ORIGINAL ARTICLE

COMPARISON OF COMMA INCISION VERSUS MODIFIED WARD'S INCISION IN MANDIBULAR THIRD MOLAR SURGERY- A CLINICAL STUDY

Vishal Lohana, Sundas Kunbher, Shumaila Younus*, Suneel Kumar Punjabi, Omaiz Memon, Ghulam Ali

Oral & Maxillofacial Surgery Department, Liaquat University of Medical & Health Sciences, Jamshoro-Pakistan
***Ziauddin University, Karachi-Pakistan**

Background: To evaluate the effectiveness of the two flap/incision techniques**,** viz**.** the comma incision versus modified ward's incision in mandibular third molar surgery. **Methods:** This randomized research comprised of 126 participants, 63 in every group. Male and female patients between the ages of 20 and 45 who had mesio-angular impacted mandibular third molar till the age of 20 to 24 years were enrolled in the research. Patients with specific problems, that is pregnancy, trismus, pericoronitis, horizontally impacted wisdom teeth, and disto-angular impaction, and limited mouth opening in which there was difficulty in access to third molar region due to any reason were omitted from the study. The independent t-test were used to evaluate the mouth opening over groups, and the chi-square test were used to evaluate the pain and edema. **Results:** The participants average age was 31.16±9.29 years. On the first day, the comma shaped group reported significantly mild pain (47.6%) compared to the Modified Ward's group (30.2%) (p=0.230). On the seventh day, the comma shaped group reported significantly greater mild pain (63.5%) and decreased severe pain (1.6%) compared to the Modified Ward's group, which reported decrease mild pain (55.6%) and more severe pain (4.8%) (p=0.032). On the first, third and seventh days, mouth opening was also considerably higher in the comma-shaped group than in the Modified Ward's group. On the third and seventh days, swelling was much decreased in the comma-shaped group than in the Modified Ward's group. **Conclusion:** Our study delivers some proofs that the comma-shaped incision is more effective than the modified Widman's incision at promoting good mouth opening and decrease post-operative edema and discomfort after flap surgery.

Keywords: Comma incision; Modified Ward's incision; Third molar

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INTRODUCTION

An impacted tooth is when the tooth does not fully er upt within the expected time.[1,2] This can happen for a number of reasons, including inadequate space, irregular development or location, physical obstructions in the eruption's course, and dense bone structure.

Wisdom teeth are often affected by the size and position of adjacent teeth, as well as genetic and environmental variables. Third molar eruption often occurs between the ages of 18 and 24 years.[2] According to estimates, 26% of people have at least one impacted tooth.[3]

Surgery for removing a lower third molar (impacted) teeth is one of the most common remedies to this problem. Yet, there are also plenty of complications related to this procedure, include pain, a decreased range of motion of the mouth, inflammation at the site of the extraction, and poor healing of the wound edges. These issues may have a detrimental effect on the individual's overall well-being.[4]

Patients often report an increase in discomfort few hours after having a tooth extracted. Oedema, or swelling, at the extraction site can be quite painful, although it usually goes away over time.[5]

Due to the surrounding muscles swelling, decreased mouth opening that lasts for few days or further is another usual effect. For up to a week, this can make it difficult to eat enough. Before beginning the treatment, Oral surgeons need to use the technique carefully and precise planning thorough competence in order to lessen the risk of these symptoms and complications.[6]

It is possible to physically harm both soft and hard structures when removing wisdom teeth. When lifting a full-thickness flap, damage may result from the reflection of flaps and uncovering of the bone. A significant element that can affect how the extraction turns out is the flap's design. It is required to reflect the

flap and remove the bone to successfully uncover the underlying impacted tooth.[7,8]

A mucoperiosteal flap is frequently used to reveal the nearby second molar during the lower third molar (impacted) tooth extraction to deliver the good visibility and access. In order to properly expose the surgical site and reduce any complications, which could cause pain for the patient, this surgical procedure includes lifting the soft tissue, often known as a flap.[9,10] The two corners, three corners, or four corners' flaps are only few flaps that can be utilized to approach and visualize the impacted wisdom tooth.[11,12]

Our goal is to reduce the post-operative issues related to surgically removing impacted teeth, which frequently result in discomfort, oedema, and restricted mouth opening and can all seriously interfere with the patient's daily activities and lifestyle. The goal of this research is to evaluate results of these two types of flaps in order to ascertain which strategy is more beneficial in lowering the post-operative difficulties after the surgical removal of impacted third molar, thus improving the QoL of those getting the procedure performed. This research focuses on the usage of two types of flaps to achieve this goal: namely, the Comma shaped incision and the modified Ward's incision.

