Original Article

Received : 17-02-15
Review completed : 15-04-15
Accepted : 23-05-15

A MODIFIED TOOTH SECTIONING TECHNIQUE FOR MANDIBULAR THIRD MOLARS- A PROSPECTIVE SHORT STUDY

Nithin Mathew Cherian, * Charis Chandy Joseph, ** Sankar Vinod V, *** Sujeev N, † Anju Samuel, †† Giju Baby George †††

* Senior Lecturer, Department of Oral & Maxillofacial Surgery, ST Gregorios Dental College, Ernakulam, India
** Senior Lecturer, Department of Oral Medicine & Radiology, Mar Baselios Dental College, Ernakulam, India
*** Professor & Head, Department of Oral & Maxillofacial Surgery, Mar Baselios Dental College, Ernakulam, India
† Post Graduate Student, Department of Oral & Maxillofacial Surgery, Mar Baselios Dental College, Ernakulam, India
†† Senior Lecturer, Department of Periodontology & Implantology, ST Gregorios Dental College, Ernakulam, India
††† Professor & Head, Department of Oral Medicine & Radiology, Mar Baselios Dental College, Ernakulam, India

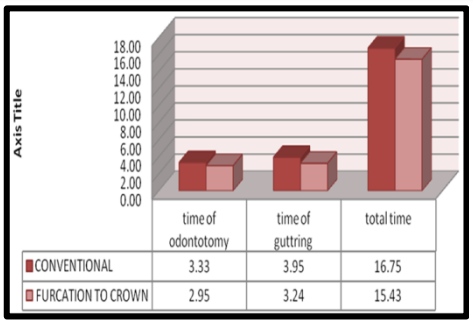
ABSTRACT

Aim: The aim of the study is to outline a very simple and reproducible technique that dental practioners can utilize to remove mesioangularly impacted M3M. **Materials & Methods:** Two operators conducted the study on a total of 48 patients with an impacted 3rd molar.Each operator had 24 patients each and used the conventional technique of tooth splitting for 12 patients while the modified tooth sectioning technique for the other 12.Evaluation of the extracted site was made after 24hours and 7 days. **Results:** The result shows that the furcation to crown technique takes lesser time. **Conclusion:** The modified 'furcation to crown' tooth sectioning technique is a simple and reproducible alternative technique for removing mesioangularly impacted third molars while totally avoiding the risk of lingual nerve injury and injury to the adjacent tooth.

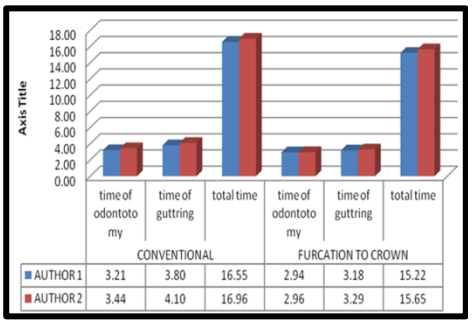
KEYWORDS: Tooth sectioning; mesioangularly; furcation

INTRODUCTION

Third molars are present in 90% of the population, with 33% having at least one impacted third molar.[1] Surgical removal of the impacted mandibular third molar is the single most commonly performed operation by oral and maxillofacial surgeons, but like many other clinical problems the impacted M3M presents more a question of management than of treatment.[2] Thus one must adopt a systematic, patient-oriented approach in order to maximize the therapeutic benefit for each individual.[2] The NIH 1979 Consensus Development Conference for removal of M3 brought forth a well-defined criterion for M3 removal: infection, non-restorable carious lesion, cyst, tumor, destruction of adjacent tooth and bone.[3] In order to justify the removal of the M3M, the risk of non-intervention should outweigh the risk of intervention and the benefit of intervention should far outweigh the benefit of non-intervention. Once the decision is made to remove the M3M, then the next area of debate lies in the choice of the surgical technique. A simple classification is those using a bur and those using a chisel.[4] The general aim is to reduce the intra- as well as postoperative complications to a minimum following third molar surgery thus reducing morbidity. The conventional chisel technique, even though atraumatic, seems to have lost out on the account of patient acceptability and perception as it may be seen as an unrefined practise. The surgical bur technique uses burs under irrigation to remove bone to produce space for elevator application and tooth delivery, via a buccal approach.[4] Recently a shift in paradigms can be observed towards atraumatic techniques in third molar surgery, such as odontosection,[5-7] partial removal of M3M crowns[8] and use of piezoelectric devices. There is no significant discussion in the literature on how to perform atraumatic procedures. This article aims to outline a modified tooth splitting technique which is a very simple and reproducible technique that even less experienced dental practitioners can utilise to remove mesioangularly impacted M3M. The technique is based on the principle of eliminating the arc of rotation that resists the elevation of mesioangularly impacted mandibular third molars. The technique has been compared with the conventional odontectomy technique so as to evaluate the advantages and disadvantages of using this technique.



