

## Original Research

### A Clinical Study Comparing Standard Ward's Incision with Comma-Shaped Incision for Impacted Mandibular Third Molar Removal

<sup>1</sup>Dr. John Rejinald Sikha, <sup>2</sup>Dr. P Rosy Florence, <sup>3</sup>Dr. Shravya Allena, <sup>4</sup>Dr. Sharmista Sreeram

<sup>1</sup>MDS, Oral and Maxillofacial Surgery, Assistant Professor, Gitam Dental College and Hospital, Vishakapatnam, Andhra Pradesh, India;

<sup>2,4</sup>MDS, Prosthodontics and Implantology, <sup>3</sup>BDS, Rhema Prime Dental Clinic, Madhurawada, Vishakapatnam, Andhra Pradesh, India

#### ABSTRACT:

**Aim:** This clinical study aimed to compare the outcomes and complications associated with the standard Ward's incision and the comma-shaped incision in the surgical removal of impacted mandibular third molars in a cohort of 100 patients.

**Materials and Methods:** A total of 100 patients requiring surgical extraction of impacted mandibular third molars were randomly assigned into two groups: Group A (n=50) underwent the standard Ward's incision, and Group B (n=50) received the comma-shaped incision that matched the mucoperiosteal fold. Preoperative evaluations were conducted, and the impacted third molars were carefully extracted according to the assigned incision technique. Pain, swelling, lockjaw, and wound healing were assessed before surgery, after three hours, and on the first, third, and seventh day postoperatively.

**Results:** The pain scores recorded immediately after surgery, at three hours, and on days 1, 3, and 7 were consistently lower in the surgical area with the comma-shaped incision compared to the standard incision area. Additionally, the degree of swelling was significantly reduced in patients with the comma-shaped incision. The incidence of lockjaw and wound healing outcomes also showed significant differences between the two incision techniques, with better outcomes observed in the comma-shaped incision group. **Conclusion:** In this study involving 100 patients, the findings support the superiority of the comma-shaped incision over the standard Ward's incision for impacted mandibular third molar removal. The comma-shaped incision resulted in lower postoperative pain, reduced swelling, decreased incidence of lockjaw, and improved wound healing outcomes compared to the standard incision technique. These results suggest that the comma-shaped incision may offer advantages in terms of patient comfort and postoperative recovery.

**Keywords:** ward's incision, extraction, surgery, third molar, comma incision

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**Corresponding author:** John Rejinald Sikha, Assistant Professor, Gitam Dental College and Hospital, Vishakapatnam, Andhra Pradesh, India

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#### INTRODUCTION

Third molars can be present in up to 90% of persons, and 33% of those have at least one impacted tooth [1]. The surgical removal of impacted third molars is the most popular kind of minor oral surgery. The mandibular third molar is most vulnerable to being impacted. According to the majority of research, there is no sexual preference. However, some research has indicated that women are more likely to experience it than males [1]. Surgery requires working with both hard and soft tissues. It is frequently followed by a variety of issues [2]. To enable surgery on the afflicted area and clear visibility of the planned

osteotomies and odontectomies, the flap must be allowed to migrate far enough away from them. Important body elements such the buccinator muscle, the lingual nerve, and the end of the second tooth should be considered when creating the flap. To ensure proper blood flow, the flap should also have a broad base [2]. The entrance point and fold configuration for every procedure are determined by reliable criteria. Entry point lines should, to the greatest extent feasible, not intersect significant muscle or ligament additions or lay over potential bone deformations.

The distal conveying cut, which is created by slicing the third molar's external sloping edge into the buccal mucosa, is made by making a traditional Ward's cut distal to the succeeding molar. This cut extends over the alveolar apex (if the tooth is completely embedded) or along the buccal gingival sulcus of the third molar. The front delivering entrance point should, if required, be shifted up to the end of the first molar for improved openness.

From the most acute mark of this expanded vestibular reflection back to the farthest limit of the preceding second molar, a forward incision resembling a comma is made. Under the following tooth, an incision is made and brought to a point. From there, a flawless twist will raise it to the distobuccal line at the gingival apex of the following molar. The entry is established by cutting a hole-like incision around the third molar's tip [3].

The temporalis ligament, which is a common source of postoperative lockjaw, is near or even cut through at the end of a standard Ward's incision, which is used to carefully remove infected mandibular third molars. The fold typically conceals the bone loss that follows extraction of the impacted tooth, which can cause a delayed healing process, discomfort, and infection.

