



Comparison of Complications of Extraction among Partially Impacted Mandibular Third Molars with or without a Buccal Flap

**M. Ahmed Khan¹, Tahera Ayub², Bibi Gulsama¹,
Azizullah Muhammad Nawaz Qureshi³, Aosaf Anwar Memon⁴,
Syed Ghazanfar Hassan¹ and Taimoor Ali Khan¹**

¹Oral and Maxillofacial Surgery Department, Faculty of Dentistry, Liaquat University of Medical and Health Sciences, Pakistan.

²Oral and Maxillofacial Surgery Department, Liaquat College of Medicine and Dentistry, Karachi, Pakistan.

³Department of Periodontology, Faculty of Dentistry, Liaquat University of Medical and Health Sciences, Pakistan.

⁴Department of Operative Dentistry, Liaquat University of Medical and Health Sciences, Pakistan.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i36B31947

Editor(s):

(1) Dr. S. Srinivasa Rao, V. R. Siddhartha Engineering College, India.

Reviewers:

(1) Jorge Paredes Vieyra, Universidad Autonoma de Baja California, México.

(2) Gustavo Alberto Obando-Pereda, Universidad Católica de Santa María, Peru.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/70856>

Original Research Article

Received 02 May 2021

Accepted 06 July 2021

Published 10 July 2021

ABSTRACT

Objective: To compare the complications of extraction of partially impacted mandibular third molars with or without a buccal flap.

Materials And Methods: A comparative cohort study was performed at Department of Oral & Maxillofacial Surgery, Institute of Dentistry, Liaquat University Hospital, Hyderabad from September 2020 to March 2021. Sixty-two patients of either gender, having age 15-50 years and recommended for extraction of partially impacted mandibular third molars were selected by non-probability consecutive sampling technique and distributed into flapless group (31 patients) and buccal flap group (31 patients). Patients were treated with standard procedures of flapless and

buccal flap, operating time was noted and follow up was done at 1st day, 2nd day post-operatively for pain, swelling, trismus, whereas periodontal pocket distal to second molar was measured at 1 month and 3 months follow up interval.

Results: In flapless and buccal flap group male patients were 17 (54.8%) and 18 (58.1%) and female patients were 14 (45.2%) and 13 (41.9%) respectively with mean age of 27.4 ± 9.6 and 26.7 ± 8.4 years. Statistically significant difference was obtained in flapless and buccal flap groups in terms of operative time, pain score, swelling score, pocket depth and trismus.

Conclusion: Flapless technique is more effective in conditions of operative time and post-operative complications. So, flapless technique can be used frequently for elimination of incompletely impacted mandibular third molars.

Keywords: Extraction; mandibular molars; flapless; buccal flap.

1. INTRODUCTION

When teeth cease to emerge or form in the appropriate functional position, they become impacted [1]. Insufficient development of the retromolar space is one of the most prominent theories for the high prevalence of mandibular third molar impaction. The far more usually impacted teeth are the mandibular third molars [2,3]. The number of people reaching adulthood with impacted third molars appears to be on the rise to epidemic proportions [4].

Mandibular third molar impaction is still a major public health concern among young adolescents [5]. Impacted teeth are predisposed to periodontal disease such as pericoronitis and periodontitis, as well as other issues such as cystic lesion, neoplasia, and root resorption, many of which can lead to pain, irritation, and dysfunction in neighbouring teeth [6,7]. Therefore, mandibular third molars are often extracted [7].

The worldwide incidence of third molar impaction in the human condition typically varies between 27 and 68.6% [8-10]. One of the reported incidences of impacted lower third molars were most frequent 22.8% than impacted upper third molar 15.9% [1]. The local prevalence of impacted third molar was found 26% [11]. Tooth impactions are a pathological condition in which a tooth is unable or unwilling to erupt into its natural functional position unless it has been helped by therapy [10].