Our study's goal was to examine the results of two alternative flap procedures used in the surgical extraction of the mandibular impacted third molar teeth, the Comma shaped incision and the modified Ward's incision.

MATERIAL AND METHODS

This Randomized control trial study done in the Oral & Maxillofacial Surgery Department, Institute of Dentistry, Liaquat University of Medical & Health Sciences, Jamshoro. After permission from ethical board review of the institute.

The duration was from 1st January 2021 to 30th January 2023**.** This study's sample size was determined by open epi sample size calculator version 3.0, with confidence interval 95%, power 80%, ratio of sample size in group A and group B is 1, (mean of post-operative mouth opening in group A is 46.71±6.11, in group B is 43.78±5.58).[20] Total sample size calculated was 126, (63 in group A and 63 in group B), taking P value less than equal to 0.05 as significant.

Male and female patients between the ages of 20 and 45 who had mesio-angular impacted mandibular third molar until the age of 20 to 24 were enrolled in the study. Patients with specific problems, such as pregnancy, trismus and pericoronitis, horizontally impacted wisdom teeth, disto-angular impaction, and limited mouth opening in which there was difficulty in access to third molar region due to any reason were omitted from the study.

Following approval from the ethical review committee, patients who met the trial's inclusion criteria and provided informed, written consent were admitted. Age, gender, disease, medical history, and extraction method are a few of the variables that were noticed and noted in the form. Patients were randomized to any one of the study groups using port chit method after the principal investigator has documented the demographic factors: history, examination, and X-rays in the form. The surgical extractions were done under the local anaesthesia using the technique of the relative nerve blocks related to that particular tooth with 1.8mL cartridges of 2% xylocaine with epinephrine 1: 100,000. This was carried out under the supervision of the supervisor and in accordance with the fundamental guidelines for preparation and draping. The Comma incision (Group A) and Modified Ward's incision (Group B) techniques were performed by a sterile steel surgical blade no #15.

The bone was removed with a hand-piece (slow-speed) with a round bur on the mesio-buccal and disto-buccal sides under 0.9% normal saline irrigation, then Coupland elevator was employed to elevate the tooth. The surgical site was sutured with 3-0 Vicryl suture after smoothening of any sharp bone. After that patient was guided to bite on sterile, folded piece of gauze (2×2) for 30 minutes, to maintain haemostasis. Comma shaped incision, the flap consists of a buccal incision starting from a point at the depth of the stretched vestibular reflection posterior to the distal aspect of the preceding second molar. The incision is made in an anterior direction 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.[10]

In Modified Ward's incision design, the anterior vertical incision is commenced at the distobuccal corner of the crown of the lower first molar and extended forwards alongside that tooth. A horizontal incision is made in the buccal gingival crevice of the second molar and then the incision is extended along the buccal side of the tooth to the external oblique ridge.[11]

Patients were prescribed antibiotics like Amoxicillin (dose according to weight and severity of trauma due to surgery, TDS) and Metronidazole (dose according to weight and severity of trauma due to surgery, TDS), as well as NSAIDS (dose according to weight and severity of trauma due to surgery TDS), for a period of 5–7 days. Observations were made on a number of things after the extraction of the mesio-angular

impacted lower third molar tooth, how painful it was, how much swelling there was, and how quickly mouth opening were improved. The visual analogue scale, was used to measure pain. Scores of 1–3 denote minor discomfort, 4–7 indicate moderate discomfort, while 8–10 denote severe discomfort. The maximum separation between the upper and lower central incisors was assessed by measuring the mouth opening using a millimetre ruler. The typical mouth opening is between 30 and 45 mm.

A millimetre ruler and 2–0 nylon thread were used to assess facial oedema. Before the procedure, permanent marker markings were made on the following facial regions: the angle of the mandible, the tragus, the labial commissure, the nasal border, laterally to the external corner of the eye, and on the soft pogonion. After the procedure, measurements were taken on the first day, third day, and final day to assess the results.

Distances I (from the mandibular angle to the tragus), II (from the mandibular angle to the external corner of the eye), III (from the mandibular angle to the nasal border), Distance IV **(**from the angle of the mandible to the labial commissure); Distance V (from the angle of the mandible to the soft pogonion). Distance measurements taken before surgery and those taken at the first, third, and seventh days following the procedure was evaluated, and the average of the five readings was calculated. Patients were labelled as having mild swelling if the average of the five variations was less than 10 mm, moderate oedema if it was between 10 and 20 mm, and severe swelling if it was greater than 20 mm. Every patient had his/her follow-up appointments on the first, third, and seventh days following the procedure.

