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ORIGINAL ARTICLE

Comparative Study Between Standard Ward's Incision and Coma Shaped Incision and its Postoperative Outcome on Impacted Mandibular Third Molars Extraction in Bangladeshi Population

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Abstract

Objective: To evaluate the postoperative outcome in standard Comma Shaped incision and Ward's incision on postoperative complications in surgical removal of impacted mandibular third molar. **Material and Methods:** In this study, 100 patients with impacted mandibular third molar were selected for study. The patients were divided in to two groups. Each group contains 50 patients. A standard Ward's incision was made on one group and a Comma incision was made on another group to reflect the mucoperiosteal flap, after the common steps for removal of impacted third molars were followed. The postoperative parameters were recorded immediately on the postoperative days 1, 3 and 7. For bivariate analyses, Chi square and Student t test were used. The significance level was set at 5%. **Results:** 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 Ward's incision were made. In mouth opening, there was a sufficiently great difference seen between the two incisions on first postoperative day, but on day 3 and 7 there was no statistical significance. **Conclusion:** the Comma Shaped incision design was preferable over the standard Ward's incision, considering the lesser degree of postoperative complications.

Keywords: Surgery, Oral; Tooth, Impacted; Molar, Third; Postoperative Complications.

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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].

Sometimes, impacted mandibular third molar teeth don't cause any problems, and the only way the oral surgeon knows they are impacted is from examining the routine dental x-ray. However, as the age of the person progresses, they can stimulate varied problems such as pain in affected side of jaw (unilateral or bilateral), swelling, pericoronitis, difficulty in mouth opening etc. [4,5]. 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 [6].

Flap design is important, not only for allowing optimal visibility and access to the impacted tooth, but also for subsequent healing of the surgically created defect. With so many objectives, the actual design of a flap sometimes becomes a compromise between peri and post-operative considerations [7]. 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 [8]. 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 [9].

The aim of this study was to compare two different flap designs in extraction of impacted mandibular third molars, by assessing their postoperative complications. In this study, pain, swelling and mouth opening were selected as parameters for comparing the two flap designs.

Material and Methods

Study Design and Sample

This study was a hospital based, experimental study with a cross sectional design, which was done on 100 patients. Patients with impacted, mandibular third molar or partially erupted third molars, without any symptoms of pain or swelling, who had good oral hygiene, were included in the study. Patients who were on any medications, lady patients who were pregnant, patients with severe pericoronitis, patients who were medically compromised and missing mandibular second molars were excluded.

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Data Collection

The instrument used to compare two flap designs was a visual analog scale of 0 to 10 was used to estimate pain by subjectively asking the patient to rate the nociceptive experience [10]. Swelling was assessed by measuring by the distance between the Tragus notch and reproducible soft tissue pogonion a long the skin surface; Tragus notch to angel of mouth; Tragus notch to ala base; Tragus notch to outer surface on lateral wall of eye; and Angel of mandible to outer surface on lateral wall of eye. Mouth opening was evaluated by measuring the maximum inter incisal distance with the help of centimeter scale. The percentage difference between the postoperative and preoperative measurements was calculated.

Assessment of the position, class and depth of the impacted teeth was done by using orthopantomogram. Preoperative measurements of pain, swelling and mouth opening. Surgical removal of one side impacted mandibular third molar was done under local anesthesia. Standard Ward's incision was made on Group A patients (N = 50) and comma shaped incision on Group B patients (N = 50). Patients were chosen randomly for incision. Postoperative measurements of pain, swelling and mouth opening were measured on days 1, 3 and 7 respectively. The follow up and postoperative complications of patients on days 1, 3 and 7 were recorded for the parameters, which were studied.

Flap Designs

- Standard Ward's Incision: Anterior incision curves forward from the distobuccal corner of the crown of the lower second molar and it ends alongside the mesiobuccal cusp of that tooth. Incision is then extended distally level with the buccal side of the tooth to the external oblique ridge. If the anterior part of the flap is elevated from the bone, one blade of a pair of scissors may be inserted onto the surfaces of the bone and closing the blades may complete the incision. Posterior part of the incision must slope outwards as well as backwards, as the ascending ramus lies on the lateral side of the body of the mandible (Figure 1).