The mainly familiar surgical treatment in oral surgery is the extraction of impacted mandibular third molars. Several surgical techniques for third molar removal have been suggested. The extraction of mandibular third molars necessitated the construction of a flap and osteotomy. This sort of surgery has been linked to a number of negative outcomes [12].

Bleeding, continual soreness, infection, dry socket (alveolar osteitis), dentoalveolar breakage, numbness of the inferior alveolar nerve and of the lingual nerve, temporomandibular joint harm, and even mandibular fracture can all occur as a result of surgical removal of impacted third molars [13]. Buccal flap arrangement, that is crucial of not only allowing ideal sight and exposure to the impacted tooth as well as for future recovery of the surgically produced breach, reduces the occurrence of these problems [14]. Flapless technique can participate a vital responsibility in avoiding the complications arising from elevation of flap as well as bone osteotomy [15]. Flapless removals are utilised clinically when the distal side of the crown is entirely anterior to the anterior border of the mandibular ramus and the occlusal surface of the impacted tooth is equal or nearly parallel to the occlusal plane of the second molar [12]. Flapless technique can be used frequently for removal of partially impacted mandibular third molars so that, the postoperative sequelae that cause distress to the patient and affect the patient's quality of life after surgery can be avoided [15].

When compared to a buccal flap operation, the use of a flapless technique to take away partly impacted mesioangular or horizontal third molars dramatically reduced postoperative problems such as discomfort, edoema, and pocket deepness. The aim of this study was to compare the complications of extraction of partially impacted mandibular third molars with or without a buccal flap in our local setup.

2. METHODOLOGY

With the aid of WHO software for sample size determination at a 95 percent confidence level, a total sample of 62 patients was determined, with 31 subjects in each group. Sampling technique

incorporated was Non-Probability consecutive sampling.

2.1 Inclusion Criteria

- Either gender.
- Age between 15-50 years.
- Medically healthy patients.
- All cases who were recommended for extraction of partially impacted mandibular third molars.

2.2 Exclusion Criteria

- Non-consenting.
- Pregnant women.
- Cases in whom a flapless extraction method failed.
- Those who are taking any medicine that might affect the surgical process or the recovery of their wounds afterward.

3. DATA COLLECTION PROCEDURE

Patients who have visited Department of Oral and Maxillofacial Surgery, Liaquat University Hospital, Hyderabad for extraction of partially impacted mandibular third molar and following inclusion criteria were included in the study. Clinical history of patients along baseline data regarding swelling, pain, mouth opening the patients was recorded pre-operatively (baseline) and postoperatively. All of the teeth were removed while the patient was sedated with 2% Xylocaine and adrenaline (1:80,000). Before extraction, all of the patients were required to rinse their mouths for 1 minute with a 0.2 percent chlorhexidine mouthwash. The left or right mandibular third molars were each randomly assigned to one of the two surgical techniques. A sulcular incision was made from the second molar's mesiobuccal margin to its distal surface in the buccal flap method. Without piercing the interdental papilla, a relieving incision was performed in the mesial area. In the mandibular ramus, a second releasing incision was designed to facilitate for the raising of a mucoperiosteal flap. A spherical bur with a low-speed hand piece and sterile saline washing were used to conduct a minor ostectomy. A carbide fissure bur placed on a low speed hand piece was used to split the tooth into two pieces. The tooth was not entirely partitioned in the lingual direction since this is more prone to cause lingual nerve damage. The two fragments were evacuated after sectioning, and the socket was washed with physiologic

saline. 4-0 silk sutures were used to realign the flap.

The alveolar bone was not exposed because no mucoperiosteal flap was created in the flapless method. The same procedure was used for tooth slicing as for the buccal flap method. The soft tissues were approximated with 1 interrupted suture if required after the sections were removed.