The data was analyzed using the SPSS version 22. Percentages and frequencies were calculated for gender, swelling, and pain, while mean and standard deviation were calculated for age and mouth opening. A chi-square test was performed to compare gender, swelling, and pain, while an independent t-test was used for age and mouth opening between the two interventions (Comma shaped vs Modified Ward's incision). The *p*-value will be set at <0.05 as significant.

RESULTS

With a range of 20 to 45 years, the mean age was 31.16±9.29. With 38 females (60.3%) in the Comma shaped incision and 40 females (63.5%) in the Modified Ward's features.

The gender distribution in both groups is virtually similar. The gender distribution across the two groups does not differ significantly (p=0.471). The age range of 20 to 30 has the most people within both study groups viz: Comma shapes (n=25, 39.7%), and Modified Ward's incisions (n=30, 47.6%).

The age distribution of the Comma-shaped and Modified Ward's features for this age group does not significantly differ from each other (p=0.616) (Table-1).

On Day 1, the Comma-shaped group stated significant mild pain (47.6%) and significantly less moderate pain (31.7%), while the other group (Modified Ward's group) reported significantly less mild pain (30.2%) and more moderate pain (42.9%) (p=0.230). On Day 3, the Comma-shaped group reported significantly greater mild pain (55.6%) and decreased severe pain (4.8%), in contrast to the Modified Ward's group, which stated decreased mild pain (46%) and greater severe pain (7.9%) (p=0.410). However, there was statistically significant difference in pain between the two flap designs at day 7 (p=0.032) (Table-2).

The findings show that on day 1, the Comma-shaped group stated much decreased swelling (68.3% absent) than the Modified Ward's group (39.7% absent) (p=0.73).

In addition, compared to the Comma-shaped (28.6% present), the Modified Ward's group reported higher swelling (44.4% present) on day 3 (p=0.001). Similar findings were found for day 7, with the Comma-shaped group reporting much less swelling (87.3% absent) than the Modified Ward's group (63.5% absent) (p-0.000). (Table-3).

On all three follow up days (Day 1: 47.65±5.20 vs. 44.60±4.44, Day 3: 36.70±9.07 vs. 30.87±9.17, and Day 7: 40.97±9.75 vs. 36.55±9.33), the mean mouth opening measurements using the Comma shaped were greater than using the Modified Ward's group. For both techniques, the average mouth opening from Day 1 to Day 3, it reduced, and from Day 3 to Day 7, it increased. For Days 1, 3, and 7, the p-values for the differences between the two approaches were, respectively, <0.001, 0.004, and 0.001 (Table-4).

Table-1: Distribution of participants' ages and genders in the two groups

Variables	Characteristics	Comma Shaped, (n=93)	Modified Ward's, (n=93)	*p*-value
Gender	Female	38 (60.3%)	40 (63.5%)	**0.471**
	Male	25 (39.7%)	23 (36.5%)	
Age	20-30	25 (39.7%)	30 (47.6%)	**.616**
	31-40	20 (31.7%)	17 (27.0%)	
	41-45	18 (28.6%)	16 (25.4%)	

Table-2: Evaluation of the pain between two groups

Variables	Characteristics	Comma Shaped, (n=93)	Modified Ward's, (n=93)	*p*-value
Pain at day 1	Mild	30 (47.6%)	19 (30.2%)	**0.230**
	Moderate	20 (31.7%)	27 (42.9%)	
	No pain	8 (12.7%)	13 (20.6%)	
	Severe	5 (7.9%)	4 (6.3%)	
Pain at day 3	Mild	35 (55.6%)	29 (46%)	**0.410**
	Moderate	15 (23.8%)	25 (39.7%)	
	No pain	10 (15.9%)	4 (6.3%)	
	Severe	3 (4.8%)	5 (7.9%)	
Pain at day 7	Mild	40 (63.5%)	35 (55.6%)	**0.032**
	Moderate	4 (6.3%)	19 (30.2%)	
	No pain	18 (28.6%)	6 (9.5%)	
	Severe	1 (1.6%)	3 (4.8%)	