The comma-shaped incision enables reflection of a distolingual-based flap that reveals the whole third molar area. The next clean region makes it extremely simple for a dentist to employ the lingual split system or the conventional buccal bone removal procedure. The fold can be moved and corrected with a few sutures once the troublesome tooth is removed. The bone distortion that results from the damage is not even near to the level of the retromolar cushion or the addition of the temporalis muscle ligament [3,4].

## **MATERIALS & METHODS**

### **METHODOLOGY**

For the delicate removal of infected mandibular third molars, forty patients between the ages of 18 and 60 were referred to the Department of Oral and Maxillofacial Surgery.

### **SURGICAL PROCEDURE**

For the study, 100 people with impacted third molars in the jaw were selected, and they were equally divided into two groups of 50. An ordinary Ward's incision was used to remove the mandibular third molars in group A. In group B, a comma incision was used to remove the mandibular third molars.

The patients were put to sleep using 2 mL of 2% lignocaine mixed with adrenaline under all sterile circumstances. We did a 1:100,000 block of the long buccal nerve, lingual nerve, and inferior alveolar nerve.

### **WARD'S INCISION GROUP A**

In order to gain access to the impacted tooth, Ward demonstrated how to construct a sulcular entrance site by extending the mesiobuccal border of the second or

first molar to the distal surface. Because it is more aesthetically acceptable, they permit the interdental papilla between the second and third teeth to serve as the mesial section position. Depending on tissue inclusion and impaction depth, a horizontal incision was created along the mandibular ramus, either at the midpoint or at the distal section of the next molar's distolingual cusp, to assist delivery.

### **COMMA INCISION GROUP B**

In this group, a buccal incision known as the "comma" was applied. It stretched back to the region below the prior second molar from the base of the elongated vestibular reflection. The gingival top will be beautifully bent up to meet the incision at the distobuccal line point of the succeeding molar from where it was beautifully bowed up to a position underneath the following molar. The next step is to create a crevicular entry point near the distal end of the following molar. The thick mucoperiosteal fold surrounding the third molar region was lifted and retracted after the incision had been made. The round diamond bur number 8 and the straight diamond bur numbers 702 and 703 were used for buccal guttering. Using lifts and forceps in a saline solution to extract the tooth, the fold will then be straightened and stitched up using 3-0 black braided silk sutures. A five-day course of antibiotics containing amoxicillin 500 mg, metronidazole 400 mg, and diclofenac potassium 50 mg tablets will be administered to all patients. On the first, third, and seventh postoperative days, the patients will be monitored, and all parameters (pain, swelling, trismus, and wound healing) will be evaluated.

The ASA 1 group (A and B, class 1 and 2, and patients willing to report for follow-up research) and patients with an impacted third tooth in the mandible who were between the ages of 18 and 60 were included in the current study. Patients with severe medical conditions who were in the ASA 2-ASA 4 group were excluded (pregnancy, class 3, substance abuse and alcoholism, refusal to give informed permission, presence of acute infection at the injection site, and long-term use of CNS depressants or antidepressants).

### **STATISTIC EVALUATION**

The intensity of pain was assessed using the VAS, which ranges from 0 to 10. Anteroposterior growth was measured from the corner of the mouth to the tragus of the ear, and superoinferior growth was recorded from the ala tragus line to the reduced mandibular boundary [5]. According to Wood and Branco [6], the largest space between the two incisors is a sign of trismus. The clinical models developed by Holland and Hindle [7] for efficient healing are used to quantify recovery following an accident. If a blunt probe could not be put into the socket through a mucosal defect, socket healing was classified as

primary, and if a mucosal defect was present, secondary.

The Student's t-test and Mann-Whitney U test are used to assess data using the Statistical Package for the Social Sciences (SPSS) version 28.0.1.1 (IBM

SPSS Statistics, Armonk, NY, USA). A repeated measures approach was used to investigate changes in the ratings of pain, edema, and trismus over time. In the aforementioned tests, a P value of less than 0.05 was generally regarded as significant.

## RESULTS

All of the participants were between the ages of 18 and 25. (Table 1).