After the surgical procedure, all the patients were treated for 5 days with Cap Amoxicillin 500 mg, Tab Metronidazole 400 mg, Diclofenac 50 mg + Paracetamol 500 mg twice in a day, these post-operative medications would be given to reduce post-operative swelling and pain. Follow up was done for 1st day, 2nd day post-operatively for the following clinical parameters i.e. pain, swelling, trismus and operating time except for periodontal pocket distal to second molar which was measured at 1st month and 3rd month follow up interval. All the information was collected on a proforma specifically designed for this study. Confounding variables and biasness were controlled by strictly following inclusion criteria.

4. DATA ANALYSIS PROCEDURE

Data was compiled and analyzed using statistical package for social sciences (SPSS) version 21. Mean and standard deviations were calculated for the quantitative variables like age, operating time, pain score (before operation, 1st and 2nd day post operatively), swelling score (before operation, 1st and 2nd day post operatively) and pocket depth (before operation, 1st and 2nd month post operatively). Frequencies and percentages were calculated for the qualitative variables like gender, technique group and trismus before operation, 1st and 2nd day post operatively (Y/N). Effect modifiers were controlled through stratification of age and gender to see the effect of these on outcomes. Post stratification chi square test was applied taking p-value ≤ 0.05 as statistically significant.

5. RESULTS

In flapless and buccal flap group male patients were 17 (54.8%) and 18 (58.1%) and female patients were 14 (45.2%) and 13 (41.9%). P-value was 0.7 (non-significant) on chi-square test.

No difference in descriptive statistics of age was observed in flapless and buccal flap group. Mean

and standard deviation (SD) of age was 27.4 ± 9.6 and 26.7 ± 8.4 years in flapless and buccal flap group respectively. P-value was 0.7 (non-significant) on independent samples t-test.

Significant difference in descriptive statistics of operation time was observed in flapless and buccal flap group. Mean and standard deviation (SD) of operation time was 11.2 ± 1.0 and 19.5 ± 3.1 minutes in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.1 Pain Evaluation

5.1.1 Before operation

Mean and standard deviation (SD) of pain score was 5.4 ± 1.0 and 3.0 ± 0.8 in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.1.2 Post-operatively 1st day

Mean and standard deviation (SD) of pain score was 2.1 ± 0.7 and 4.1 ± 0.9 in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.1.3 Post-operatively 2nd day

Mean and standard deviation (SD) of pain score was 2.1 ± 0.7 and 5.0 ± 0.8 in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.2 Swelling

5.2.1 Before operation

Mean and standard deviation (SD) of swelling score was 2.6 ± 0.8 and 3.5 ± 1.1 in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.2.2 Post-operatively 1st day

Mean and standard deviation (SD) of swelling score was 4.7 ± 1.0 and 5.6 ± 1.1 in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.2.3 Post-operatively 2nd day

Mean and standard deviation (SD) of swelling score was 4.1 ± 0.8 and 5.2 ± 0.8 in flapless and

buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.3 Pocket Depth

5.3.1 Before operation

Mean and standard deviation (SD) of pocket depth was 3.9 ± 0.8 and 4.7 ± 0.8 in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.3.2 Post-operatively 1st month

Mean and standard deviation (SD) of pocket depth was 5.4 ± 1.1 and 6.4 ± 1.0 in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.3.3 Post-operatively 2nd month

Mean and standard deviation (SD) of pocket depth was 4.6 ± 0.5 and 6.5 ± 0.5 in flapless and buccal flap group respectively. P-value was $< 0.001^*$ (significant) on independent samples t-test.

5.4 Trismus

5.4.1 Before operation

Trismus was present in 4 (12.9%) and 5 (16.1%) patients and absent in 27 (87.1%) and 26 (83.9%) patients in flapless and buccal flap group respectively. P-value was 0.7 (non-significant) on chi-square test.

5.4.2 Post-operatively 1st month

Trismus was present in 10 (32.3%) and 19 (61.3%) patients and absent in 21 (67.7%) and 12 (38.7%) patients in flapless and buccal flap group respectively. P-value was 0.02^* (significant) on chi-square test.

