and subjective parameters with a larger sample size.

MATERIALS AND METHODS

Two hundred patients between the age group of 18 to 30 years, having completely impacted bilateral mandibular third molars or partially erupted third molar, with good oral hygiene, without any symptoms of pain or swelling were included for the study. Patient on any medication, pregnancy, severe pericoronitis, soft tissue impaction, medically compromised, missing mandibular second molars was the exclusion criteria for the study and were excluded from the study.

The instruments used to compare two flap designs were:

- Williams probe to measure pocket depth.
- Visual analog scale of 0 to 10 was used to estimate pain by subjectively asking the patient to rate the nociceptive experience.⁷

Swelling was assessed by measuring by the distance between the:

- Tragus notch and a reproducible soft tissue pogonion a long the skin surface.
- Tragus notch to angle of mouth.
- Tragus notch to ala base.
- Tragus notch to outer surface on lateral wall of eye. Angle of mandible to outer surface of lateral wall of eye.

The percentage difference between the postoperative and preoperative measurements was calculated.

Mouth opening was evaluated by measuring the maximum interincisal distance.

After obtaining ethical clearance from the hospital ethical committee, written consent was obtained from all the patients who satisfied the inclusion criteria. Preoperative radiographs were taken to assess the position, depth and angulation of the third molars and to exclude any

local pathosis, such as a cyst, tumor etc. pain, swelling, mouth opening and pocket depth were recorded pre-operatively. One side of impacted mandibular molar is surgically removed under local anesthesia using standard flap (Figs 2A to E). Pain, swelling and mouth opening were measured postoperative on day 1, 3 and 7 respectively. The extraction on the opposite side was done with the alternate flap design—comma incision (Figs 3A to E). The follow-up and postoperative complications of patients on day 1, 3 and 7 were recorded for the parameters studied.

After flap reflection standard procedural steps were followed. Flap was sutured with 3'0 Braided silk sutures. Postoperative instructions were given and patients with a standard antibiotic regimen of:

Capsule amoxicillin 500 mg TDS \times 5 days

Tablet ibuprofen 400 mg TDS \times 5 days

Tablet metronidazole 400 mg TDS \times 5 days

Bilateral the pocket depth is recorded after month.

Data Management and Analysis

The postoperative complications for each subject for both incisions were recorded and all data were entered in Microsoft Excel. Data were analyzed using computer software, statistical package for social sciences (SPSS) version 10. Data were expressed in its frequency and percentage as well as mean and standard deviation. To elucidate the associations and comparisons between different parameters, Chi-square (χ^2) test was used as nonparametric test. Student's t-test was used to compare mean values between two groups. For all statistical evaluations, a two-tailed probability of value, <0.05 was considered significant.