**Table 1: Distribution of study subjects according to age group**

Age group	Number	
	Group A	Group B
18-25	12	16
26-30	16	17
31-35	9	5
36-40	13	12

Male and female participants were equally distributed in both groups, with 30% of the male participants in group A and 20% of the female participants in group B. To quantify misery, a 10-point visual analog scale (VAS) was utilized. Prior to surgery, the average VAS ratings in groups A and B were 0.2 and 0.3, respectively. After three hours, 24 hours, 72 hours, and one week, the VAS scores (mean± standard deviation (SD) for group A varied from 5.21 to 4.33,

2.76 to 0.81 accordingly. In group B, the relative VAS scores (mean±SD) immediately following surgery, 24 hours later, 72 hours later, and one week later were 5.08, 3.16, 1.35, and 0.09, respectively. Pain decreased with longer recovery times following surgery, with significant intragroup variations being seen. It was shown that group B individuals' postoperative outcomes were worse (Table 2).

**Table 2: Pain details in both groups**

Duration	Group A	Group B	P value
Preoperative	0.2±0.04	0.3±0.03	0.67
Immediate postoperative (three hours)	5.21±1.1	5.08±1.07	0.02
First postoperative day (24 hours)	4.33±1.2	3.16±1.34	0.01
Third postoperative day (72 hours)	2.76±0.04	1.35±0.02	0.01
Seventh postoperative day (one week)	0.81±0.07	0.09± 0.03	0.02
P value	0.001	0.001	

By measuring the maximal interincisal distance using a divider and a ruler, trismus was evaluated [6]. Genuinely significant intragroup contrasts existed. When compared to the two groups' immediate postoperative three-hour follow-up, there was growth at the 24-hour mark. At 72 hours follow-up, as

opposed to 24 hours follow-up in the two groups, the trismus increased even more. At the seven-day follow-up, both groups' trismus decreased. The intergroup factual disparities were also demonstrably significant. It was shown that group B experienced reduced postoperative enlargement (Table 3).

**Table 3: Postoperative trismus (interincisal mouth opening) outcomes in both groups**

Duration	Group A	Group B	P value
Preoperative	36.2±1.05	36.34±0.98	0.76
Immediate postoperative (three hours)	31.1±1.21	37.2±1.22	0.02
First postoperative day (24 hours)	15.3±1.16	27.2±1.33	0.02
Third postoperative day (72 hours)	10.3±1.05	17.3±1.03	0.01
Seventh postoperative day (one week)	27.34±1.14	39.2±1.05	0.02
P value	0.01	0.001	

Wound closure was evaluated using Holland and Hindle's [7] clinical criteria for effective wound healing. 90 % of individuals in group A were judged to have healed enough, compared to 95 % of those in group B. A statistically significant difference between the groups was seen in the amount of improvement in wound healing in group B. Additionally, there were statistically significant differences between groups, and recovery accelerated following surgery (Table 4).

**Table 4: Postoperative wound healing in both groups**

Duration	Group A	Group B	P value
Seventh postoperative day	90.11	95.32	0.001
P value	0.01	0.01	

## DISCUSSION

The shape of the incision is one of the variables that may have an impact on the severity of postoperative issues [8]. This prompted us to look at two different incision designs, one based on the standard third molar disimpaction approach, known as Ward's incision, and the other based on a comma-shaped incision made on the distolingual surface. Pain, swelling, and trismus are frequently experienced after having the impacted third molars out. An analog visual scale (VAS) with a 1–10 scale was used to quantify the level of discomfort.

These new findings are particularly important to note because they concur with Neelkandan et al. [9] and Nageshwar [1]'s findings. Comparative analysis was done, and the results revealed conclusions that matched those of our examination. Erdogan et al. [10] reported no discernible difference in discomfort between the two methods, hence their findings were not consistent with those of the present investigation. The frequency and severity of symptoms can also differ greatly from person to person [5]. Numerous factors may influence how painful something feels, and various methods of evaluating pain have been detailed in published studies [11]. Over the next few days, the degree of interruption should steadily decrease, assuming that the repair procedure goes according to plan. On day one following surgery, as well as on days three and seven, pain ratings were much lower in the comma incision group than in the Ward's incision group, although these differences were not statistically significant. This may be due to less tissue being harmed than at conventional entry points.

For this research, we measured the affected region in two dimensions: superior-inferior (from the ala tragus line to the lower limit of the jaw) and anterior-posterior (from the corner of the mouth to the tragus of the ear). There was a clear difference between the two groups. Edema manifested more quickly during the 24-hour follow-up in both groups than it did the previous three hours. Over the course of the 24- and 72-hour follow-up periods, the edema dramatically worsened. At the seven-day follow-up, edema had lessened in both groups.

