

Comparative Evaluation of Comma Incision and Conventional Incision for Surgical Extraction of Impacted Mandibular Third Molar - A Prospective Randomised Controlled Split Mouth Study

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INTRODUCTION

Third molars are the most commonly impacted teeth in the oral cavity because of results of genetic, environmental and other possible factors like associated pathology, tooth size jaw space discrepancy. Third molar extraction has become a monotonous practice for Oral and Maxillofacial Surgeons in treatment centres to prevent or to treat a variety of pathoses originating from impacted teeth^[8,9]. Removal of such teeth requires sound understanding of the surgical principles along with patient management skills. Although it is a minor surgical procedure, its relation to the adjacent teeth, soft tissues, and neurovascular bundle makes it a complex procedure^[10].

One of the important factors influencing the postoperative outcome following third molar surgery is the incision and flap design. Incision lines should not, as far as possible, lie over prospective bony defects or cut across major muscle or tendon insertions. In present study, an attempt has been made to compare the Standard Ward's incision with the distolingually based flap design, i.e., Comma incision to evaluate the influence of flap designs on the postoperative complications, including pain, trismus, swelling.

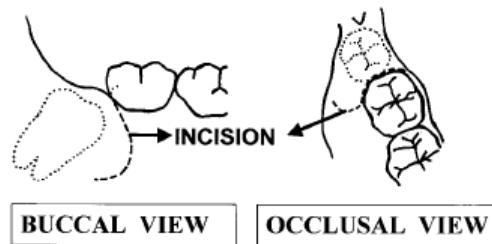
MATERIALS AND METHODS

A Prospective Randomised Controlled Trial-Split mouth study was conducted having difficulty index score as Slightly difficult (3-4) and Moderately difficult (5-6) using Pederson's scale. The side for Test group (was given Comma incision) and Control group (was given Conventional incision) was randomly selected in the selected patients. The randomisation was achieved using computer generated sequence using which the subjects were categorised into Test group and was given Comma incision, and into Control group and was given Conventional incision in right and left side quadrants of mandible as generated in order. In present study, twenty patients were included and followed up on 1st (D1 PO), 3rd (D3 PO), 7th (D7 PO) day postoperatively and were assessed for the following Clinical Parameters-

- Time for flap reflection (From starting of incision till completion of mucoperiosteal flap elevation)
- Duration of procedure (from starting of incision till the end of suture placement)
- Pain - using Visual Analog Scale(VAS)
- Swelling - (by facial measurements-two measurements: tragus-pogonion and gonion-lateral canthus). The preoperative sum of the 2 values (in millimeters) were taken as the baseline for that side and the difference in measurements from the baseline value is considered as the increase in swelling.
- Mouth opening (by measuring the difference in the interincisal distance at the maximal mouth opening)
- Any complications

Flap Design-Comma incision:

The reflection of the buccal vestibule below the preceding second molar was stretched down as far as possible with the index finger or thumb of the hand not wielding the scalpel. This stretched the buccinators beyond its origin on the mandible. Starting from a point at the depth of this stretched vestibular reflection posterior to the distal aspect of the preceding second molar, the incision was made in an anterior direction. The incision was made to a point below the second molar, from where it was smoothly curved up to meet the gingival crest at the distobuccal line angle of the second molar. The incision was continued as a crevicular incision around the distal aspect of the second molar^[11].



Flap Design-Conventional incision: Ward’s incision

The flap consisted of a sulcular incision starting near the mesio-buccal edge of the second or first molar (depending on the depth of the impaction) to its distal surface. A releasing incision was in the mesial region without cutting the interdental papilla. Another releasing incision was made in the mandibular ramus. Then, a full-thickness mucoperiosteal flap was elevated^[3].

All data were entered into a computer by giving coding system, proofed for entry errors

- Data obtained was compiled on a MS Office Excel Sheet (v 2019, Microsoft Redmond Campus, Redmond, Washington, United States).
- Data was subjected to statistical analysis using Statistical package for social sciences (SPSS v 26.0, IBM).

