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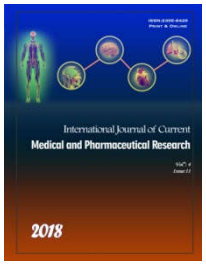

CO-RELATION BETWEEN FRACTURES OF THE MANDIBULAR ANGLE WITH THE PRESENCE OR ABSENCE OF IMPACTED THIRD MOLAR - A RETROSPECTIVE AND RADIOGRAPHIC ANALYSIS

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ABSTRACT

Aims and Objectives:

1. To evaluate the co-relation between fractures of the mandibular angle with the presence or absence of impacted third molars.
2. To assess the influence of the angulation, position and degree of impacted third molars on the incidence of mandibular angle fractures.
3. To determine the necessity of prophylactic removal of impacted mandibular third molars.
4. To correlate the site of fracture with the age, sex and the cause of injury.

Patients and Methods: This retrospective study was performed using medical records and panoramic radiographs as data source from the various centers in the districts of Hassan and Mysore. All the cases which had mandibular angle fracture were assessed for the presence or absence of third molars. If third molar was present it was categorized using Pell and Gregory and Winter's system of classification. A standardized data sheet was formulated and collected data was analyzed through student's t- test and chi-square test.

Results: 300 cases with mandibular angle fracture were enrolled in the present study. Males of 2nd to 3rd decade were 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 left side (65 %) than on the right side.

Interpretation and Conclusion: This retrospective study shows that there is a significant (asignificant to be changed to a significant) co-relation between the mandibular angle fracture and impacted third molars. Mesioangular, Class 1 and Position A type of impacted teeth are most commonly associated with mandibular angle fractures.

INTRODUCTION

Isolated mandibular fractures are frequently located in the angle region. This is because of its relatively prominent position and biomechanical characteristics of the mandible [1].The increased frequency of mandibular angle fractures relative to their locations has been hypothesized to be attributable to the presence of mandibular third molars [3M]. In fact, some investigators have advocated removal of impacted mandibular third molars to prevent mandibular factures [1]. Various authors have suggested that the angle of the mandible forms an area of lowered resistance to fracture [1-20].

The relationship between 3M position and angle fracture risk is still unclear. The literature has consistently shown that the presence of 3M is associated with 2 to3 fold increased risk of angle fractures in patients with fractured mandible. It has been hypothesized that the presence of 3Ms decrease bone mass in the angle region, thereby increasing the risk for angle fractures. If the hypothesis is true, then 3M position should be associated with a variable risk for angle fracture, specifically it would be predicted that deeper impactions are associated with an increased risk of fracture [3].

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However, Tevenpaugh and Dodson's study failed to confirm a relationship between 3M position and the risk of angle fractures [1]. Although Safdar and Meechan reported an association between the position of 3M and the risk of angle fractures, a secondary analysis of their data failed to show a satistically significant association between 3M position and the risk of angle fractures [2].

Aims and Objectives

- To evaluate the co-relation between fractures of the mandibular angle with the presence or absence of impacted 3M.
- To assess the influence of the angulation, position and degree of impacted 3M on the incidence of mandibular angle fractures.
- To correlate the site of fracture with the age, sex and the cause of injury.

PATIENTS AND METHODS

A retrospective, radiographic, observational study was carried out for a period of 3 years from 2011 - 2014. All the patients with diagnosis and or treatment of mandibular angle fracture who reported to the various centres' in the districts of Hassan and Mysore were evaluated for the study.

Inclusion Criteria

1. Patients of above 20 years age with mandibular angle fracture irrespective of associated facial fractures
2. Patients with Orthopantomograph and case records available

A standardized data sheet was prepared and comprehensive evaluation of the mandibular angle fracture was done.

All cases were divided into 2 groups based on the age **(**Table-1).

Group A: - 20-40 years.
Group B: - of 41- 60 years.

Distribution of fractures in various sites, in all the two groups was considered by using OPG. Each group was considered in detail regarding the determination of following features.