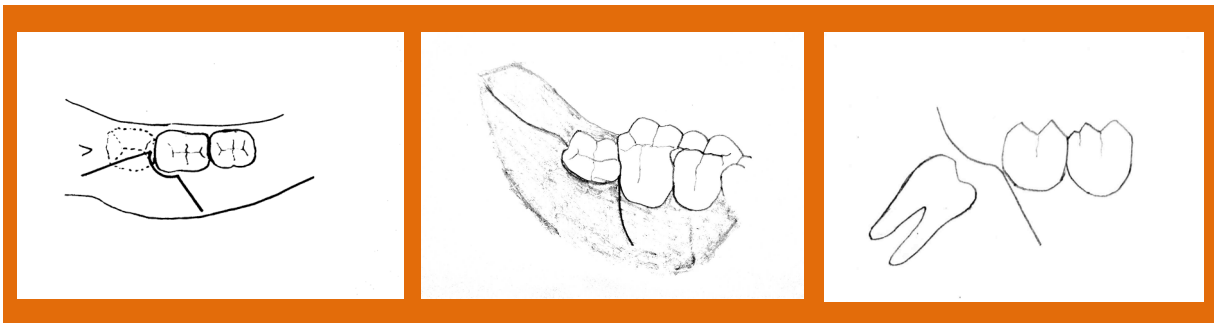


Figure 1. Standard Ward's Incision different view.

- Comma Incision: Starting from a point, which is at the depth of stretched vestibular reflection, which was posterior to the distal aspect of the preceding second molar, the incision is made in an anterior direction. Incision is made to a point below the second molar from where it is smoothly

curved up to meet the gingival crest at the distobuccal line angle of the second molar. The incision is continued as a crevicular incision around the distal aspect of the second molar (a distolingually based flap). After reflection of the flap, common steps for removal of impacted third mandibular molars are followed, that is retraction of the buccal mucosa and lingual mucosa. The lingual nerve is protected along with the lingual mucoperiosteum by Rugieme end of Howarths elevator. After exposing the bone around the tooth by using a straight shank surgical 703 bur and bone is guttered by the bur, with adequate saline irrigation. Flap was sutured with 3/0 Braided silk sutures (Figure 2).

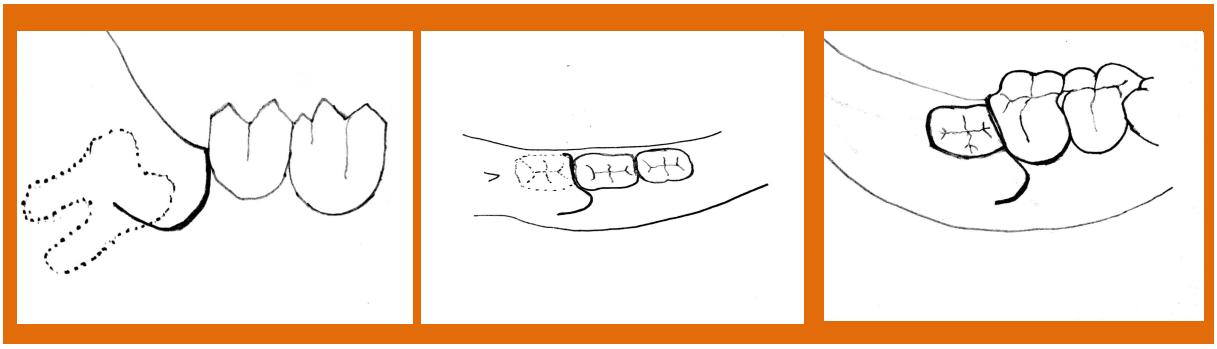


Figure 2. Comma Incision in different view.

