ORIGINAL ARTICLE

FREQUENCY OF UNERUPTED MANDIBULAR THIRD MOLAR IN MANDIBULAR ANGLE FRACTURES

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Background: Fractures of the mandibular angle are common and comprise 31% of all mandibular fractures. Multiple recent studies report a 2–3 fold increased risk for mandibular angle fractures when un-erupted mandibular third molars are present. The objective of this study was to assess the frequency of un-erupted mandibular third molar in mandibular angle fractures. **Methods:** This cross-sectional study was conducted at the Department of Oral and Maxillofacial Surgery, Ayub Medical College, Abbottabad from April to October 2009. One hundred and two patients were included both from the outdoor and ward on consecutive non-probability sampling base. Data were recorded on a structured Performa and analysed using SPSS-16. **Results:** A hemi-mandible containing un-erupted mandibular third molar was seen to have a 1.41 times the risk of mandibular angle fracture then a hemi-mandible containing an erupted mandibular third molar. **Conclusion:** The presence of un-erupted mandibular third molar is associated with an increased risk for mandibular angle fracture.

Keywords: Maxillofacial trauma, mandibular third molar, mandibular angle fracture

INTRODUCTION

Trauma to facial region frequently results in injuries to soft tissues, teeth, and major skeletal components of the face including mandible, maxilla, zygoma, naso-orbito-ethmoidal complex and supra-orbital structures.[1] Mandible is the commonest of the facial bones to fractures.[2,3] This may occur alone or in association with other facial fractures.[4] Despite the fact that mandible is the heaviest and strongest facial bone, it is prone to fractures for some specific reasons like it is an open arch, it is located in the lower portion of the face, mechanism of hyperextension and hyper-flexion of the head in accidents and due to the fact that it gets atrophied with age.[5] This is due to its relative prominent positioning in relation to common injuring forces.[6]

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.[7] As a result its fractures are never left unnoticed because it is very painful during mastication, swallowing, phonation and respiratory movements.[5] Multiple factors such as the size, direction, nature, and surface area of the impacting force are known to influence the pattern of mandibular fractures. Other factors that are thought to be responsible include the presence of soft tissue bulk and biomechanical characteristics of the mandible, such as bone density, mass, and normal or pathologic anatomic structures creating weak areas within the bone.[8,9]

Fractures of the mandibular angle are common and comprise 31% of all mandibular fractures.[10] Recent studies show that the risk of mandibular angle fracture is increased in the presence of mandibular third molars especially when these were incompletely erupted.[3,6,8,11] Multiple studies report a 2–3 fold increased risk for mandibular angle fractures when un-erupted mandibular third molars are present.[9,11,12] It has been hypothesised that patients with un-erupted mandibular third molars were more likely to have an angle fracture than those patients without un-erupted mandibular third because the mandibular angle region that contains an un-erupted mandibular third molars has a decreased cross-sectional area of bone.[6,9,13,14]

The objective of this study was to assess the frequency of un-erupted mandibular third molar in mandibular angle fractures in our setup.

MATERIAL AND METHODS

This cross-sectional study was conducted at Department of Oral and Maxillofacial Surgery, Ayub Medical College, Abbottabad from April to October 2009. One hundred and two patients were included both from the outdoor and ward on consecutive non-probability sampling base. Cases of mandibular angle fractures diagnosed clinically and radiographically (on orthopentomogram, OPG), both genders, any age, who consented to participate in the study were included. Confounding variables like iatrogenic and pathological fractures, edentulous patients and patients with congenitally missing and extracted mandibular third molars were excluded. Fracture side was diagnosed by history, examination and OPG. Status of mandibular third molar (erupted or un-erupted) on the side of fracture was evaluated through clinical and radiographical examination (on peri-apical and OPG). Data were analysed using SPSS-16.

RESULTS

A total of 102 patients with 116 mandibular angle fractures were included in the study. Their mean age was 29.85±11.21 years with a range of 16–70 years. There were 15 females with mean age of 28.73±9.706 years, and 87 males with a mean age of 30.04±11.49 years.

Out of the total, 25 (24.5%) patients were below the age of 20 years, 64 (62.74%) patients were between the age of 21 and 40 years. Twelve (11.76%) patients were between the age 41 and 60 years and 1 (1%) patient was above the age of 60 years (Table-1).

Out of the 116 fractured hemi-mandibles in 102 patients (49 left angle fractured patients, 39 right angle fractured patients and 14 bilateral angle fractured patients each having 2 fractured hemi-mandibles), 68 hemi-mandibles were having an un-erupted mandibular third molar while 48 hemi-mandibles were having erupted mandibular third molar. Thus a hemi-mandible containing an un-erupted mandibular third molar was seen to have a 1.41 times the risk of mandibular angle fracture than a hemi-mandible containing an erupted mandibular third molar (Table-2).