1. Presence or absence of 3M
2. Status of mandibular 3M.
3. Etiology of fracture.

Determination of Angle Fracture (Figure - 1)

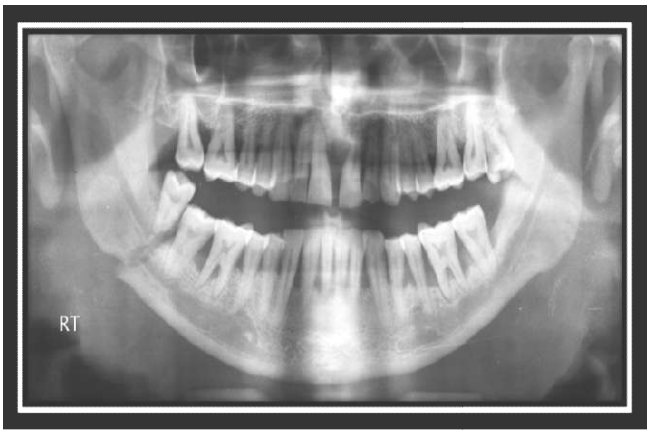

Figure- 1 Panoramic radiograph showing right mandibular angle fracture associated with presence of third molar.

The angle fracture was defined as a fracture located posterior to the second molar and located at any point on the curved form by the junction of the horizontal and the posterior border of the ascending ramus of the mandible (Kelly and Harrigan 1975).

Determination of Status of Third Molar

This was done by using OPGs. The status of 3Ms - whether impacted or erupted, if impacted than the severity of impaction was determined. Winter's classification and Pell & Gregory systems were used to assess the status of 3Ms in the present study.

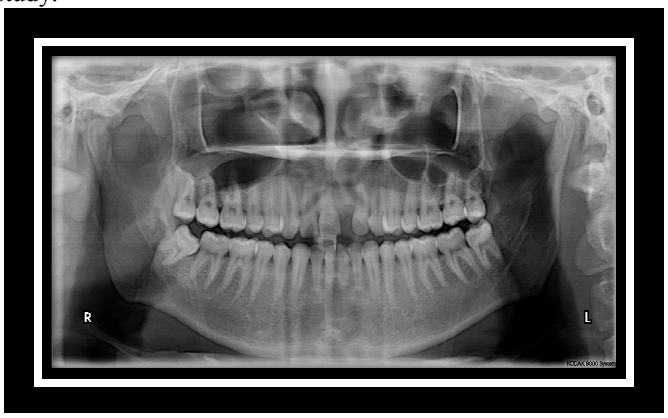

Figure 2 Panoramic radiograph showing right angle fracture associated with mesioangular impacted mandibular third molar.

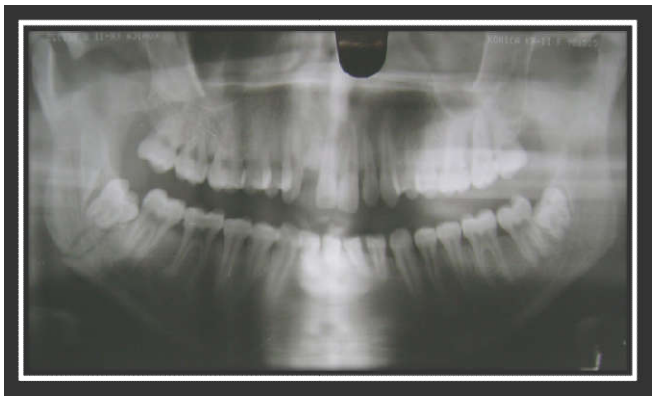

Figure 3 Panoramic radiograph showing bilateral angle and bilateral subcondylar fracture of the mandible.

Procedure

All the selected radiographs were examined and placed on acetate tracing paper and landmarks were traced. Radiographic interpretations were done using a radiographic view box, a radiographic magnifying glass, and all the assessments were carried out in a dark room.

20 radiographs were examined on a daily basis to ensure that the researcher was not subjected to fatigue that could lead to errors in interpretation. All the data collected were tabulated and taken up for statistical analysis, $P<0.05$ was considered statistically significant.

RESULTS

Demographic variables, Mechanism of injury and incidence of site and associated fractures are summarized in table 1.

