

ORIGINAL ARTICLE



Association of mandibular condylar fracture with mandibular impacted molar

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ABSTRACT

Objective: The aim was to determine the relation of condylar fractures with mandibular impacted third molars

Material and methods: 178 patients with facial fractures who visited to the oral and maxillofacial surgery department of Khyber College of Dentistry in Peshawar were the subjects of this descriptive cross-sectional study. Information on gender, age, mandibular condylar fracture, and the angulations and locations of the mandibular third molars was obtained through history, clinical examination, and radiographic confirmation. The relationship between an impacted lower third tooth and a condylar fracture was examined using the Chi-Square test.

Results: The males (n=140, 78.7%) were more than females (n=38, 21.3%). The mean age was 29.33 ± 11.25 years. Of total 178 cases with impacted mandibular third molar 125 (70.2%) had condylar fracture. There was no statistically significant correlation between the horizontal pattern of third molar impaction and condylar fracture ($P=0.748$). Class A had the strongest correlation (n=119, 95.2%) between condylar fracture and the vertical pattern of lower third molar impaction ($P=0.015$). Likewise, there was an extremely strong statistical correlation ($P<0.001$) between condylar fracture and the angulation of lower third molar impaction. The mesioangular pattern had a high condylar fracture rate (n=120, 96%).

Conclusions: The most frequent cause of condylar fracture is the presence of an impacted third molar in the mandible. The vertical position and angulation of the impacted third molar with condylar fracture were found to be significantly correlated.

KEYWORDS

Impacted tooth; Mandibular Third molar; Condylar fracture

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Introduction

One of the commonly fractured bone in maxillofacial area is mandible and can be attributed to its prominent position in lower face [1,2]. Male gender are predominantly suffered from mandibular fracture [2]. The annual fracture rate for mandibular bone is 11.5 per one lac cases [3]. The pattern of fracture for mandible is subjected to many factors like direction of impact, severity of trauma, amount of bulky soft tissue, and bone density [4].

Among the mandibular fracture the condylar fracture is about 50%. It is the weakest area in mandible and in most of time the impact of trauma is absorbed by angle of mandible and prevents its fracture [1]. But on other hand when third molar is impacted the mandibular angle loses its safety role and results in increased incidence of condylar fracture [1]. A previous retrospective study showed that the rate of condylar fracture is different depending on horizontal space between ramus and lower second molar [3]. Studies showed a positive association between condylar fracture and impacted third molar. The frequency of condylar fracture was higher in cases having meioangular impaction and more vertically positioned impacted teeth [5-8].

The objective of this study is to gather information on the frequency of condyle fractures in individuals in this area who

have impacted third molars, as research indicates that condyle fractures are more common when impacted third molars are present. In order to prevent condylar fractures, the research can offer suggestions on the retention or extraction of the asymptomatic impacted mandibular third molars.

Material and Methods

Using a sequential, non-probability sampling technique, this descriptive cross-sectional study was carried out in the Oral & Maxillofacial Surgery Department of Khyber College of Dentistry, Peshawar. Ethics approval from the hospital was acquired. Following a thorough explanation of the study, each participant gave their verbal informed consent. Using the WHO calculator, the sample size was 178 with a 95% confidence level, 6% margin of error, and a 21% proportion of mandibular condyle fractures [3]. All patients with impacted lower third molars who were reported to the department with facial damage, regardless of gender, and between the ages of 18 and 60 met the inclusion criteria. Patients with pathological fractures and gunshot wounds were not accepted.

Demographics of patients were recorded. A detailed medical record followed by clinical and radiographic examination using Orthopantomogram (OPG) and posterior-anterior (PA) view was done to assess the impacted

3rd molar and condylar fractures. Exclusion criteria were strictly followed to control bias in the study results.

The position of the impacted mandibular third molar was ascertained using Pell and Gregory's categorization. The amount of space between the ramus and the lower second molar is shown by its horizontal component as below;

- Class I: Sufficient space for the emergence of the third molar
- Class II: Insufficient space for the emergence of the third molar
- Class III: The ramus contains the lower third molar entirely or partially

The vertical component shows the vertical relationship between the lower second molar crown and the affected third molar crown as below;

- Class A: The mandibular third molar crown is level with the occlusal plane
- Class B: The cemento-enamel junction (CEJ) of the second molar and the occlusal plane are separated by the crown of the mandibular third molar
- Class C: The mandibular third molar crown is situated behind the second molar CEJ

Data analysis was conducted using SPSS 22 and mean and standard deviation were calculated for continuous data. Frequencies and percentages were calculated for categorical parameters such as gender, condylar fracture, and third molar impaction pattern. The chi-square test was used to examine the relationship between the pattern of third molar impaction and condylar fracture. The significance level was $P \leq 0.005$.

Results

The males ($n=140$, 78.7%) were more than females ($n=38$, 21.3%). The mean age was 29.33 ± 11.25 years with range from 18 to 60 years. Of total 178 cases having mandibular third molar 125 (70.2%) had condylar fracture. Most common age group was 18-30 years ($n=118$, 66.29%) followed by age group 31-45 ($n=44$, 24.72%) [Figure 1].