Postoperative instruction were given and patients with a standard antibiotic regimen of: 1) Capsule Cefixim 200mg BD x 7 days; 2) Tablet Metronidazole 400mg TDS x 7 days; 3) Tablet Ketorolac 10mg TDS if pain after meal; 4) Capsule Omeprazole 20mg BD if pain before meal; and 5) Mouth wash Viodin 1% Gurgle 4-5 time's daily for 10 days.

Data Analysis

Data were analyzed using IBM SPSS Statistics for Windows Software, version 20 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to calculate the absolute and relative frequencies. For bivariate analyses, Chi square and Student t test were used. The significance level was set at 5%.

Ethical Aspects

This study followed recommendations of the Declaration of Helsinki was approved by the Bangladesh Dental College Ethics Research Committee (E.R.C/BDC/2018/0472).

Results

In Group A out of 50 cases, 22 were nonerupted and 28 were partially erupted. In Group B out of 50 cases, 19 were nonerupted and 31 were partially erupted. Surgical extractions, which were done by standard Ward's incisions, 42% of subjects were found to have severe pain on day 1, where as only 14% of subjects had severe pain in the extractions which were done by using comma

incisions. It was found that there was a highly statistically significant difference between the two types of incisions on day 1 on comparing the pain (p = 0.001). Similarly, the pain was severe for 6% of the patients who had undergone extractions with standard incisions and there was no patient with severe pain on the 7th day in whom extractions were done by making comma incisions (p= 0.001).

Table 1. Subjective assessment of pain in relation to standard and comma incision.

Pain	Standard Ward's		Comma Shaped		p-value
	N	%	N	%	
Preoperative					
Absent	50	100.0	50	100.0	1.000
Mild	-	-	-	-	
Moderate	-	-	-	-	
Severe	-	-	-	-	
Day 1					
Absent	-	-	-	-	0.001
Mild	3	6.0	19	38.0	
Moderate	26	52.0	24	48.0	
Severe	21	42.0	7	14.0	
Day 3					
Absent	-	-	-	-	0.002
Mild	14	28.0	13	26.0	
Moderate	23	46.0	26	52.0	
Severe	13	26.0	11	22.0	
Day 7					
Absent	10	20.0	32	64.0	0.001
Mild	25	50.0	18	36.0	
Moderate	12	24.0	-	-	
Severe	3	6.0	-	-	

It was found that there was no statistically significant difference between the two types of incisions on day 1 on comparing the swelling (p = 0.527). The swelling was severe for 26% of the patients who had undergone extractions with standard incisions and it was only 12% in patients on the 3rd day in whom extractions were done by using comma incisions (p= 0.025). There was a statistical difference between both groups on day 7 also (p = 0.046).

Table 2. Comparison of standard incision with comma incision in relation to swelling.

Pain	Standard Ward's		Comma Shaped		p-value
	N	%	N	%	
Preoperative					
Absent	50	100.0	50	100.0	1.000
Mild	-	-	-	-	
Moderate	-	-	-	-	
Severe	-	-	-	-	
Day 1					
Absent	-	-	-	-	0.527
Mild	7	14.0	5	10.0	
Moderate	20	40.0	32	64.0	
Severe	23	46.0	13	26.0	
Day 3					
Absent	-	-	5	10.0	0.025

Mild	12	24.0	15	30.0	
Moderate	25	50.0	24	48.0	
Severe	13	26.0	6	12.0	
Day 7					
Absent	17	34.0	32	64.0	0.046
Mild	26	52.0	16	32.0	
Moderate	7	14.0	2	4.0	
Severe	-	-	-	-	

The mouth opening on day 1 on standard incision side of between 29-25 mm was 22%, where as only 4% of the patients inter incisal distance measurement lied between this value in comma incision side. It was found that there was a highly statistically significant difference between the two incisions on comparing the mouth opening on day 1 (p = 0.000). But though there was a clinical difference between the two incisions on days 3 and 7, there was no statistical significance.

Table 3. Comparison of the two incisions with respect to mouth opening.