Incidence of presence and absence of mandibular third molars

Mandibular 3Ms were present in 116 cases (96.6%) and absent in 04 cases (3.33%). Impacted third molars were present in

62.06 % of patients, while 37.93 % of the cases had fully erupted third molar (Table 1). Mesioangular, Class 1, and position A were the most common type of impacted teeth in the present study (Table 2).

Table 1 Distribution of study subjects according to variables

Variables	No. of patient	Percentage (%)
Sample size	**120**	
Sex		
Male	112	93.33
Female	08	6.66
Age		
21 – 40 years	107	89.16
41 – 60 years	13	10.8
Aetiology		
RTA	73	60.83 X^2=117.96 (P<0.05)
Falls	27	22.5
Sports	07	5.83
Assault	11	9.16
others	02	1.66
Presence / Absence of III Molar		
Present	116	96.66
Absent	04	3.33
Status of third molar		
Impacted	72	62.06
Erupted	44	37.93

Table 2 Distribution of impaction based on Pell & Gregory classification

Variable	Parameters	No. of patients n =72	Percentage (%)
Horizontal plane	Class I	39	54.16
	Class II	26	36.11
	Class III	07	9.72
Vertical plane	Position A	52	72.22
	Position B	15	20.83
	Position C	05	6.94
Angulation (Winter's Classification)	Mesioangular	32	44.44%
	Distoangular	13	18.05%
	Vertical	16	22.22
	Horizontal	11	15.27%

Chi squaare (x^2) – 46, P ≤ 0.01 For Angulation

Pell and Gregory classification and mandibular angle fractures

Among all impacted teeth, the highest incidence of angle fracture was observed in class I position (54%) followed by class II position (36%). The analysis of 3M in vertical plane showed that the position A (72.22 %) is most commonly found for impacted third molar followed by position B (20.83 %) (Table 2). Table 2 shows comparison of angulation of teeth in different groups. Mesioangular (44%) followed by Vertical angulation (22%) were the most commonly involved. This indicates that fracture is more frequent in persons having Mesioangular 3M compared to other type (x^2 = 46, degree of freedom (DF) =3, p ≤0.05) (Table 3).

Table 3 Comparison of Fracture Susceptibility According To Presence or Absence of III Molar

Factor	Percentage	Pearsons Chi Square	p- value	Significance
Presence of III Molar	96.66%	209.06	0.001	HS
Absence of III Molar	3.33%			

P<0.05, HS - Highly Significant

Table 2&3 shows degree of third molar impaction using chi square test. Among all impacted teeth, the highest incidence of angle fracture was observed in class I position (54.16 %) followed by class II position (36.11 %) and there was a statistically significant difference between these groups (p<0.05). The analysis of third molar in vertical plane showed that the position A (72.22%) is most commonly found for impacted 3M followed by position B (20.83%) with a significance level of 0.05**.**

Table 4 shows comparison of angulation of teeth in different groups using chi square test**.** This significance of chi - square at probability 0.001% indicates that there was unequal distribution of patient. Maximum patient were of Mesioangular (44%) followed by Vertical angulation (22%). This indicates that fracture is more frequent in persons having Mesioangular 3M compared to other type (x^2 = 46, degree of freedom (DF) =3, p ≤0.05).

Table 4 Comparison of Winters Classification among Patients with Impacted Third Molar

Factor	Percentage	Pearsons Chi Square	p- value	Significance
Vertical	16 (13.79%)	43.825	0.002	HS
Mesioangular	32 (27.58%)			
Horizontal	13 (11.20%)			
Distoangular	11 (9.48%)			
Erupted	44 (37.93%)			

P<0.05, HS – Highly Significant, degree of freedom (DF) =3.

DISCUSSION

Various studies [1-5,12-16] have implicated mandibular 3Ms as a risk factor for angle fracture. Some of them have also showed the higher risk of angle fractures with incompletely erupted mandibular 3Ms [3,13,17]. The present study showed that the frequency of occurrence of angle fracture among patients with impacted mandibular 3M was significantly more 62% (p ≤0.05) when compared with completely erupted mandibular 3Ms 37%.