Graph 1: Comparison of the average time taken for each technique



Graph 2: Comparison of the conventional and the furcation to crown tooth sectioning

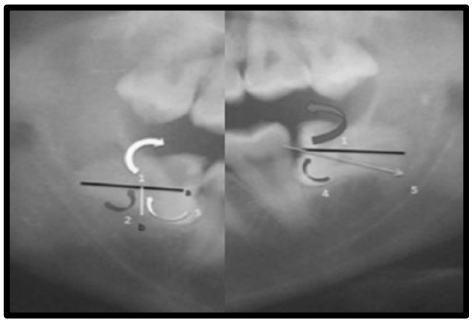


Fig. 1

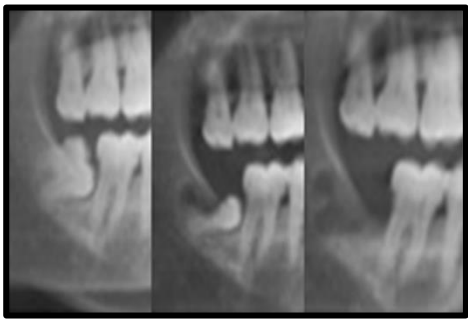


Fig. 2

Table 1: T - Test for overall calculation between the techniques irrespective of operators

	Technique	N	Mean	Std. Deviation	t	df	P VALUE
Time of odontotomy	Conventional	24	3.325	0.3554	3.862	46	**<0.001**
	Furcation to crown	24	2.95	0.3162			
Time of guttering	Conventional	24	3.95	0.32168	6.066	46	**<0.001**
	Furcation to crown	24	3.2375	0.477141			
Total time	Conventional	24	16.75417	0.789595	5.767	46	**<0.001**
	Furcation to crown	24	15.43333	0.797096			

MATERIAL AND METHODS

48 patients visiting our OPD with an impacted mandibular third molar were included in the study. All the patients were informed of the purpose of the study and signed informed consent forms were taken. The study was approved by the institutional ethics committee. The criteria for inclusion in the study were: teeth in the mesioangular position in Winter's classification; teeth in classes I and II and positions B and C of Pell and Gregory; all teeth with complete root formation; and the presence of the second molar in occlusion. The following exclusion criteria were adopted: failure to meet the inclusion criteria at the radiological evaluation; complications occurring during surgery that could mask the intended outcomes; patients presenting systemic problems contraindicating surgery; and patients with a mouth opening lesser 30mm; medically compromised patients and those who did not or could not follow the instructions given to them. Two operators conducted the study on 24 patients each. Each operator used the conventional technique of tooth splitting for 12 patients while the modified tooth sectioning technique was used for the other 12. In the conventional technique the crown portion is split at the cementoenamel junction and the tooth is elevated out. In the modified tooth sectionique technique the crown is split in the long axis from the furcation to the crown portion stopping just short of the occlusal surface (Fig. 1A). The elevator is then used to split the tooth into two halves (Fig. 1B) following which the distal segment and mesial segment are elevated separately (Fig. 1C). All the patients were selected using inclusion and exclusion criteria. All the patients were pre-medicated with amoxicillin 500mg 1hr before the procedure. 2.5ml solution of 2% lignocaine with 1:200000

