

FREQUENCY OF UNERUPTED MANDIBULAR THIRD MOLAR IN MANDIBULAR ANGLE FRACTURES

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ABSTRACT:

AIMS AND OBJECTIVES: To determine the frequency of patients of mandibular angle fracture having unerupted mandibular third molar.

DURATION: September 2016 to February 2017

SETTINGS: Out-patient Madinah Teaching Hospital, Faisalabad.

MATERIAL & METHODS: This study enrolled 83 cases of mandibular angle fractures (both genders & 20 to 50 years) diagnosed clinically and radiographically who gave their consent to be a part of this study. Fracture side was diagnosed by history, examination and radiographs (orthopantomogram) and the status of whereas mandibular third molar (i.e., erupted or unerupted) on the side of fracture as well as on the non-fractured side was seen through clinical and radiographical examination.

RESULTS: Out of the 83 patients with mandibular angle fracture, 68 patients were having an unerupted mandibular third molar while 15 patients were having an erupted mandibular third molar. Thus, a patient having mandible with unerupted 3rd molar have shown increased risk (1.41 times) of mandibular angle fractures as compared to the risk of fracture of mandible with erupted mandibular 3rd molar.

CONCLUSION: An unerupted mandibular third molar tooth (M3) increases the risk and chances of mandibular angle fracture.

KEYWORDS: Facial trauma, mandible fracture, molar teeth and Angle of mandible fracture

INTRODUCTION:

Trauma to the face can lead to soft tissue injuries of the face, disturbance of facial bones and naso-orbito-ethmoidal structures. Among the commonest of the bones of this region to be fractured is the mandible and angle of the mandible being the weakest part and more prone to breakage. Angle fracture of the mandible is more common if 3rd molar teeth not erupted. Incidence of mandible angle fractures in association with unerupted 3rd molar tooth is about 31%. This may occur alone or in association with other facial fractures. Although mandible is a heavy and strong bone of the face, risk of fracture is increased because of its open arch nature with lower location on the face and being in front, mechanism of hyperextension and hyper-flexion of the head

in the accidents and due to the fact that it gets atrophied with age. Also, this is due to its relative prominent positioning.

Mandible is the only mobile bone of the facial skeleton and it is responsible for various important functions like maintenance of occlusion, mastication, swallowing and phonation. As a result its fractures are never left unnoticed because it's very painful whenever mandible performs functions of mastication, swallowing, phonation and respiratory movements. Various factors of the impacting

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force, bulk of the soft tissue, and some features of the bone, making bone weak and vulnerable to fractures, determine the pattern of fractures. Mandible is commonly fractured after trauma at the angle; roughly more than 30% of all mandibular fractures. It has been hypothesized that any patient having unerupted 3rd molars tooth have more chances of angle of mandible fracture as compared to those with erupted 3rd molar; because the mandibular angle region that contains M3 have a smaller cross-sectional area of bone^[3]. In support of this hypothesis, mandibular fractures have been known to occur at times after M3 removal (angle further weakened after tooth extraction) when usual food is consumed.^[4]

The depth and position of impaction of 3rd molar teeth may also be associated with increased risk for angle fracture and the more deeply placed M3 would be the greatest risk for angle fractures. This however has not been proven correct through various clinical studies. It has been reported in fact that more the depth of 3rd molars lower is the risk of an angle of mandible fracture. This is due to the reason that external oblique ridge provides a pillar of strength for the mandible in angle region. And M3s which are erupted and seen to be disrupting the external oblique ridge are most often seen to be involved in angle fractures.^[3,4] So it can be argued that there may be advantages in removing third molars that are not deeply impacted (the superior border at angle region is already disturbed by their presence) but in patients with deep and impacted molar tooth, it is better not to remove it if superior border of mandible is disrupted.

Ma, aita J et al reported in his study that the most common cause of mandibular fracture in Oman population is road traffic accident (RTA). He also stated that unerupted mandibular 3rd molar tooth is a predisposing factor of angle fractures. But Ugboko VI et al in a study in Nigeria suggested that although RTA is the commonest cause, but presence of unerupted mandibular 3rd molar doesn't mean the chances of fracture can be prevented. Road traffic accidents are also the commonest cause of mandibular fractures in our country^[4]. But the incidence of angle of mandible fractures in our population and the role of mandibular 3rd molars in causing these injuries still needs to be

evaluated.

The rationale of the study is to assess the frequency of unerupted mandibular third molar in mandibular angle fractures in our setup. And if a significant association is present between the presence of unerupted mandibular 3rd molar and its angle fracture then individuals having increased risk of sustaining trauma to facial region like athletes, all those involved in sports or persons frequently travelling by road may benefit from prophylactic removal of unerupted mandibular third molar to prevent mandibular angle fracture.