Previous retrospective analysis [2,12,9] have documented that mandibular angle fracture is common in cases with buried 3M but no references have been made in relation to the size of the tooth. The reason for the higher risk of angle fractures in cases with large third molar is thought to be that the mandibular angle is weakened by increased space occupied by the presence of the large 3M [2,1,15]. By using the dry isolated vervet monkey mandible, Reitzik *et al*. (1978) [6-7] showed that mandibles containing unerupted mandibular third molar fractured at approximately 60% of the force required to fracture the mandible containing erupted third molars and also hypothesised that the level of impaction of mandibular 3M further increases the risk of angle fractures.

Wolujewicz (1980) [5] addressed the issue of the buried teeth within the angular region as a predisposing factor to their weakness and concluded that there was no relationship between the state of eruption of the respective mandibular 3M and the incidence of angle fractures. The reasoning behind this hypothesis is that a mandibular 3M occupies more osseous space and therefore weakens the mandible to outside stresses. Lee and Dodson (2000) [3] showed that mandibles with the most deeply placed 3M (position IIIC) had a 50% decrease in angle fracture risk compared with those with mandibular 3Ms in position I A, and that there was no difference regarding the position in relation to the ramus. A similar tendency was observed by Tevepaugh and co- workers (1995) [1] and Fuselier *et al*. (2002) [16]. However, Ma'aita and Alwrikat (2000) [13] showed a higher risk of fracture from deeply

impacted third molar both in the ramus and occlusally. In the present study, the highest fracture incidence was observed in the Class I group (54.16%) (sufficient space available horizontally for eruption of 3M), and in Position B group (72.22%). According to the different results obtained in each one of those studies, it seems that these classifications of positions of the mandibular 3M do not clearly show the biomechanical weakness of the mandibular angle to injury forces. It was found that the deepest impaction position (IIIC) was associated with the lowest risk of an angle fracture. Other biomechanical hypotheses are needed to explain why mandibular 3M presence and position affect the risk of angle fracture. For example, having an intact superior cortical border may be more important than the amount of osseous space occupied by mandibular 3M.

The relevance of various angulations of mandibular 3M to the risk of an angle fracture was only demonstrated in the study of Ma'aita and Alwrikat (2000) [13]. They showed a higher risk of angle fractures in the Vertical and Distoangular mandibular 3M. In the present study, a raised risk of fractures associated with non impacted 3M (34%, $p<0.001$) was also observed, and a greater incidence of fractures was found in Mesioangular position. As the root of 3M in this type of impaction is directed towards the angle of the mandible, the third molars may act as a wedge splitting the mandibular angle, by which the injury force is redirected toward the mandibular ramus and angle. Further biomechanical analyses concerning these forces and the effect of the angulation of mandibular third molar are needed.

The result of this study shows that the peak incidence of angle fractures is found in patients between the ages of 20 and 40 years and is in agreement with the results reported in the literature **[**17]. Given the fact that uprighting of impacted third molars decreases significantly with age, especially after the age of 20 years, and that postoperative morbidity significantly increases with age, it is quite reasonable to suggest that prophylactic extractions should be done during the second and third decades of life.

Some studies [1,18] recommended removal of third molar to prevent the risk of the possible angle fracture especially for younger sportsmen. In present study also all cases of angle fracture (6 %) due to sports related injury were found in younger age group patients, which is in agreement with other studies.

SUMMARY AND CONCLUSION

This retrospective study has shown that there is statistically significant co-relation between the mandibular angle fractures and impacted 3M. Mesioanangular type of impactions with position A and class 1 were commonly associated with mandibular angle fractures. Interestingly none of the cases had associated mandibular condylar fractures except three cases. This also led us to a thought that is there any co-relation between the mandibular condyle fractures and impacted 3M. Does absence of 3M predispose mandible to condylar fractures.

Further biomechanical studies are necessary to quantify one of the hypothesis i,e whether the impacted third molar disrupts the cortical bridge of the superior border; exploiting an inherent weakness in the mandibular angle or if impacted third molars increase the risk of an angle fracture by creating a relative osseous defect in the angle.

It can also be concluded that the prophylactic removal of impacted third molar can significantly diminish the possibility of mandibular angle fractures and should be considered in young persons involved in contact sports or other activities that put individuals at high risk for angle fracture.