Observation and Results: Pain observed using VAS scores for test group with mean of 1.25, 1.9, 1.05, 0.15 at Preop, Day 1(D1 PO), Day 3(D3 PO), and Day 7 (D7 PO) postoperative respectively and for Control group mean of 0.70, 1.95, 0.75, 0.05 were observed respectively. There were also statistically insignificant results seen between both the groups in consideration of Swelling, Mouth opening, Time for flap reflection with values of mean, standard deviation and error and t value as stated in the table. Both the incisions were comparable in terms of the parameters recorded based on the simple inter group comparisons, intragroup comparison between set of different difficulty index scores. Based on *intragroup pairwise comparisons* between the Preop, D1, D3, D7 PO, in *both incisions*, there were statistically highly significant difference($p<0.01$) for test group between Preop & D1 PO; Preop & D3 PO and statistically significant($p<0.05$) values between Preop & D7 PO; D1 PO & D7 PO. In addition, there were statistically highly significant difference ($p<0.01$) for control group between Preop & D1 PO; Preop & D3 PO; D1 PO & D7 PO and statistically significant ($p<0.05$) values between D1 PO & D3 PO in terms of Mouth opening. Based on *intragroup comparisons* between the incisions in Preop, D1, D3, D7 PO, there were statistically highly significant ($p<0.01$) difference seen for VAS values of Comma incision group with higher value at D1 PO. Similarly, there was statistically highly significant ($p<0.01$) difference seen for VAS values of Conventional incision group with higher values at D1 PO.

Based on the intergroup comparison using t test, duration of surgery with a mean 51.1minutes for comma incision group and mean 47.1minutes was noted for conventional incision group. But the duration of surgery as observed to have a statistically significant low & positive *correlation* between Duration of the surgery in minutes & Pederson’s difficulty index score ($p<0.05$)

Comma Incision



Table : Inter group comparison with incision name	Incision name	N	Mean	Std. Deviation	Std. Error Mean	T value	P value of t test
Duration of the surgery (in mins)	Comma	20	51.1085	25.38221	5.67563	.552	.584#
	Conv	20	47.1150	20.07619	4.48917		

VAS Preop	Comma	20	1.25	1.916	.428	.955	.345#
	Conv	20	.70	1.720	.385		
VAS D1 PO	Comma	20	1.90	1.119	.250	-.149	.882#
	Conv	20	1.95	.999	.223		
VAS D3 PO	Comma	20	1.05	1.356	.303	.895	.376#
	Conv	20	.75	.639	.143		
VAS D7 PO	Comma	20	.15	.489	.109	.831	.411#
	Conv	20	.05	.224	.050		
SWELLING Preop	Comma	20	248.40	15.476	3.461	-.021	.983#
	Conv	20	248.50	14.555	3.255		
SWELLING D1 PO	Comma	20	255.60	15.274	3.415	.246	.807#
	Conv	20	254.45	14.229	3.182		
SWELLING D3 PO	Comma	20	251.70	15.339	3.430	-.119	.906#
	Conv	20	252.25	13.799	3.086		
SWELLING D7 PO	Comma	20	249.40	14.873	3.326	-.096	.924#
	Conv	20	249.85	14.641	3.274		
Increase in swelling Baseline value	Comma	20	.0000	.00000	.00000	0.000	.000#
	Conv	20	.0000	.00000 ^a	.00000		
Increase in swelling For D1 PO	Comma	20	7.1000	2.77014	.61942	1.367	.180#
	Conv	20	5.9500	2.54383	.56882		
Increase in swelling For D3 PO	Comma	20	3.3000	2.07998	.46510	-.597	.554#
	Conv	20	3.7500	2.65320	.59327		
Increase in swelling For D7 PO	Comma	20	1.3000	2.12999	.47628	-.226	.822#
	Conv	20	1.4500	2.06410	.46155		
MO Preop	Comma	20	43.610	7.3301	1.6391	-.246	.807#
	Conv	20	44.126	5.8600	1.3103		
MO D1 PO	Comma	20	22.71	9.548	2.135	-.509	.614#
	Conv	20	24.14	8.190	1.831		
MO D3 PO	Comma	20	27.284	9.6883	2.1664	-1.495	.143#
	Conv	20	31.337	7.2886	1.6298		
MO D7 PO	Comma	20	33.15	10.271	2.297	-1.430	.161#
	Conv	20	37.42	8.558	1.914		