Additionally, the disparities between the groups were clearly discernible. Compared to those in group A, participants in group B showed considerably reduced postoperative edema. According to the research, the better incision design lessens the possibility of complications following surgery, such as edema. For mandibular third molar surgery, the impact of two distinct flap designs on postoperative problems were contrasted [10]. There were no parallels between the findings of this study and those of the current inquiry.

The results of this study agree with those of Neelkandan et al. [9] and Nageshwar et al. [1]. The horizontal distance between the tragus and the soft tissue pogonion of the jaw is what we refer to as "enlargement" for the purposes of this investigation [12]. This method of assessing swelling is quicker, more comfortable, and less costly than previous approaches. The timing of edema after excision of the third mandibular tooth has been examined in a number of research. Edema increases rapidly during surgery and peaks between 24 and 72 hours later [13]. Following seven days, both groups' edema had lessened. There were statistically significant variations between the groups, as was to be expected. In comparison to group A, group B experienced less postoperative edema. Compared to the Ward's incision group, the edema described by the comma incision group was often less severe. Our research supports the findings of Neelkandan et al. [9] and Nageshwar et al. [1]. The largest interincisal distance was measured to assess lockjaw in the current investigation using a divider and a ruler, as suggested by Wood and Branco. Contrasting within-group characteristics contributed real relevance. In comparison to the three-hour follow-up stage, lockjaw got worse in all groups during the 24-hour follow-up stage. Lockjaw revealed greater growth at 72 hours following the first injury when comparing the two groups' development at 24 and 72 hours.

Studies similar to ours were undertaken by Suarez-Cunqueiro et al. [14], Neelkandan et al. [9], Nageshwar et al. [1], and Jakse et al. [15] with similar findings. The research by Erdogan et al. [10] is not comparable to our investigation since its findings did not show a statistically significant difference between the two methods for postoperative trismus.

Wound closure was evaluated using the clinical standards for effective wound healing published by Holland and [7]. 92.23% of individuals in group A were judged to have healed enough, compared to 96.46% of those in group B. A statistically significant difference between the groups was seen in the amount of improvement in wound healing in group B. Additionally, there were statistically significant differences between groups, and healing accelerated following surgery. According to Jakse et al. [15] and Suarez-Cunqueiro et al. [14], an incision affects how quickly a third molar disimpaction operation heals from essential harm.

Yazdani et al. [16] conducted research in 2014 on the effects of two distinct flap designs on pain and edema following the surgical extraction of impacted mandibular third molars. After the surgical extraction of impacted mandibular third molars, the flap design had little to no impact on pain or edema. In a

prospective comparison research, Desai et al. [3] examined two incision designs for the surgical removal of impacted mandibular third molars. Visibility, accessibility, severe bleeding during surgery, healing of the flap, sensitivity of the neighboring teeth, and dry socket were not significantly different across the groups. Postoperative hematoma, wound gaping, and the distal pocket in the adjoining tooth all showed statistically significant differences between the Ward's triangle incision group and the Koener's envelope incision group.

One of the most common surgical operations in the oral and maxillofacial field is the removal of third molars in order to prevent or cure a number of pathologies resulting from impacted teeth [1,2]. Such teeth must be removed by a skilled surgeon with a solid grasp of surgical concepts and patient care abilities. It must be done correctly to enable quick and painless removal of teeth lodged in a generally painless region of the oral cavity. Despite being a small surgical operation, it is complicated because of its relationship to the surrounding teeth, soft tissues, and neurovascular bundle. The manipulation of both soft and hard tissues is involved in surgical removal, thus there are frequently a variety of postoperative problems [17,18]. As a result, it becomes crucial to decrease the frequency of these issues, which can only be done with a complete understanding of the many elements that influence them.

The design of the incision and flap is one of the elements affecting the recovery from third molar surgery. The flap design is crucial for healing the surgically caused defect once the defect has been formed, in addition to providing the best view and access to the affected tooth. The insertion of the temporalis tendon is near or even severed by the distal leg of the incisions that are typically used to access impacted mandibular teeth. Additionally, it frequently covers bone abnormalities created by tooth extraction. It's possible that this contributed to these issues, at least in part. Therefore, there is sufficient justification to take various incision and flap designs into account. The study's sample size was small, and just a handful of parameters and two incisions were investigated.

## CONCLUSIONS

According to the study's findings, a comma incision has less postoperative issues than a typical Ward's incision since it requires more time and presents fewer challenges, such as poor accessibility. If we had included other variables like the periodontal pocket depth measurement of the neighboring second molar and the prevalence of dry socket postoperatively, the analysis may have been more precise.

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