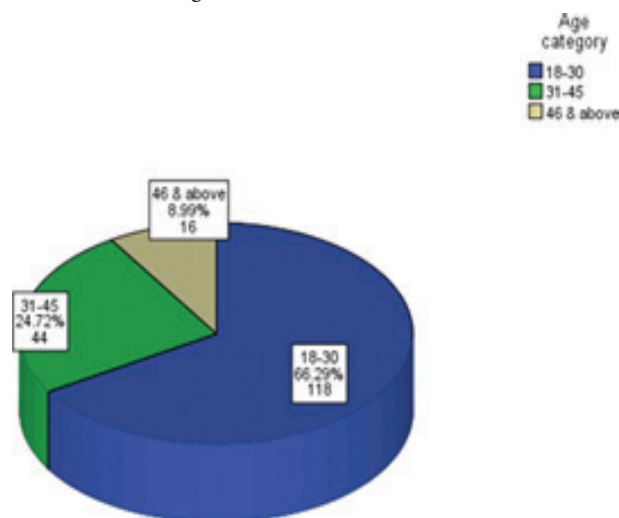


Figure 1. Age distribution of the study.

According to Pell & Gregory, class I ($n=162$, 91.0%) was the most widely used horizontal categorization, followed by class II ($n=10$, 5.6%). According to Pell & Gregory, class A ($n=163$, 91.6%) was the most widely used vertical categorization, followed by class B ($n=12$, 6.7%). Mesioangular angulation was the most common for impacted mandibular third molars ($n=145$, 81.5%), followed by vertical angulation ($n=31$, 17.4%) [Table 1].

Table 1. Pattern of mandibular third molar impaction.

	Variable	Frequency	Percentage
Horizontal Position	Class I	162	91.0
	Class II	10	5.6
	Class III	6	3.4
	Class A	163	91.6
Vertical position	Class B	12	6.7
	Class C	3	1.7
Angulation	Mesioangular	145	81.5
	Vertical	31	17.4
	Distoangular	2	1.1

Condylar fracture and the horizontal pattern of third molar impaction did not statistically significantly correlate ($P=0.748$). Class A had the strongest correlation ($n=119$, 95.2%) between condylar fracture and the vertical pattern of lower third molar impaction ($P=0.015$). Likewise, there was an extremely strong statistical correlation ($P<0.001$) between condylar fracture and the angulation of lower third molar impaction. The condylar fracture rate was high in mesioangular pattern ($n=120$, 96%) [Table 2].

Table 2. Association of condylar fracture with pattern of third molar impaction.

		Condylar fracture				P-Value*
		No		yes		
		N	%	N	%	
Horizontal	Class I	47	88.7	115	92	0.748
	Class II	4	7.5	6	4.8	
	Class III	2	3.8	4	3.2	
Vertical	Class A	44	83	119	95.2	0.015
	Class B	8	15.1	4	3.2	
	Class C	1	1.9	2	1.6	
Angulation	Mesioangular	25	47.2	120	96	<0.001
	Vertical	26	49.1	5	4	
	Distoangular	2	3.8	0	0	

*chi-square test/Fischer exact test

Discussion

The purpose of this study was to ascertain if impacted lower third molars and condylar fractures are related in patients who had experienced facial trauma. According to our primary

findings, condylar fractures occurred in 70.2% of instances involving mandibular third molar impaction. There was a correlation between the impacted third molar vertical position and angulation with the condylar fracture.

In our study males (78.7%) was much higher in number than females (21.3%). Our inclusion criterion was patients with facial trauma. The higher frequency of facial fracture among males in our study can be attributed to factors like outdoor nature of males and more use of bicycle in males than females. Previous investigations revealed similar results where males were 84.5% and females were 15.5% [9], on the relationship between third molar impaction and condylar fracture. Others also experienced similar outcomes [10].

The presence of impacted lower third molar in mandibular angle area render weakness to the mandible due to lack of significant bone volume in this area [5]. Mandibular angle area is stress concentration area and prone mandible to fracture in this region [11].

Previous studies showed positive association between condylar fracture and impaction of lower third molar. 8 This is due to reduced cross section of mandibular bone in angle region occupied impacted tooth [12].

According to Pell and Gregory's categorization, our data indicated that condylar fractures were more common in class I horizontal impaction; however, these findings were not statistically significant. This demonstrates that the distance between the anterior ramus and the lower second molar's distal end plays little part in condylar fractures. Similar results were found in previous study.⁹ However two earlier studies showed that horizontal pattern of impaction have impact on condylar fracture and condylar fracture is higher in class I than class II pattern of impaction [6,7]. Meisami et al reported biomechanical theory stating that entire resistance of mandible is sustained by cortical bone integrity not by medullary one [13].

Our findings showed that condylar fracture was more common in mesioangular type of impaction. This can be due to less occupation of mandibular bone by this type of angulation and rendering it to fracture more easily on impact. Similar findings were reported in previous studies [5-8].

The current study showed that more vertical position of impacted third molar the higher the chance of condylar fracture. Similar results were found in earlier studies [5-8].

Conclusions

Within the parameters of this investigation, it can be said that the presence of an impacted mandibular third is most frequently linked to condylar fractures. The vertical position and angulation of the impacted third molar with condylar fracture were found to be significantly correlated.

Disclosure statement

No potential conflict of interest was reported by the author.

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