# ROLE OF MANDIBULAR THIRD MOLAR IN MANDIBULAR CONDYLAR FRACTURE

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#### ABSTRACT

Mandibular condylar fracture is one of the most common fractures of mandible. Presence or absence of mandibular third molar is an important risk factor in addition to various other factors. Presence of unerupted mandibular third molar concentrates the stress in angle region leading to its fracture while, in absence of unerupted third molar, forces are diverted towards condyle making it more vulnerable to injury. The objective of this study was to evaluate role of unerupted mandibular third molar in reducing incidence of condylar fracture. A cross sectional descriptive study was conducted at the department of Oral & Maxillofacial surgery, Ayub Medical College, Abbottabad, on 150 patients having condylar fractures over a period of eighteen months. Data on patient's demographics, side of condylar fracture and status of mandibular third molar was obtained and observed. Total number of hemimandibles under study was 175. In 120 patients i.e. 68.6% mandibular third molar was erupted while, in 55 patients i.e. 31.4%, mandibular third molar was unerupted. The results concluded that presence of unerupted mandibular third molar reduces incidence of condylar fracture by 2.2 times so prophylactic removal of these teeth in practice should be discouraged.

Key Words: Mandibular third molar, Mandibular fracture, Mandibular condylar fracture.

## INTRODUCTION

Mandible is the largest and strongest bone of the face; the only mobile bone. Mandibular injuries are not uncommon and a number of factors influence the pattern of injury including age, gender, occupation, socio-economic status and direction and impact of force.<sup>1</sup> Condylar fractures are the most common among mandibular fractures constituting up to 29-56%.<sup>2</sup> Higher incidence of condylar fracture is due to different biomechanical factors such as variation in bone density and different anatomical structures which result in weakening of certain areas.<sup>3,4</sup> Impact forces are indirectly transmitted and directed towards condyle because of the joint between highly rigid ra-

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mus of mandible and less rigid condyle. Other than these, presence or absence of mandibular third molar (M3) is also considered a major factor when it comes to fracture of angle and condyle of mandible. In the literature, a number of researchers have reported that presence of unerupted M3 increases the risk of angle fractures by weakening the area.<sup>5,6,7</sup> On the other hand, a few investigators have found that incidence of condylar fracture is reduced in the presence of unerupted M31.<sup>6,9</sup> In case of erupted M3 stress forces are smaller in angle region and increase in condylar region leading to fracture of the area.

Condylar fracture results in disturbance of mandibular functions such as occlusion, mastication, swallowing and phonation.<sup>10</sup> These fractures are difficult to treat in comparison to angle fractures because of limited access and higher rate of per-operative and post-operative complications, including facial nerve injury, facial asymmetry, malocclusion, limited and deviated mouth opening and ankylosis.<sup>10,11,12</sup>

The rationale of this study is to assess relationship between erupted and unerupted mandibular third molar and condylar fracture so as to reach the decision regarding retention or prophylactic removal of M3s.

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## METHODOLOGY

A descriptive study was conducted in Oral & Maxillofacial surgery department of Ayub Medical College, Abbottabad. Non-probability purposive sampling technique was used. One hundred and fifty patients having condylar fracture were included in the study. The study was approved by ethical committee of Ayub Teaching Hospital, Abbottabad. An informed consent about use of data in research was taken and study protocol was explained to patients. Data was collected on a specially designed Proforma which included age, gender, side of condylar fracture and status of mandibular third molar. Patients older than 17 years were rendered to be part of study. Confounding variables like edentulous patients, patients with iatrogenic or pathological fracture or having missing third molar (congenitally or extracted) were controlled by excluding them on the basis of history, clinical and radiographic examination.

Condyle was said to be fractured when fracture line started from sigmoid notch and extended to posterior border of ramus above angle of mandible. Diagnosis was made by taking history, performing clinical and radiological examination. Orthopantomogram (OPG) and posteroanterior (PA) view of mandible were assessed. Status of mandibular third molar was evaluated by clinical and radiographic examination. Mandibular third molar was said to be erupted when it was at normal occlusal level, otherwise considered unerupted/impacted. Data collected were entered in SPSS version 19. The qualitative variables like gender were presented as frequencies and percentages while quantitative variables like age presented in terms of mean and standard deviation.

#### RESULTS

A total of 150 patients with mandibular condylar fractures were assessed. The mean age of the patients was 27.74 (SD 9.96) years with an age range of 17 to 57 years. Males formed the predominant gender with 74.67% i.e. 112 patients, while females were 25.33% i.e. 38 patients of the total sample.

The mean age of the males was 26.58 (SD 9.38) years and mean age of females was 31.16( SD 10.74) years. Majority of the patients belonged to age range of 17 to 30 years making 70.66% of total sample while

29.34% patients belong to age range of 31 to 57 years. The condylar fracture was seen to occur more predominantly on the left side in 41.33% i.e. 62 patients and 36.66% fractures occur on the right side i.e. in 55 patients. Whereas, 33 patients i.e. 22% had bilateral fractures.