Chi-square test

Table-3: Evaluation of the swelling between two groups

Swelling	Characteristics	Comma Shaped, (n=93)	Modified Ward's, (n=93)	*p*-value
Swelling at Day 1	Absent	43 (68.3%)	25 (39.7%)	**0.73**
	Present	20 (31.7%)	38 (60.3%)	
Swelling at day 3	Absent	45 (71.4%)	35 (55.6%)	**0.001**
	Present	18 (28.6%)	28 (44.4%)	
Swelling at day 7	Absent	55 (87.3%)	40 (63.5%)	**0.000**
	Present	8 (12.7%)	23 (36.5%)	

Chi-square test

Table-4: Evaluation of the mouth opening between two groups

Mouth opening	Comma Shaped, (n=93)	Modified Ward's, (n=93)	*p*-value
Mouth opening Day 1	47.65±5.20 (Mean±SD)	44.60±4.44	**<0.001**
Mouth opening Day 3	36.70±9.07 (Mean±SD)	30.87±9.17	**0.004**
Mouth opening Day 7	40.97±9.75 (Mean±SD)	36.55±9.33	**0.001**

Independent t test

DISCUSSION

This research looked at how age, gender, pain, swelling, and measures of the mouth opening changed after third molar surgery between Comma shaped incision and Modified Ward's incision designs. The findings demonstrate that there is nothing obvious variation in the gender or age distribution between the two groups. On days 1st, 3rd, and 7th, however, the Comma-shaped incision considerably outperformed the Modified ward's incision in terms of mouth opening measurements, however there was no significant difference in pain in between two groups on day 1st and 3rd, but there was discernible difference on day 7 as there was decrease in pain in comma shaped group. There was significant difference in swelling on day 3 and day 7 as there was decrease in swelling in comma shaped incision/flap group. The research suggests that the Comma-shaped incision is a good choice for surgery since it is outcomes are reduced pain and oedema and improves mouth opening after surgery. After having a third molar surgically removed, discomfort, trismus, and facial swelling are frequent after effects. These are frequently brought on by postoperative inflammation. The lifting of the full thickness mucoperiosteal flap to properly view and access the third molar is the primary cause of surgical trauma during the procedure. Numerous studies have been carried out to look at various flap patterns and the effects of primary and secondary healing after the procedure [13,14]. Patients who have trouble opening their mouths during third molar surgery are treated using the Comma shaped flap procedure. In comparison to alternative flap designs, it encourages better primary healing, lowering the likelihood of post-operative dehiscence, with advantages over other flap designs, it is a useful choice for third molar surgery.

The disadvantages of the Modified Widman's flap technique include increased trismus, pain, inflammation, and difficulty in suturing the flap. Additionally, there is a higher chance of hematoma development, distal pockets appearing in neighbouring teeth, and bone reabsorption.[16]

While Koyuncu *et al.*[18] found significantly less postoperative discomforts of comma shaped incision compared to the envelope flap during the first four days, a study showed its advantage in terms of healing as compared to the other flaps[17]. Silva *et al.*[19] Additionally, it should be highlighted that this flap produces a less traumatic surgical procedure than the Modified ward's incision, enhancing incision site healing.

Our study compared the two procedures and showed that the comma-shaped incision significantly outperformed the modified Widman's flap in terms of encouraging mouth opening as well as lowering pain and swelling. These findings demonstrate how crucial a comma-shaped incision can be in facilitating surgical healing and increasing patient comfort. As far as we are

aware, no prior study has directly contrasted the effectiveness of these two therapies on mouth opening, swelling, and pain. However, compared to other traditional envelop flaps, the use of a comma-shaped incision resulted in improved healing and fewer postoperative problems, according to prior studies.[11,13] In order to confirm these results and provide a more thorough knowledge of the advantages of comma-shaped flaps in postoperative healing, additional research with bigger sample sizes and controlled confounding factors is necessary. Our study had a few of limitations. Sample size was bit small, which can have a adverse effect on how the findings were. Second, although they were not taken into account in this study, other variables including age, sex, and comorbidities may have an impact on mouth opening measurements.

CONCLUSION

Our study delivers some proofs that the comma-shaped incision is more effective than the modified Widman's incision at promoting good mouth opening and decrease post-operative oedema and discomfort after flap surgery.
Conflicts: No conflict of study

AUTHORS' CONTRIBUTION

VL: Data collection, write-up, literature search. SK: Data collection. SY: Data analysis, data interpretation. SKP: Conceptualization of the study design, proof reading. OM: Literature search, write-up. GA: Data collection.

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Address for Correspondence:

Vishal Lohana, Oral & Maxillofacial Surgery Department, Liaquat University of Medical & Health Sciences, Jamshoro-Pakistan
Cell: +92 333 276 0510
Email: vishal.lohana@gmail.com