

Frequency of Impacted Third Molar in Mandibular Angle Fractures in Patients Presenting to Ayub Teaching Hospital

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¹ Conception of study

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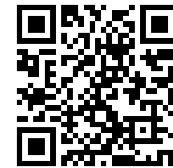
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Abstract

Objective: The objective of the study is to determine the frequency of impacted third molar in mandibular angle fracture.

Materials and Methods: This descriptive cross-sectional study was performed for a period of six months on one hundred and twenty-two patients (122) with mandibular. OPG was done to determine the state of 3rd molar tooth. After approval from the institutional ethical review committee, informed consent was taken from all patients. A proper history and required examination and investigation were undertaken to rule out pathologies associated with 3rd molar impaction. The data was collected using a pro forma including the patient's biographical data in addition to studying variables such as angulation and level of occlusion (using Pell and Gregory classification) along with cause and direction of fracturing force. The collected data was analyzed using Statistical Package for Social Sciences (SPSS) version 21.

Results: The frequency of 3rd molar impaction in fractures of the angle of the mandible was 36.1%. Young age (less than 31 years in this study) was significantly associated with impacted 3rd molar tooth ($p < 0.05$).

Conclusion: Individuals with impacted 3rd molar should be educated about the possibility of the fracture of the mandibular angle so that preventive measures can be adopted.

Keywords: Mandible fractures, 3rd Molar, Impaction, Traumatic dental fractures.

Introduction

The incidence and etiology of maxillofacial trauma vary widely due to social, economic, cultural consequences, awareness of traffic rules, and alcohol consumption.^{1,2} Interpersonal violence, road traffic accidents and stumble and fall are the main causes of maxillofacial trauma with relative percentages of 39.7%, 29.2%, and 27.2%.²

Mandibular fractures are one of the commonest maxillofacial injuries. Fractures take place at various locations.³ The incidence of parasymphysis, condyle, and angle fracture was found to be 41.1%, 29.09%, and 26.72% respectively.⁴

Mandibular angle fracture susceptibility in addition to being associated with the type and direction of impact is also associated with impacted 3rd molar. The frequency of 3rd molar impaction in a study population was found to be 26%.⁵ A study conducted in Margalla Institute of dental sciences reported that impacted 3rd molar increases angle fracture susceptibility 2.3 folds.⁴ In the same study out of 134 fractures 38 (28.35%) angle fractures were reported with impacted third molar.⁶

Angulation and depth of impaction have been associated with an increase or decrease in susceptibility to angle fracture.⁷ A study conducted in India reported the most common angulation to be mesioangular (39%) and the most common level of occlusion to be level B.⁸

Various theories have been put forward to explain the relationship between angle fracture and impacted third molar. A finite element analysis using micro CT in a cadaver mandible showed that the reason for the increased risk of angle fracture is due to stress concentration around the apex of the root of the third molar.⁹ Impacted third molar also possesses various other problems in addition to angle fracture that includes; pain, infection, acute or chronic pericoronitis, periodontal damage to 2nd molar, increased susceptibility of interdental caries, presence of cyst or tumor, external or internal tooth/root resorption and adjacent tooth damage, orthodontic reason, and preparation of orthognathic.¹⁰

The rationale of this study is to determine the frequency of impacted third molar in mandibular angle fractures which would help the surgeon to evaluate the outcome of whether 3rd molar should be extracted early or not.

Materials and Methods

This descriptive cross-sectional study was performed in the Department of Oral and Maxillofacial Surgery, Ayub Teaching Hospital, Abbottabad for a period of six months after the approval of the synopsis Sample size of 122 was calculated using the WHO software for sample size determination for health studies (Confidence level=95%, Anticipated proportion of impacted third molar in mandibular angle fracture=28.35%⁶, Absolute precision=8%). Non-probability Consecutive sampling technique was used. All patients aged between 18-60 years of both genders having mandibular angle fractures were included in the study. The Angulation and level of occlusion of the mandibular third molar were confirmed on radiographs. Impactions associated with other pathologies such as keratocyst, dentigerous cyst, or ameloblastoma and patients who are not willing to contact or follow up were excluded from the study. After approval from the institutional ethical review committee, informed consent was taken from all patients. A proper history and required examination and investigation were undertaken to rule out pathologies associated with 3rd molar impaction. The data was collected using a pro forma including the patient's biographical data in addition to study variables such as angulation and level of occlusion (using Pell and Gregory Classification) along with cause and direction of fracturing force. The collected data was analyzed using Statistical Package for Social Sciences (SPSS) version 21. Frequencies and percentages were calculated for categorical variables like gender, angulation, level of occlusion, and cause of fracture. Mean± SD was calculated for numerical variables like age. Outcome variables were stratified by age and gender. Post-stratification Chi-square test at a 5% significance level was used to know the relationship of 3rd molar with angle fracture. All the data was collected by the researcher himself

Results

In this descriptive cross-sectional study, the mean age was 31.65± 6.25. Males comprised the significant majority of the study population 93; (76.23%); there were 29 (23.77%) females. 69 (56.6%) patients had erupted third molars, 44(36.1%) had impacted third molars and 9 (7.3%) had missing third molars. Of the 44 patients with impacted molars, 30 (24.59% of total study participants) had level C impaction, 8 (6.56% of

total study participants) had level A and 6 (4.92% of total study participants) had level B impaction of the third molar. Interpersonal violence was the most common (42.62%) cause of mandibular fracture in our study, followed by road traffic accidents (32.79%) and falls/slips (24.59%).