DISCUSSION

The patient's postoperative sequelae in terms of pain, swelling, trismus, and healing are believed to occur due to invasive manipulation of soft and hard tissues during tooth extraction. In this context, the selection of the surgical access flap can affect the post-operative outcomes following third molar surgery, including many complications^[26].

The surgical removal of impacted third molars can result in considerable pain, swelling, and dysfunction. Although the contributing factors to these sequelae are complex, many of them are considered to be initiated by the surgical trauma relating to the inflammatory process. Meticulous surgical techniques will minimize this process but will not prevent it^[42]. Like edema, jaw stiffness usually reaches its peak on the second day and resolves by the end of the first week^[41].

Nevertheless, there have been many 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. Various surgeons in the anticipation of making a better flap design have modified the standard incisions to reduce the severity of the postoperative sequelae. Nageshwar designed the comma shaped incision and it proved to be superior to the standard incision in his study^[2].

In present study, the measurement of swelling (in both the flap groups) showed an increase at the 1st day postoperatively followed by a slight decrease at the 3rd day and a further decrease at the 7th day respectively in comparison with the baseline reading. Overall, there were almost comparable swelling recorded with comma incision

group as well as Ward's incision group. This is not in accordance with the results drawn by, Nageshwar^[1], Ali et al^[3], Anisuzzaman et al^[4], Saravana kumar et al^[2], Neelkandan *et al.* The increase in the amount of swelling is measured by taking the difference between follow up value and preoperative value and is found statistically insignificant. However, it is considered that swelling can be measured with accuracy by using more stable reproducible reference points, as soft tissue points are subjected to observer's view and it may vary with some minor errors while measuring readings on subsequent visits.

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^[2]. There were proportionately lower pain score were recorded at immediate, 3rd day, and 7th day postoperatively in the comma incision group as well as in the Ward's incision group. This were not in accordance with the results drawn by, Nageshwar^[1], Ali et al^[3], Anisuzzaman et al^[4], Saravana kumar et al^[2], Neelkandan *et al.*

Van Gool et al' noted that pain and swelling are mostly related to the incision and the reflection of a mucoperiosteal flap and the duration of the procedure. The incision of the mucosa, the reflection of a mucoperiosteal flap, and the surgical time (defined as the time elapsing between the incision and the suturing) are generally thought to be the main variables related to postoperative complaints^[7]. The duration of surgery, the incision, and the reflection of a mucoperiosteal flap have been shown to affect the intensity and frequency of postoperative complaints^[7]. Based on correlation between the incision designs, duration of the procedure are comparable and relates to the easiness of conducting the procedure clinically with respect to the difficulty index of the impacted molar even though there were statistically non-significant difference observed. Similarly, based on *inter incision comparison* between comma and conventional, there were statistically insignificant results with respect to time for flap reflection. It can be attributed to new technique and possible learning curvature required, as all the procedures were done by the same surgeon.

CONCLUSION

In the present study, it is perceived that the conventional incision and comma shaped incision for removing impacted mandibular third molar are comparable and did not have statistical significance between the parameters such as duration of surgery, time for flap reflection and post operative complications like pain, swelling, reduced mouth opening. Although clinically the comma incision at the first instance was stabled upon with little intricacy in laying and closure, in due course it was found comfortable relatively, showing it's necessity for technical experience to become proficient at. We have come to the conclusion that this new comma incision may probably be a good substitute for impacted mandibular third molar with lesser difficulty index score considering its minimal soft tissue trauma, reduced surgical duration, ease of access and visibility. To add merit to this study, further research with large sample size and multicentric study and extended follow up is recommended.

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