5.4.3 Post-operatively 2nd month

Trismus was present in 7 (22.6%) and 15 (48.4%) patients and absent in 24 (77.4%) and 16 (51.6%) patients in flapless and buccal flap group respectively. P-value was 0.03^* (significant) on chi-square test.

Table 1. Patients Distribution According to Gender(n=62)

Gender	Surgical groups		Total	P-value
	Flapless (n=31)	Buccal Flap (n=31)		
Male	17 (54.8%)	18 (58.1%)	35 (56.5%)	0.7
Female	14 (45.2%)	13 (41.9%)	27 (43.5%)	
Total	31 (100%)	31(100%)	62 (100%)	

Table 2. Descriptive Statistics of Age (n=62)

Variables	Surgical groups		Total	P-value
	Flapless (n=31)	Buccal Flap (n=31)		
N	31	31	62	0.7
Minimum	15	15	15	
Maximum	49	47	49	
Mean	27.4	26.7	27.1	
SD	9.6	8.4	9.0	

Table 3. Descriptive Statistics of Operation Time (n=62)

Variables	Surgical groups		Total	P-value
	Flapless (n=31)	Buccal Flap (n=31)		
N	31	31	62	<0.001*
Minimum	10	15.0	10	
Maximum	13	25.0	25	
Mean	11.2	19.5	15.4	
SD	1.0	3.1	4.8	

Table 4. Descriptive Statistics of Pain Score (n=62)

Pain Score	Surgical groups		Total	P-value
	Flapless (n=31)	Buccal Flap (n=31)		
Before Operation				
Mean ± SD	5.4±1.0	3.0±0.8	4.2±1.5	< 0.001*
Post-Operatively 1st Day				
Mean ± SD	2.1±0.7	4.1±0.9	3.1±1.3	< 0.001*
Post-Operatively 2nd Day				
Mean ± SD	2.1±0.7	5.0±0.8	3.5±1.6	< 0.001*

Table 5. Descriptive Statistics of Swelling Score (n=62)

Swelling Score	Surgical groups		Total	P-value
	Flapless (n=31)	Buccal Flap (n=31)		
Before Operation				
Mean ± SD	2.6±0.8	3.5±1.1	3.0±1.1	0.001*
Post-Operatively 1st Day				
Mean ± SD	4.7±1.0	5.6±1.1	5.2±1.2	0.001*
Post-Operatively 2nd Day				
Mean ± SD	4.1±0.8	5.2±0.8	4.7±1.0	< 0.001*

Table 6. Descriptive Statistics of Pocket Depth (n=62)

Pocket Depth	Surgical groups		Total	P-value
	Flapless (n=31)	Buccal Flap (n=31)		
Before Operation				
Mean ± SD	3.9±0.8	4.7±0.8	4.3±0.9	< 0.001*
Post-Operatively 1st Month				
Mean ± SD	5.4±1.1	6.4±1.0	5.9±1.2	0.001*
Post-Operatively 2nd Month				
Mean ± SD	4.6±0.5	6.5±0.5	5.5±1.1	< 0.001*

Table 7. Patients distribution according to Trismus (n=62)

Trismus	Surgical groups		Total	P-value
	Flapless (n=31)	Buccal Flap (n=31)		
Before Operation				
Yes	4 (12.9%)	5 (16.1%)	9 (14.5%)	0.7
No	27 (87.1%)	26 (83.9%)	53 (85.5%)	
Post-Operatively 1st Day				
Yes	10 (32.3%)	19 (61.3%)	29 (46.8%)	0.02*
No	21 (67.7%)	12 (38.7%)	33 (53.2%)	
Post-Operatively 2nd Day				
Yes	7 (22.6%)	15 (48.4%)	22 (35.5%)	0.03*
No	24 (77.4%)	16 (51.6%)	40 (64.5%)	

6. DISCUSSION

Surgical removal of the mandibular third molar has become a common procedure considering the evolutionary pattern. Post third molar surgery discomfort is often felt by patients arising from complications at the time of surgery or after surgery. Patients often experience pain, swelling, pocket depth, trismus, dehiscence, alveolar osteitis, infection, nerve injury and periodontal tissue damage [16,17]. Avoiding post-operative complications after surgery is challenging for physicians. Different techniques are for decreasing the rate of post-operative complications such as atraumatic, aseptic, drug administration and physiotherapy, suturing technique and surgical technique [18].