METHODOLOGY:

This Descriptive Cross-sectional study enrolled 83 labeled cases of mandibular angle fractures (both genders & 20 to 50 years) who gave their consent to be a part of this study. Fracture side was diagnosed by history, examination and radiographs (orthopantomogram). The status of mandibular third molar (i.e., erupted or unerupted) on the side of fracture as well as on the non-fractured side was seen through clinical and radiographical examination. Those fractures due to an iatrogenic cause, classified as pathological (tumour and cyst), edentulous patients, congenitally missing third molar and those with extracted third molars were excluded from the study.

Patients were evaluated on the basis of history, clinical diagnosis (pain, tenderness and movement at the fracture site) and radiographs on orthopantomogram showing fracture line. Study protocol and use of data for research was explained to patient to get informed consent.

The data was collected on a structured performa. Fracture was diagnosed by history, examination and radiographs (orthopantomogram) and status of mandibular third molar (i.e., erupted or unerupted)

Data analysis was done using 23rd version of SPSS. Frequency, proportions and percentages were calculated for qualitative/categorical variables in the data including gender, side of fracture and status of eruption of mandibular third molar. Whereas quantitative/continuous data i.e. age calculated as mean with standard deviation.

RESULTS:

A total number of 83 patients with mandibular angle fractures were included. The mean age was 29.85 ± 11.21 years with an age range of 20 to 50 years. A total of 15 females were included in the study with mean age of 28.73 ± 9.706 years. Sixty eight males with a mean age of 30.04 ± 11.49 years were included in the study (Table 1).

Regarding status of the mandibular 3rd molar, out of the total of 83 patients, 10 patients were having erupted mandibular third molar on right side. Among these 10 patients, 8 were male while 2 were female; while 19 patients were having unerupted mandibular third molar on right side. Among these 19 patients 16 were male while 3 were females (Table 2).

Out of the total of 83 patients, 39 patients were having mandibular angle fracture on left side. Among these 39 patients 32 were male while 7 were female; while 11 patients were having erupted mandibular third molar on left side. Among these 11 patients 9 were male while 2

were females; while 28 patient were having unerupted mandibular third molar. Among these 23 were male while 5 were female. (Table 3).

Out of the total of 83 patients 11 patients were having un-erupted mandibular third molar bilaterally. Among these 11 patients 9 were male while 2 were female. While 4 patients were having erupted mandibular third molar bilaterally. Among these 4 patients 3 were male while 1 was female (Table 4).

Out of the 83 patients (39 left angle fractured patients, 29 right angle fractured patients and 15 bilateral angle fractured patients), 55 mandibular angle fracture were having an un-erupted mandibular third molar while 28 mandibular angle fracture were having an erupted mandibular third molar. Thus a patient having mandible with un-erupted 3rd molar have shown increased risk (1.41 times) of mandibular angle fractures as compared to the risk of fracture of mandible with erupted mandibular 3rd molar. (Table 5).

Table I: Gender wise age characteristics of patients.

G E N D E R	AGE (in years)			
	Gender	Number	Mean	Standard Deviation
	Male	68	30.04	± 11.49
	Female	15	28.73	± 9.71
Total	83	29.85	± 11.21	

Table II: Status of Eruption of Mandibular Third molar on Right side of the patients according to Gender wise distribution.

Status of Eruption of Mandibular Third Molar on Right	GENDER			
		Male	Female	Total
	Unerupted	16	3	19
	Erupted	8	2	10
Total	24	5	29	

Table III: Status of Eruption of Mandibular Third molar on Left side of the patients according to Gender wise distribution.

GENDER				
Status of Eruption of Mandibular Third Molar on Left Side		Male	Female	Total
	Erupted	9	2	11
	Unerupted	23	5	28
	Total	32	7	39

Table IV: Status of Eruption of Mandibular Third molar bilaterally of the patients according to Gender wise distribution

GENDER				
Status of Eruption of Mandibular Third Molar bilateral		Male	Female	Total
	Erupted	3	1	4
	Unerupted	9	2	11
	Total	12	3	15

Table V: Distribution of Mandibular Angle Fracture according to the Status of Eruption of Mandibular third Molar on the side of fracture

Status of Mandibular Third Molar on Side Of fracture					
SIDE OF FRACTURE		Unerupted	Erupted	Total	
	Left	26	13	39	
	Right	19	10	29	
	Bilateral	Left	4	2	6
		Right	6	3	9
	Total	55	28	83	

DISCUSSION:

Mandible bone is one of the heaviest bones of the face and it provides airway space and a normal facial contour. Normal process of chewing, swallowing and speech, need a functional and anatomically stable mandible. Any instability of mandible due to any reason can disturb the normal function and can even be life threatening. Many studies have reported complications due to 3rd molars, one of the major is the mandibular angle fracture.

Age of patients in our study was 29.85 ± 11.21 years with an age range of 20 to 50 years. Compared to our study a mean age of 26.97 ± 9.88 years for the patients sustaining mandibular fractures was demonstrated by Aslam A, et al. in his study. Duan et al and his colleagues reported that mean age of patients sustaining mandibular fractures was 27.9 ± 9.5 years in unerupted third molar present group and 35.1 ± 10.9 years in patients having erupted third molar present.