References

1. Tevepaugh DB, Dodson TB. Are mandibular third molars a risk of factor for angle fractures? A retrospective cohort study. *J Oral Maxillofac Surg*. 1995; 53:646-649.
2. Safdar N, Meechan JG. Relationship between fractures of the mandibular angle and the presence and state of eruption of the lower third molar. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1995; 79:680-684.
3. Joyce T. Lee, Thomas B. Dodson. The effect of mandibular third molar presence and position on the risk of an angle fractures. *J of Maxillofac & Oral Surg* 58:2000: 394-398.
4. Aitasalo K, Lehtinen R, Oksala E. An Orthopantomographic Study of Prevalence of Impacted Teeth. *Int. J Oral Surg* 1972; 1: 117-20.
5. Wolujewicz MA. Fractures of the mandible involving the impacted third molar tooth: an analysis of 47 cases. *Br J Oral Surg*. 1980; 18:125-131.
6. Reitzek M. Are mandibular third molar a risk factor for angle fractures? A retrospective cohort study. *J Oral Maxillofac Surg* 1995; 53:649 - 50.
7. Reitzik M, Lownie JF, Cleaton-Jones P, Austin J. Experimental fractures of monkey mandibles. *Int. J Oral Surg*. 1978; 7:100-103.
8. Dodson Thomas B. Impacted third molar and mandibular angle fracture .Oral Surgery, Oral Medicine, Oral Pathology, Oral Radilogy & E ndodontics. 1996;81 (3) :264
9. Tams J. *et al*. A three dimensional study of bending and torsion movements for different fracture sites in the mandible. An in-vitro study. *Int. J Oral Maxillofac Surg* 1997; 26(5): 383-388.
10. Gracia.G. A, Sampedro.G.F, Rey .G.J, Vila .G.P, Martin. S.M. Pell -Gregory claasification is unreliable as a predictor of difficulty in extracting impacted lower third molars.2000; 38:585-587.
11. Ugboko VI, Oginni FO, Owotade FJ. An investigation into the relationship between mandibular third molars and angle fracture in Nigerians. *Br J Oral Maxillofac Surg*. 2000; 38:427-429.
12. Ma'aita J, Alwrikat A. Is the mandibular third molar a risk factor for mandibular angle fracture? Oral Surg, Oral Med, Oral Path, Oral Rad and Endo. 2000; 89:143-146.
13. Gracia G, Sampedro FG, Rey JG, Vila PG, Martin MS. Pell- Gregory classification is unreliable as a predictor of difficulty in extracting impacted lower third molars. *Br J Oral Maxillofac Surg*. 2000; 38:585-587.
14. Mehmet Yaltirik, Cem R. BT. Tanyel, B.Lent. A Comparative Study of the Clinical Aspects and Relationship Between Fractures of Mandibular Angle and the Presence of A Lower Third Molar Turk *J Med Sci* 32 (2002) 391-395.

15. Fuselier JC, Ellis EE, Dodson TB. Do mandibular third molars alter the risk of angle fracture*? J Oral Maxillofac Surg*. 2002; 60:514-518.
16. Edward Ellis III. Treatment methods for fracture of mandibular angle. *Int J Oral Maxillfac Surg*. 1999; 28(4), 243-252.
17. Meisami T, Sojat A, Sandor GK, Lawrence HP, Clokie CM. Impacted third molars & risk for angle fracture. *Int J Oral Maxillfac Surg*: 2002; 31(2):140-4.
18. David R.Halmos, Edward Ellis III, Thomas B. Dodson. Mandibular Third molars and Angle fractures. *J Oral Maxillofac Surg* 2004; 62: 1076-1081.
19. S. J.Zhu *et al*. Relationship between the presence of unerupted mandibular third molars and fractures of the mandibular condyle. *Int J Oral Maxillofac Surg* 2005; 34:382-385.
20. D.H.Duan, Y. Zhang. Does the presence of mandibular third molars increase the risk of angle fracture and simultaneously decrease the risk of condylar fracture? *Int J of Maxillofac & Oral Surg* 2008:37:25-28.

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