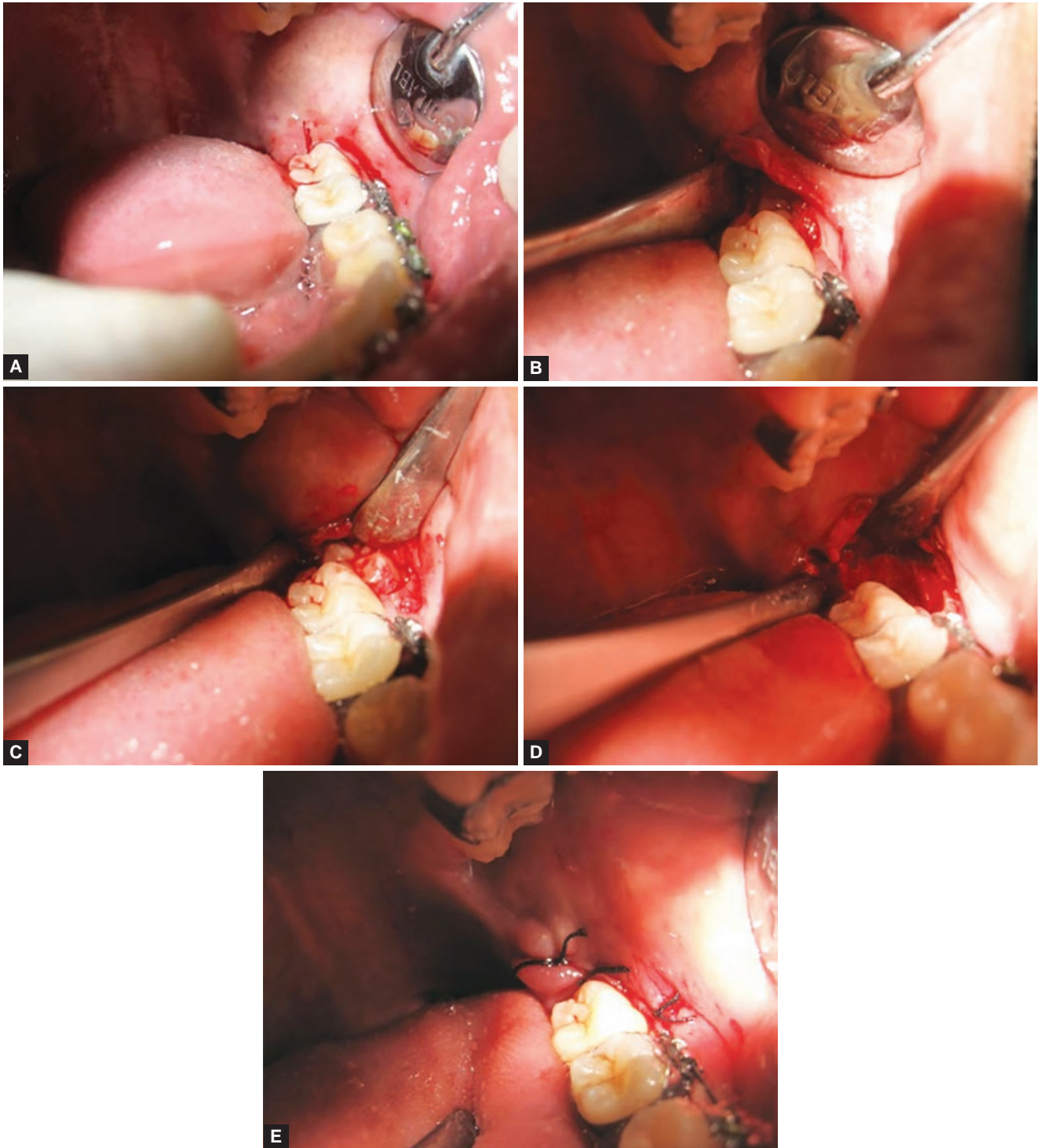
RESULTS

Out of 200, extractions done using ward's incision 107 were nonerupted and 93 were partially erupted.

Out of 200, extractions done using comma incision 111 were non erupted and 89 were partially erupted (Table 1).

In extractions done with standard incision 26.67% of subjects had severe pain on day 1 whereas only 13.33% of subjects had severe pain on the extraction side done by comma incision. There is a high statistically significant difference between the two types of incision on day 1 in comparing the pain (Chi-square = 15.627, $p = 0.0062$). Similarly, the pain was severe for 6.67% of the patients extracted with ward's incision and there was no pain on other side where comma incision was used on the 7th post operative day (Chi-square = 28.799, $p = 0.000$) (Table 2).

In extractions done with standard incision 46.47% of subjects had severe swelling on day 1, whereas only