Mouth Opening (mm)	Standard Ward's		Comma Shaped		p-value
	N	%	N	%	
Preoperative					
55 – 50	13	26.0	12	24.0	1.00
49 – 45	22	44.0	24	48.0	
44 – 40	15	30.0	14	28.0	
39 – 35	-	-	-	-	
34 – 30	-	-	-	-	
29 – 25	-	-	-	-	
Day 1					
55 – 50	-	-	-	-	0.000
49 – 45	-	-	-	-	
44 – 40	4	8.0	8	16.0	
39 – 35	11	22.0	24	48.0	
34 – 30	24	48.0	16	32.0	
29 – 25	11	22.0	2	4.0	
Day 3					
55 – 50	-	-	2	4.0	0.096
49 – 45	6	12.0	8	16.0	
44 – 40	21	42.0	26	52.0	
39 – 35	23	45.0	14	28.0	
34 – 30	-	-	-	-	
29 – 25	-	-	-	-	
Day 7					
55 – 50	5	10.0	15	30.0	0.052
49 – 45	23	46.0	28	56.0	
44 – 40	17	34.0	7	14.0	
39 – 35	5	10.0	-	-	
34 – 30	-	-	-	-	
29 – 25	-	-	-	-	

Discussion

The incisions which are used to expose impacted third molars can be broadly classified into triangular and envelope types. Regardless of variations in the anterior end of the incisions, all

incisions extend posteriorly from the distal aspect of the preceding second molar, towards the ascending ramus. The standard incisions have been modified by several surgeons. The comma shaped incision was designed by Nageshwar and it proved to be superior to the standard incision [1].

Postoperative pain after third molar surgery presents itself as a localized inflammation with pain of varying intensities. The removal of the impacted third molar and the resultant tissue and cellular destruction cause the release and production of several biochemical mediators which are involved in pain process, particularly, histamine, bradykinin and the prostaglandins [11].

Moderate to severe pain usually develops during the first 12 hours, with the peak intensity showing after about 6 hours when a conventional local anesthetic is used. The pain then gradually disappears within a few days if the wound heals normally [12]. Lower pain scores were recorded with comma incision sides as compared to standard incision sides, which was similar to previous findings [1].

In this study surgical extraction, which was done by standard Ward's incisions, 42% of subjects were found to have severe pain on day 1, where as only 14% of subjects had severe pain in the extractions, which were done by using comma incisions. Similarly, the pain was severe for 6% of the patients who had undergone extractions with standard Ward's incisions and there was no patient with severe pain on the 7th day in which extractions were done by comma shaped incisions.

The two main contributing factors in the formation of postoperative swelling are trauma and infection. The damage to the soft and hard tissues, which is associated with oral surgical procedures, is the usual cause of the early postoperative swelling. It is most marked after 19-24 hours and it then diminishes after about seven days [13].

The factors which affect the occurrence of pain and swelling include the skill of the surgeon, the extent of the surgical trauma, suturing, age, sex, medication, time of the day and the local flap design [3,14,15]. Swelling in the area with comma incision was less as compared to the swelling in the area in which the standard Ward's incision was done. These results complimented the results of a previous study [1]. Swelling was an important issue in our study, which showed more in standard Ward's incision then comma shaped incision in 1 postoperative day as well as 7 postoperative day also.

The comma shaped incision was found to be encountered by less number of subjects with limited mouth opening as compared to the standard Ward's incision, which was in agreement with previous results [1]. The interrelationship between trismus and pain has been reported in many studies. This hypothesis was confirmed by an electromyographic study, where it was concluded that restricted mouth opening was a voluntary action for avoiding pain [16]. Coma shaped incision is less extensive and requires less tissue manipulation than the standard Ward's incision, which could have resulted in lesser inflammation and lesser postoperative pain [17].

During postoperative period, evaluation of mouth opening in this study showed mouth opening maximum when use comma shaped incision. When use standard Ward's incision mouth opening was minimum in 1 and 7 postoperative days.

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Conclusion

The new incision design was preferable over the standard Ward's incision, without any postoperative complications.

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Conflict of Interest: The authors declare no conflicts of interest.

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