Males formed an overwhelming majority of the patient population with a percentage of 85.3% accounting for 68 out of the 83 patients; while 15 female patients forming a percentage of 14.7% were present in our study. Abbas et al also reported an over whelming 90.5 % of mandibular fractures to occur in males. In study of Meisami et al⁵ 83 % of their patient population were males. Males bearing the main workload in our society necessitate them to work and travel around quite a lot more than the females. Also, males being more aggressive in nature, indulge in interpersonal violence's a lot more than females and results in sustaining more mandibular fractures than females.

The angle fracture was seen to occur predominantly on the left side, including 39 out of the 83 patients forming a percentage of 48%. The right side was fractured in 29 patients forming a percentage of 38.2 % of the angle fractures. While in 15 cases forming a percentage of 13.7%, the angle fractures were observed to be bilateral. Compared to our study it was shown by Aslam A^[11] in his study that the angle fractures to occur predominantly on left side was 57.9%; while in 39.5 % cases of his study the angle fracture was on the right side. Subbaiah MT, et al observed that increased incidence of angle fractures was more in males

with mean average age being 29 years, and most common cause being road traffic accident; fractures were observed more on the left side in the total sample.

Out of the 83 patients (39 left angle fractured patients, 29 right angle fractured patients and 15 bilateral angle fractured patients), 55 mandibular angle fracture were having an unerupted mandibular third molar while 28 mandible fracture were having an erupted mandibular third molar. Thus a patient having mandible with unerupted 3rd molar have shown increased risk (1.41 times) of mandibular angle fractures as compared to the risk of fracture of mandible with erupted mandibular 3rd molar.

Many studies have shown that risk of angle and condylar fracture is increased 2-3 times if third molars (M3) are present. Compared to our study Metin et al. reported in their study that a patient having mandible with unerupted 3rd molar have shown increased risk (1.73 times) of mandibular angle fractures as compared to the risk of fracture of mandible with erupted mandibular 3rd molar. Menon S, et al reported that more than 80% of mandible angle fractures in their study had impacted or un-erupted 3rd molar ($p < 0.001$). Similarly, angle fracture is also common if 3rd molar is erupted or/and impacted, as seen in a retrospective analysis by Kumar PS. Ugboko VI et al^[7] showed that in patients having an unerupted mandibular 3rd molar were having 2.16 times more risk of mandibular angle fracture than patients having an erupted mandibular third molar. Ruela WS, et al and Thangavelu A, et al reported after a meta-analysis that an unerupted or impacted M3 raises the risk of mandibular angle fracture in adults by more than three times.

Ugboko VI et al^[7] in their labs done to show relation of M3s and angle fractures in Nigerian population and concluded by saying that angle fractures occur less and is uncommon because of typical mechanism (i.e. assault/violence). They also concluded that the presence of an M3 does not confirm fracture of the angle of the mandible. They contended that, angle of mandible fractures occur in unerupted mandibles more than with erupted mandibles. But in their study description of M3s as either erupted or unerupted requires more clarity as a tooth just below the proposed line from second molar may be called as unerupted and

therefore, occupying more osseous space in the angle region as the authors in this study suggested, but these teeth would also be causing a disruption of the external oblique ridge and thus would function at two different fronts; firstly by occupying osseous space and secondly by disrupting the external oblique ridge. They did not analyze mandible in two halves, which leads to ambiguity in the presence of; for example, a right sided angle fracture and a left sided M3. Overall, their incidence of present M3s was quite high (83 %). Again, the way they calculated this incidence of M3s is ambiguous (408 present in total number of 490 patients) since there was no mention of including one present and one absent third molar jaw in the category of present or absent third molars. To reduce these ambiguities, we divided all patients mandibles into two halves where these halves were judged independently of the other side for the presence or absence of erupted or unerupted mandibular third molar and the presence or absence of the angle fracture.

Kumar SR, et al also reported that mandibular angle fractures are more common in patients with un-erupted or impacted mandibular third molar teeth and that the incidence of angle fracture.^[6]

LIMITATION OF THE STUDY

One of the limitations of our study was probably the smaller number of patients with mandibular angle fractures. Studies done over a 2-3 year period with around 500 patients or more would have allowed us to have a more conclusive result. A shortage of statisticians with interest in medical epidemiology and who are also ready to help in our region is also a hampering factor while analyzing such data. Another limitation of our study was the presence of 29 unerupted mandibular third molar on one side and presence of fracture on the contra lateral side (8 angle fractures of right hemi mandibles and 21 angle fractures of left side). This may be attributed to other variables such as cause of the fractures, the magnitude, direction and severity of the traumatic forces causing fracture. In our study, these variables were not studied. A study taking into account all these variables might be helpful in explaining this

relationship.

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