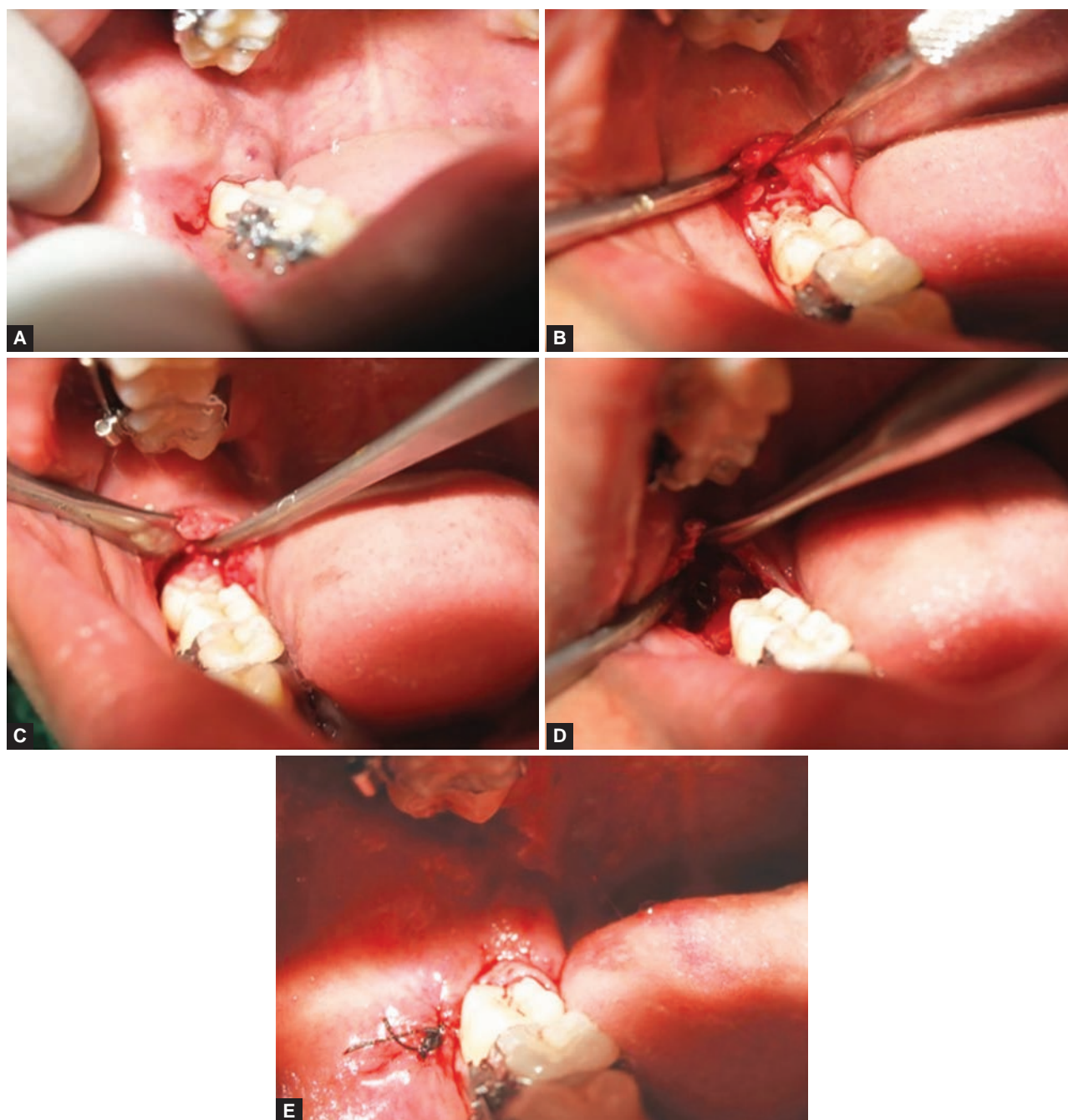


Figs 2A to E: Standard incision and mucoperiosteal flap elevation, bone guttering, extracted socket, wound closure

33.33% of subjects had severe swelling on the extraction side done by comma incision. But the difference seen was statistically significant difference between the two types of incision on day 1 in comparing the swelling, (Chi-square = 2.4762, $p = 0.2889$). The swelling was severe for 20% of the patient extracted with ward's incision and there were no patient with severe swelling on comma incision side, (Chi-square = 8.6872, $p = 0.0365$). On 7th day, there were no patient with severe swelling in both the groups but 40% of the patients experienced moderate

pain in ward's incision group whereas only 13.33% had moderate swelling in comma group. There is a statistically significant difference between the two groups on day 7 (Chi-square = 18.879, $p = 0.0158$) (Table 3).