The commonest angulation in this study was vertical (54.92%), followed by mesioangular (30.33%), distoangular (13.11%), and horizontal (1.64%). When the outcome variable, i.e., impaction of 3rd molar was stratified by age and gender of study participants, a statistically significant association was seen with age ($p=0.05$), while no statistically significant association was observed with the sex of study participants.

Table 1: Age of study participants

Variable	Mean	Standard Deviation	Mini mum	Maxi mum
Age	31.65	6.25	21.00	42.00

Table 2: Sex of study participants

Sex	Frequency	Percent
Male	93	76.23
Female	29	23.77
Total	122	100.0

Table 3: Cause of mandibular fracture in study population

Cause of fracture	Frequency	Percent
Interpersonal Violence	52	42.62
Road traffic Accidents	40	32.79
Slips and falls	30	24.59
Total	122	100.0

Table 4: Frequency of mandibular third molar angulations in study participants

Angulation of mandible	Frequency	Percent
Vertical Angulation	67	54.92
Mesioangular Angulation	37	30.33
Distoangular Angulation	16	13.11
Horizontal Angulation	2	1.64
Total	122	100.0

Table 5: State of third molar in study participants

State of 3 rd molar	Frequency	Percent
Erupted	69	56.56
Impacted	44	36.07
Missing	9	7.38
Total	122	100.0

Table 6: Frequency of impaction level of 3rd molar in study participants

Types of impaction of 3 rd molar	Frequency	Percent
Level C	30	24.59
Level A	8	6.56
Level B	6	4.92
No Impaction	78	63.93
Total	122	100.0

Table 7: Cross-tabulation of 3rd molar impaction with age of study participants

3 rd Molar Impaction	Age (years)		Total	p-value
	Up to 31 years	More than 31 years		
Yes	25	19	44	0.05
No	30	48	78	
Total	55	67	122	

Table 8: Cross-tabulation of 3rd molar impaction with sex of study participants

3 rd Molar Impaction	Sex		Total	p-value
	Male	Female		
Yes	37	7	44	0.13
No	56	22	78	
Total	93	29	122	

Discussion

In the present study, 3rd molar impaction was found in 44 (36.1%) patients with fractures of the mandibular angle. Interestingly, a study from Karnataka, India reported that 73% of the mandibular 3rd molar teeth were impacted majority having position A, class II, and mesioangular impaction of the third molar.¹⁰ There was male predominance in their study with the mean average age being 29 years similar to that found in the present study (76.23% male, mean age 31.65±6.25), however, the study sample was older than the above-mentioned study. A road traffic accident was the primary cause of fracture in their study (observed more on the left side) while in the current study interpersonal violence was the main reason for mandibular fractures. In the total sample, the mandibular third molar was present in 90% of the cases with angle fracture.¹¹

Interestingly, another study from India reported that angle fractures of the mandible had a statistically significant association (84%) with the impacted or partially erupted third molar tooth ($p=0.000$). They found that out of 104 fractures, angle fracture was

present in 25 (24.038%) cases and among these fractures, 18 (72%) showed the presence of an impacted third molar (10 mesioangularly inclined, 4 class 3, 2 class 2, 2 vertically impacted position C). Partially erupted third molars (vertical inclination) were present in 3(12%) cases.¹²

A study from Tanzania reported the presence of an impacted third molar in more than half (59.7%) of the fractures of mandibular angles.¹³ Out of 268 OPGs, angle fracture was present in about a quarter (25.4%) of them. They found that most of the impacted thirds molars had the mesioangular inclination (44.3%), Class II (72.2%), and Position A (60.8%) with the presence of impacted molars in more than half (59.7%) of the mandibular angle fractures. They concluded that there are about nine times higher chances of mandibular fractures in the presence of an impacted third molar.¹³ Another study reported that the prevalence of impacted mandibular third molars was 26.04%.¹⁴ After analyzing panoramic radiographs and intraoral periapical radiographs of patients. They found 960 patients with the third molars, out of which 250 patients had impacted mandibular third molar. There was males (60.8%) predominance in their study and an almost equal distribution of impacted third molars on both left (45.8%) and right (54.2%) sides. The most common impactions were mesioangular (49.2%) while the least common were transverse in their study (2%).¹⁴

Likewise, a study from Nepal found a strong association between impacted third molar and angle mandibular fractures.¹⁵ In this retrospective study, 300 cases with mandibular angle fractures were enrolled in the present study. Males in the 2nd to 3rd decade were more commonly affected than females. Most fractures were caused by Road Traffic Accidents (60.83%), followed by falls (22.5%), assault (9.16%), and sports activities (5.83%). Mesioangular, Class 1, and Position A were the most common type of impacted teeth. Angle fractures were more common on the left side (65%) than on the right side.¹⁵

Conclusion

The present study concluded that an impacted third molar is associated with the fractures of the angle of the mandible. Individuals with impacted 3rd molar should be educated about the possibility of the fracture of a mandibular angle so that preventive measures can be adopted. Prophylactic removal of impacted third molar can be considered in high-risk

individuals to decrease the possibility of mandibular angle fractures.

This was a single-center-based study with small sample size; hence results should be interpreted with caution. Association of 3rd molar tooth with fractures of nearby regions of mandible was not explored. The preponderance of angle fractures in either side of the jaw/face was not studied.

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