The total number of hemimandibles in 150 patients was 183; 117 unilateral and 33 bilateral. Eight hemimandibles of bilateral mandibular condylar fracture had missing third molars so they were excluded from the study thus total number of hemimandibles under study was 175. (Table 2) In 120 hemimandibles i.e. 68.58%,





Age Range (years)	No. of patients	Percentage	
17-20	41	27.33%	
21-25	39	26.00%	
26-30	26	17.33%	
31-35	17	11.33%	
36-40	10	6.66%	
41-45	3	2.00%	
46-50	9	6.00%	
51-55	3	2.00%	
56-60	2	1.30%	

TABLE 1: AGE DISTRIBUTION OF PATIENTS

TABLE 2: RELATIONSHIP BETWEEN ERUPTION STATUS OF MANDIBULAR THIRD MOLAR AND FRACTURED CONDYLES

	Third Molar Status					
Hemimandibles		Erupted	Unerupted	Missing	Total	
	Unilateral	82	35	_	117	
	Bilateral	38	20	8	66	
	Total	120(68.57%)	55(31.43%)	8	183	

third molar was erupted while in 55 hemimandibles i.e. 31.42%, third molar was unerupted. Hemimandibles containing an unerupted third molar were seen to have 2.2 times decreased risk of condylar fractures when compared to hemimandibles containing erupted third molar.

## DISCUSSION

Mandibular fractures are quite common among facial fractures reaching up to 76%.<sup>5</sup> Certain areas of mandible are relatively at more risk and fracture more frequently such as mandibular condyle 56.5%, symphysis 45%, mandibular body 25.5% and angle 16.5%.<sup>13</sup> In this study males were the predominant gender with 74.67% of the total sample, which is in accordance with other studies.<sup>1,14,15</sup> The greater number of males being affected by trauma is because of the fact that they are more exposed to the factors resulting in facial trauma such as motor vehicle driving, outdoor activities and interpersonal violence.<sup>1,6,7</sup>

A few studies have reported no significant association between the age and gender of the patient and frequency of mandibular angle and condylar fracture.<sup>16</sup> Duan and Zhang<sup>6</sup> reported increased frequency of condylar fractures in old female patients, whereas, results of this study show increased frequency of condylar fractures in younger male patients.

A number of factors influence the pattern and distribution of these fractures including direction, severity and impact of collision force. Hypothesized by Reitzik<sup>17</sup>; angle becomes a weak area as sharp angulation concentrates stress and is easily deformed by certain forces. The condyle is the weakest area in a dentate mandible but forces imposed are absorbed by angle resulting in its fracture and sparing the condyle. Presence or absence of mandibular third molars is another important factor to be taken into account when mandibular angle and condylar fractures are considered. It has been stated by many researchers that presence of an impacted mandibular third molar increases the risk of angle fracture.<sup>5,6,7</sup> In the presence of an impacted tooth, the bone density of the area is compromised thus making it more susceptible to fractures. There is two to four folds increased risk of angle fracture in presence of impacted M3.<sup>7</sup>

Epidemiological studies have suggested that absence of mandibular third molar reduces the brittleness in the angle area and transmits the impact force towards condyle consequently increasing the incidence of condylar fracture.<sup>1,15,18</sup> It was hypothesized that mandibular angle without third molars has increased bone density which resist fracture and force is directed towards more fragile area i.e. mandibular condyle resulting in its fracture. The results of this study revealed that there is 2.2 times more risk of having a condylar fracture when unerupted M3 is absent. Similar results have been shown by some other researchers recently. Thangavelu<sup>15</sup> reported that in the absence of impacted M3s the risk of condylar fracture increases by 2.5 times while Zhu et al<sup>19</sup> found that patients without unerupted M3s were 3.5 times more likely to have condylar fracture when compared to the patients with unerupted M3s. Gaddipati<sup>3</sup> concluded from his study that presence of impacted third molar predisposes the angle to be fractured and reducing the risk of condylar fracture. Shuai Xu18 also presented results similar to these.

Some authors have advocated removal of impacted mandibular M3s to prevent mandibular angle fractures specifically in individuals who are involved in contact sports.<sup>7,8</sup> The condylar fractures are difficult to treat in terms of proper reduction of condylar fragments and fixation with plates and screws due to difficult access and poor visibility of the operative field. Risk of injury to facial nerve is another major risk factor to be considered. Nevertheless, appropriate reduction and stable fixation in angle fractures is not difficult to attain because of easy access and good visibility of fractured segments. As treatment of condylar fracture is more demanding, it is not an appropriate approach to strengthen mandibular angle by removing unerupted mandibular M3 and making condyle more susceptible to injury.

This descriptive study clearly signifies that the presence of unerupted mandibular M3 reduces the risk of condylar fractures, treatment of which is a difficult entity. To the best of our knowledge, no such study is being carried out in the local population to elaborate this relationship, providing basic statistics which can be used for further research on this topic.

## CONCLUSION

Presence of unerupted mandibular M3 reduces incidence of condylar fracture by 2.2 times thus prophylactic removal of these teeth to strengthen angle region should be discontinued.

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