The mouth opening on day 1 in ward's incision side is between 29 to 25 mm where 33.33% whereas only 13.33% of the patients in comma group. There was highly statistical significant difference between the interincisal measurements to check for mouth opening on day 1 (Chi-square = 24.658, $p = 0.000$). But though there was clinical



Figs 3A to E: Comma-shaped incision and mucoperiosteal flap elevation, bone guttering, extracted socket, wound closure

Table 1: Clinical evaluation of ward's and comma incision

Factors	Wards incision		Comma incision		Chi-square	p-value
	No.	%	No.	%		
Nonerupted	107	53.33	111	55.50	0.0267	0.8703
Partially erupted	93	46.66	89	44.50		
Class I	53	26.67	67	33.33	0.7628	0.3825
Class II	147	73.33	133	66.67		
Position A	93	46.47	80	40.00	0.6295	0.4275
Position B	107	53.33	120	60.00		
Vertical	53	26.67	27	13.33	5.9319	0.1150
Mesioangular	107	53.33	133	66.67		
Horizontal	27	13.33	27	13.33		
Distoangular	13	6.67	13	6.67		

difference between the two incisions on day 3 and 7, there was no statistical significance (Table 4).

There is significant statistical difference between wards and comma incision in relation to pocket depth recorded after first month and the second month in first month is ($t = 2.684$, $p = 0.025$), and in second month is ($t = 4.937$, $p = 0.000$) and even when ward's and comma incision are compared separately over time there was statistical significance between the pocket depth in first and the second month was seen, I'e (wards incision $t = 5.176$, $p = 0.000$) and (comma incision $t = 6.812$, $p = 0.000$) in second month (Table 5).

Table 2: Subjective assessment of pain in relation to ward's and comma incision

Factors	Wards incision		Comma incision		Chi-square	p-value
	No.	%	No.	%		
<i>Preoperative</i>						
Absent	200	100	200	100	0.000	1.000
Mild	0	0	0	0		
Moderate	0	0	0	0		
Severe	0	0	0	0		
<i>Day 1</i>						
Absent	0	0	0	0	15.627	0.0062
Mild	13	6.67	67	33.33		
Moderate	133	66.67	106	53.33		
Severe	53	26.67	27	13.33		
<i>Day 3</i>						
Absent	0	0	0	0	11.008	0.0041
Mild	67	33.33	53	26.67		
Moderate	93	46.47	133	66.67		
Severe	40	20.00	13	6.67		
<i>Day 7</i>						
Absent	53	26.67	120	60.00	28.799	0.000
Mild	67	33.33	53	26.67		
Moderate	67	33.33	27	13.33		
Severe	13	6.67	0	0.00		

Table 4: Comparison of two incisions with respect to mouth opening

Factor	Wards incision		Comma incision		Chi-square	p-value
	No.	%	No.	%		
<i>Mouth opening</i>						
<i>Preoperative</i>						
55-50	53	26.67	53	26.67	0.000	1.000
49-45	120	60.00	120	60.00		
44-40	27	13.33	27	13.33		
39-35	0	0.00	0	0.00		
34-30	0	0.00	0	0.00		
29-25	0	0.00	0	0.00		
<i>Day 1</i>						
55-50	0	0.00	0	0.00	24.658	0.000
49-45	0	0.00	0	0.00		
44-40	0	0.00	40	20.00		
39-35	53	26.67	93	46.47		
34-30	80	40.00	40	20.00		
29-25	67	33.33	27	13.33		
<i>Day 3</i>						
55-50	0	0.00	0	0.00	6.5891	0.0687
49-45	27	13.33	102	50.98		
44-40	53	26.67	62	31.18		
39-35	120	60.00	36	17.84		
34-30	0	0.00	0	0.00		
29-25	0	0.00	0	0.00		
<i>Day 7</i>						
55-50	0	0.00	53	26.67	2.333	0.3114
49-45	106	53.33	94	47		
44-40	67	33.33	53	26.67		
39-35	27	13.33	0	0.00		
34-30	0	0.00	0	0.00		
29-25	0	0.00	0	0.00		

Table 3: Comparison of ward's incision with comma incision in relation to swelling

Factor	Wards incision		Comma incision		Chi-square	p-value
	No.	%	No.	%		
<i>Swelling</i>						
<i>Preoperative</i>						
Absent	200	100	200	100	0.000	1.000
Mild	0	0	0	0		
Moderate	0	0	0	0		
Severe	0	0	0	0		
<i>Day 1</i>						
Absent	0	0	0	0	2.4762	0.2889
Mild	40	20.00	13	6.67		
Moderate	67	33.33	120	60.00		
Severe	93	46.47	27	13.33		
<i>Day 3</i>						
Absent	0	0	40	20.00	8.6872	0.0365
Mild	80	40.00	107	53.5		
Moderate	80	40.00	53	26.67		
Severe	40	20.00	0	0.00		
<i>Day 7</i>						
Absent	53	26.67	106	53.33	18.879	0.0158
Mild	67	33.33	67	33.33		
Moderate	80	40.00	27	13.33		
Severe	0	0.00	0	0.00		