In current study significantly lower operative time in flapless group as compared to buccal flap group was found. Different other researchers also reported that increased duration of surgery was directly associated with significantly higher pain scores after surgery. Operating factor might be an important factor to be considered in case of less cooperative patients or with those who cannot open their mouths fully for longer time due to anatomical reasons. Hence, flapless method of extraction among partially impacted

mandibular third molars can be a very useful tool in such cases [12,15,19].

Another important finding of current study was low rate of post-operative complication in flapless group as compared to buccal flap group. Pain, swelling and trismus score was significantly high in buccal flap group as compared to flapless extraction group. These findings related to pain, trismus and postoperative swelling score were well supported by Ullah K et al. [20] and Kim HR [12] where they found similar results in both groups. Shevel et al. [21] discovered that a tiny incision with little mucoperiosteum reflection resulted in considerably less postoperative discomfort and edema than a bigger incision with a typical flap.

In this study pocket depth was seen higher in surgical buccal flap reflection group as compared to conventional flapless technique group. Similar findings were noted in the studies conducted by Sharma NK [15], Kugelberg et al. [22] and Woolf et al. [23]. Kugelberg et al. found that 2 years after lower third molar surgery, 43.3% of the patients had a probing depth of 7 mm or more and 32.1% had intra bony defects of 4 mm or more on the distal aspect of the adjacent second molar.

Results helps to conclude that flapless technique of extraction of partially impacted mandibular third molar is safer and more effective with low rate of post-operative complications including pain, swelling, pocket depth and trismus. However, further studies should be conducted on larger scale and patients should follow for longer time period in order to further confirm the effectiveness of flapless technique over buccal flap technique.

7. CONCLUSION

Flapless technique is more effective in terms of operative time and post-operative complications. Flapless technique is significantly associated with less operative time and post-operative complications including pain, swelling, pocket depth and trismus. So, flapless technique can be used frequently for removal of partially impacted mandibular third molars.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

Informed written consent was taken before induction of patients to the study.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Alhadil Y, Al-Shamahy HA, Aldilami A, Al-Hamzy M, Al-Haddad KA, Shaalan M. Prevalence and pattern of third molar