Table 2: T - Test for comparison of the two operators in each technique separately

		Operator	N	Mean	Std deviation	t	Df	P-Value
Conventional	time of odontotomy	OP 1	12	3.208	0.3825	-1.67	22	0.109
		OP 2	12	3.442	0.2968			
	time of guttring	OP 1	12	3.8	0.356753	-2.541	17.293	0.021
		OP 2	12	4.1	0.2			
	total time	OP 1	12	16.55	0.91998	-1.285	22	0.212
		OP 2	12	16.95833	0.605217			
Furcation to crown	time of odontotomy	OP 1	12	2.942	0.337	-0.126	22	0.901
		OP 2	12	2.958	0.3088			
	time of guttring	OP 1	12	3.183333	0.567023	-0.548	22	0.589
		OP 2	12	3.291667	0.384846			
	total time	OP 1	12	15.21667	0.783736	-1.356	22	0.189
		OP 2	12	15.65	0.782188			

concentration of adrenaline was used for the mandibular nerve block using 24 guage needle. Incision was given using a no:15 blade and mucoperiosteal flap was elevated with intact interdental papillae and vertical releasing incision at the distal half of the 2nd molar. Tooth sectioning was done using a 702 bur while profusely irrigating with normal saline. After complete removal of both the tooth segments, wound closure was done with 3.0 silk following irrigation of the socket with a 1:1 ratio of betadine and normal saline. An initial follow-up evaluation was made after 24 hours and a subsequent examination at 7 days for a reassessment and removal of the suture. Swelling was evaluated by measuring the line joining tragus and corner of mouth pre and post operatively. The patients were asked about sensory changes in the vestibular gum, teeth, lower lip and chin (all innervated by the IAN) to assess the presence of sensory complications. If symptoms were present then confirmatory pin prick and directional brush stroke tests[9] were to be employed. The type of injury was based on: paresthesia, represented by abnormal sensation, provoked or spontaneous, unpleasant or not, with or without episodes of pain or hypersensitivity, tingling, burning and other symptoms; hypoesthesia, characterized by diminution of the capacity to detect and perceive mechanical and nociceptive stimuli; anesthesia, represented by the complete absence of detection or perception of mechanical and nociceptive stimuli.[5] The data was recorded and submitted for statistical analysis

RESULTS

The purpose of doing the study was to comparatively evaluate the modified technique with the conventional tooth splitting technique based on the parameters of time taken and the post operative complications. To assess the degree of retention, the Pell and Gregory classification was utilised. Of the 48 mesioangular impactions, only 14 (29.2%) were class I and the other 34 (70.8%) were class II. In relation to the depth of the lower third molar in the dental arch, it was found that 26 (54.2%) were in position A and 22 (45.8%) in position B. The time taken for both the techniques has been depicted in Graph 1. Independent t test was done to compare the time taken in both the techniques. (Table 1). The results show that the furcation to crown technique takes lesser time. The total time is lesser by more than a minute. When comparing one operator with the other, graph 2 shows that operator 1 takes marginally lesser time than the second operator. There were no statistically significant differences except for the time of guttering (P value-0.021). The difference is merely .3 min more which is clinically insignificant (Table 2). There were no instances of neurosensorial defects.