Table 5: Comparison of the two incisions with respect to pocket depth on first and second month

Incisions	Pocket depth				t-value	p-value
	1st Month		2nd Month			
	Mean	± SD	Mean	± SD		
Ward	6.333	1.81	4.067	1.07	5.176	0.000
Comma	4.867	1.41	2.601	0.26	6.812	0.000
t-value	2.684		4.937			
p-value	0.025		0.000			

DISCUSSION

Third molar surgery has been associated with a variety of complications, flap design is one important factor influencing the severity of these complications. The incisions used in surgical treatments of impacted 3rd molars can be grouped into envelop and triangular variants. All incisions irrespective of their variations, were extended from the distal aspect of second molar towards ramus. These standard incisions have been modified by many surgeons. The incision modified by Groves and Moore started distal to the distobuccal line angle of the second molar to conserve the periodonsium.⁸ Berwick designed a lingually based flap using an incision line that was tongue shaped and did not lie over the bony defect.⁹ Comma shaped incision was designed by Nageshwar to limit the postoperative pain and swelling.

Postoperative pain of moderate to severe intensity is usually noticed after third molar surgery, the pain usually begins as the effect of local anesthesia fades off. The peak intensity of pain is noticed after about 6 hours.

The pain then disappears slowly within a few days if it heals normally.¹⁰

In our study, pain was assessed by using a visual analog scale (VAS) as it takes little time to describe to the patient and it is easily understood by the patient. The results showed less pain scores on comma incision side as compared to ward's incision side which is similar to that of the study of Nageshwar. (This may be because small mucoperiosteal flap was elevated during comma incision, the drainage in comma incision is good and this is single flap hence, it will give a tight closure on occlusal surface distal to second molar.) This result is not in correlation with the results of Gool et al as they have seen that severity in pain is not related to the type of incision.¹¹

Trauma and infection are the main cause for postoperative swelling. The trauma to the tissues associated with oral surgical procedures is the usual cause of early postoperative swelling. It is most marked after 19 to 24 hours, and then diminishes after about seven days.¹²

Swelling in cases with comma incision was comparatively less than cases with standard incision was done. This study results compliments the study by Nageshwar.¹ but the method of measuring swelling was not satisfactory in that study because the swelling is three dimensional hence it is measured by marking on 6 different points on the face as described earlier.

Salata LA et al and Szmyd et al reported that restricted mouth opening peaks on the day of surgery. This study is in agreement to this statement too.¹³ The comma incision encountered less number of subjects with limited mouth opening when compared with the standard incision side which is in agreement with the study of Nageshwar's result. The interrelation between trismus and pain have been reported in many studies. It might, therefore, be expected that mouth opening after the removal of impacted mandibular third molars is painful and consequently reduced to its full extent. The hypothesis has been confirmed by an electromyographic study which proved that restricted mouth opening is a voluntary action to avoid pain.¹⁴

There was a statistical difference in the postoperative probing depth between the two types of incision after the first and second months. These results are contradictory with many studies, by Rosa et al, Quee et al and Schofield et al which show no differences in pocket depth related to flap designs.¹⁵ But Krausz AA et al suggest that increased second molar pocket may be related to osteotomy.¹⁶ However, others believe that the flap design and the patient's age might have an effect on second molar periodontal status. When removal of impacted molars was done during developmental stage of the tooth faster regrowth of the alveolar bone crest. However, as all our subjects were in the age group of 18 to 30 we feel that age was not a

major factor and the difference in pocket depth is related to the type of flap.

CONCLUSION

The results of the study show that none of the patients in the study developed lingual nerve paresthesia or any other morbidity, hence the new incision design should probably be made the conventional method, considering the less degree of postoperative complications encountered. Although it may require some practice initially. Further research with newer flap designs like the comma design, which will minimize the postoperative complications, should be considered in the extraction of impacted third molar surgery.

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