- impaction in sample of Yemeni adults. *Online J Dentist Oral Health*. 2019;1(5):1-4.
2. Mukherji A, Singh MP, Nahar P, Balaji BS, Mathur H, Goel S. Predicting pathology in impacted mandibular third molars. *J Indian Acad Oral Med Radiol*. 2017;29(1):20-4.
3. Katakam SK, Shankar U, Thakur D, Reddy TP, Hari KR, Janga D. Comparison of orthopantomography and computed tomography image for assessing the relationship between impacted mandibular third molar and mandibular canal. *J Contemp Dent Pract*. 2012;13(6):819-23.
4. Adaki SR, Yashodadevi BK, Sujatha S, Santana N, Rakesh N, Adaki R. Incidence of cystic changes in impacted lower third molar. *Indian J Dent Res*. 2013;24(2):183.
5. Saravanakumar B, Julius A, Jayesh SR, Sarumathi T, Prasanth BK. Prevalence and pattern of mandibular third molar impaction among patients attending private dental clinics in Chennai city-a cross sectional survey. *Indian J Forensic Med Toxicol*. 2019;13(2):1-4.
6. Hu T, Zhang J, Zhi Ma J, Nan Shao L, Fei Gu Y, Qi Li D, et al. A novel method in the removal of impacted mandibular third molar: buccal drainage. *Sci Report*. 2017;7(1):12602-8.
7. McGrath C, Comfort MB, Lo EC, Luo Y. Changes in life quality following third molar surgery—the immediate postoperative period. *British Dental J*. 2003;194(5):265-8.
8. Reddy KV, Prasad KV. Prevalence of third molar impactions in urban population of age 22-30 years in South India-an epidemiological study. *J Indian Dent Assoc*. 2011;5(5):609-13.
9. Quek SL, Tay CK, Tay KH, Toh SL, Lim KC. Pattern of third molar impaction in a Singapore Chinese population: A retrospective radiographic survey. *Int J Oral Maxillofac Surg*. 2003;32(5):548-52.
10. Hassan AH. Pattern of third molar impaction in a Saudi population. *Clinic Cosmet Investig Dentist*. 2010;2:109-13.
11. Amanat N, Mirza D, Rizvi KF. Pattern of third molar impaction: Frequency and types among patients attending urban teaching hospital of Karachi. *Pak Oral Dental J*. 2014;34(1):1-5.
12. Kim HR, Choi BH, Engelke W, Serrano D, Xuan F, Mo DY. A comparative study on the extractions of partially impacted mandibular third molars with or without a

- buccal flap: a prospective study. J Oral Maxillofac Surg. 2011;69(4):966-70.
13. Deliverska EG, Petkova M. Complications after extraction of impacted third molars-literature review. J IMAB. 2016;22(3):1202-11.
 14. Andreason JO, Peterson JK, Laskin DM. Textbook and color atlas of tooth impactions: diagnosis, treatment and prevention. 1st Ed, Munksgaard Copenhagen. 1997:219-313.
 15. Sharma NK, Shilpa RH, Navaneetham A, Sharma SK. A comparative study for the removal of partially impacted mandibular third molars with or without a buccal flap: A prospective study. Intern J Applied Dental Sci. 2018;4(3):376-81.
 16. Sridharan G, Nakkeeran KP, Andavan G. Effects of flap modification on third molar extraction outcomes- a randomised split mouth study. J Oral Biol Craniofac Res. 2020;10(4):619-24.
 17. Rahpeyma A, Khajehahmadi S, Ilkhani S. Wound dehiscence after wisdom tooth removal in mandibular mesioangular class IB impactions: Triangular transposition flap versus envelope flap. J Dent Res Dent Clin Dent Prospects. 2015;9(3):175-80.
 18. Aydintug, YS, Bayar GR, Gulses A, Misir AF, Ogretir O, Dogan N, et al. Clinical study on the closure of extraction wounds of partially soft tissue-impacted mandibular third molars. Quintessence Int. 2012;43(10):863-70.
 19. Chu H, Li Z, Ren F, Yang Z, Wu Z, Rong M, et al. Clinical application of flap or flapless buccal surgery on the extractions of mesially/horizontally impacted 3rd molar with high or medium position impact: a comparative study. J Oral Maxillofac Surg. 2020;121(5):490-5.
 20. Ullah K, Jamal M, Saifullah, Bashir O, Pasha M. Comparison of two surgical techniques for the removal of partially impacted mandibular third molars. JSMC. 2017;7(1): 52-57
 21. Shevel E, Koepf WG, Butow KW. A subjective assessment of pain and swelling following the surgical removal of impacted third molar teeth using different surgical technique. SADJ. 2001;56:238.
 22. Kugelberg CF, Ahlstrom U, Ericson S et al. Periodontal healing after impacted lower third molar surgery: A retrospective study. Int J Oral Surg. 1985;14:29-28.
 23. Woolf RH, Malmquist JP, Wright WH. Third molar extractions: Periodontal implication of two flap designs. Gen Dent. 1978;26:52.

© 2021 Khan et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

*The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/70856>*