DISCUSSION

To reduce surgical morbidity caused by manipulation, a number of authors have been developing techniques aimed at facilitating the removal of the impacted tooth. Tooth sectioning is a frequently used technique. The purpose of this technique is to facilitate the removal of the tooth by decreasing its zones of retention by fragmentation and also the preservation of sound bone and adjacent anatomical structures.[10] No studies have been found in the literature that provides comparative percentages related to the use of the different tooth sectioning techniques. Landi L *et al*., proposed a staged surgical extraction to reduce nerve damage risk by allowing spontaneous mesial migration of the impacted 3rd molar by sectioning the portion of the M3M crown in contact with the distal aspect of the M2. This technique was found to be useful to prevent neurosensorial injury even in cases where the IAN was in close proximity to the roots.[8] Laskin[11] and Peterson[12] have described tooth sectioning for removal of M3Ms but a detailed step by step description of how to perform tooth sectioning easily has not been documented. This article provides an easy, simple and reproducible technique that even less experienced dental practitioners can utilise to remove mesioangularly impacted M3M (Fig. 1A, 1B & 1C). Our technique is essentially a two segment technique. Genu and Vasconcelos[5] described a similar technique for extracting M3Ms and they evaluated the influence of that technique on alveolar nerve damage. But they only mentioned splitting the tooth into two halves than describing how it should be done. Ngeow W C[7] found that removing bone to the level of the cemento-enamel junction of the tooth is useful for access as well as to enable sectioning the tooth into several segments. Having more tooth segments reduces the tooth size and the possibility of 'hinging' the root over the inferior alveolar nerve when extraction/ elevation is attempted. This is because the segments are taken out one by one, leaving the apical portion with plenty of space coronally for the root segment to be elevated outward.[7] Arakeri G[6] proposed a 3 piece technique, Arakeri's FMS technique, for removing mesioangularly impacted teeth with mesial cusp locked distal to second molar. They found that when sectioning the tooth into two halves (distal/upper and mesial/lower), the upper half does not show any resistance for elevation but the lower half which is locked under the maximum convexity of the distal surface of second molar strongly resists elevation.[6] They believe that the root may hinge over the neurovascular canal leading to neurovascular complications. We agree with both the above mentioned authors regarding sectioning the tooth into several segments in cases of surgical removal of horizontal impactions where the additional sectioning allows easy removal of deeply locked crowns without untoward neurovascular injury. However, we believe the additional sectioning is not required in mesioangular impactions as sectioning the tooth into two equal halves eliminates the arc of rotation found to resist elevation as it passes through the distal part of the 2nd molar. This technique creates a new arc of rotation[13] for the mesial or lower segment which does not interfere with the elevation of the segment (Fig. 2) We found that both our technique as well as the conventional technique did not show any instances of neurovascular injury(0/48). The reason for lateral and distal bone removal for M3M extraction is to allow an outward directed mobilization of the tooth segments. Engelke W *et al*.,[10] proposed an inward fragmentation technique for M3M and documented it using an endoscope. As in their technique we have found that there is no risk of injury to the lingual nerve while using our technique as both these techniques completely precludes cutting the distal bone thus giving the added benefit of minimal bone cutting. A general concensus with regard to third molar impactions is that an atraumatic surgical technique with minimal bone cutting reduces the frequency of post-operative edema and pain. In our study we noticed that there was no significant difference in the maximum measured swelling of the face while using either the conventional or our 'modified' furcation to crown sectioning technique. However the difference in swelling from day 1 to day 7 was significantly lower in the modified 'furcation to crown' tooth sectioning technique implying that the inflammation and edema was consistently less in the modified method. Another common complication faced during mesioangular impactions is the damage to the adjacent mandibular second molar with the

rotating bur.[14] In the modified 'furcation to crown' tooth sectioning technique this complication is always avoided as the bur sectioning is always stopped just short of the crown surface and the tooth is fractured using an elevator. The fracture may occur in different directions but invariably all of them eliminated the previously impeding arc of rotation thus facilitating easy removal

CONCLUSION

The modified 'furcation to crown' tooth sectioning technique is a simple and reproducible alternative technique for removing mesioangularly impacted third molars while totally avoiding the risk of lingual nerve injury and injury to the adjacent tooth. The ease of tooth sectioning and the reduced post operative swelling with no instances of any neurosensorial defects noticed in this study are definitive advantages of using this technique. However future studies using this technique should be formulated to assess inferior alveolar nerve injury while removing mandibular third molars in close proximity to the inferior alveolar nerve.

CONFLICT OF INTEREST & SOURCE OF FUNDING

The author declares that there is no source of funding and there is no conflict of interest among all authors.

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