Table-1: Age-wise distribution of patients having mandibular angle fracture (n=102)

Age Group	Number	%
≤20 years	25	24.5
21–40	64	62.74
41–60	12	11.76
>60	1	1.0

Table-2: Distribution of mandibular angle fracture according to the status of eruption of mandibular third molar

Side of fracture		Un-erupted	Erupted	Total Hemi-mandibles
Left		23	26	49
Right		26	13	39
Bilateral	**Left**	7	7	14
	Right	12	2	14
Total		68	48	116

DISCUSSION

An overwhelming clinical evidence exists in the literature supporting the fact that patients having impacted lower third molars are more likely to have an angle fracture than those patients without impacted mandibular third molars.[15] One mechanism that has been hypothesized, by which third molars tends to increase the risk of angle fractures, is by occupying osseous space and thereby weakening the angle region by decreasing the cross-sectional area of the bone.[13]

In our study, out of the 116 fractured hemi-mandibles in 102 patients, 68 hemi-mandibles were having an un-erupted mandibular third molar while 48 hemi-mandibles were having an erupted mandibular third molar. Thus a hemi-mandible containing an un-erupted mandibular third molar was seen to have a 1.41 times the risk of mandibular angle fractures than a hemi-mandible containing an erupted mandibular third molar. Metin *et al*[16] reported that patients having mandibular fractures and impacted or un-erupted teeth had nearly a 1.73 fold more risk of a mandibular fracture compared with patients not having un-erupted or impacted teeth. Ugboko VI *et al*[17] showed that in patients having an un-erupted mandibular third molar, a 2.16 times more risk of mandibular angle fracture than patients having an erupted mandibular third molar exists. Halmos *et al*[18] did a large multi-centre study from three different major hospitals and found out a 2.8 fold increased risk for an angle fracture to occur in hemi-mandibles having an un-erupted mandibular third molar. Their study was in continuity of the earlier studies of Lee *et al*[9] and Fuselier *et al*[19] with a larger data. Aslam A[20] in his study did a cross-tabulation between the presence or absence of un-erupted mandibular third molar and the presence or absence of angle fractures. In 25.4% of the hemi-mandibles containing an un-erupted mandibular third molar, an angle fracture was seen to be present, while 11.1% of the hemi-mandibles without an un-erupted mandibular third molar were observed to have an angle fracture ($p<0.05$). Thus, the hemi-mandibles containing an un-erupted mandibular third molar were seen to have a 2.3 times increased risk of having an angle fracture.

Hanson *et al*[13] did a meta-analysis of six different selected studies with certain criteria on the association of third molars with mandibular angle fractures. The total number of patients was 3,002, out of which 835 had an angle fracture (cases) and 2,167 with some other fracture of the mandible (controls). The crude relative risk estimates in the 6 studies ranged from 1.2–12.7. The summary relative risk ratio across all 6 studies was 2.8 (95% CI =2.3–3.5).

Yamada *et al*[21] carried out a study on the association of mandibular fractures with presence and various position of un-erupted mandibular third molar. They divided their study population into two groups: fractures sustained during sports and the other containing fractures sustained due to other causes. They found that mandibular third molars were present in 26 patients with sports-related fractures and 19 of them had mandibular angle fractures. In the non-sports group, third molars were present in 54 patients and 26 of them had mandibular angle fractures. Whereas 19 out of 26 patients with mandibular third molars in the sports group had angle fractures, only 26 out of 54 patients in the non-sports group had such fractures. The incidence of angle fracture was significantly higher in the sports group than in the other group ($p<0.05$). Their sporting population was involved in hard contact sports, such as rugby and karate. They suggested that sports-related mandibular angle fracture tended to occur more readily in individuals having mandibular third molars. Schwimmer *et al*[22] had

suggested that dental screening and early removal of impacted third molars can reduce the risk of mandibular fractures in young adults specially participating in contact sports. Similarly, Tevepaugh and Dodson[14] also hypothesized that persons involved in contact sports may benefit from removal of mandibular third molars to decrease the risk of mandibular angle fractures. Yamada *et al*[21] also suggested a thorough examination of mandibular third molars in athletes playing contact sports in order to decrease the danger of mandibular angle fracture in them.

CONCLUSION

The presence of un-erupted mandibular third molar is associated with an increased risk for mandibular angle fracture. A hemi-mandible containing an un-erupted mandibular third molar has 1.41 times risk of mandibular angle fracture than a hemi-mandible containing an erupted mandibular third molar.

RECOMMENDATIONS

People involved in high mandibular fracture risk should be aware of the presence of un-erupted mandibular third molar, and pay special attention to preventing the injury forces such as by using a mouth guard or protectors.

REFERENCES

1. Ochs MW, Tucker MR. Management of facial fractures. In: Peterson LJ, Ellis E, Hupp JR, Tucker MR (Eds). Contemporary Oral and Maxillofacial Surgery. USA: Mosby; 2003.p. 527–58.
2. Banks P. Killey's fractures of the mandible. 4th ed. London: Wright; 1991.
3. Yaltrik M, Tanyel CR, Katiboglu B. 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 2002;32:391–5.
4. Abbas I, Ali K, Mirza YB. Spectrum of mandibular fractures at a tertiary care dental hospital in Lahore. J Ayub Med Coll Abottabad 2003;15(2):12–4.
5. Patrocinio LG, Patrocinio JA, Borba BHC, Bonatti BDS, Pinto LF, Vieira JV, *et al*. Analysis of 293 patients treated in the hospital or clinics. Federal University of Uberlandia. Braz J Otorhinolaryngol 2005;71:560–5.
6. Safdar N, Meechan JG. Relationship between fractures of the mandibular angle and the presence and the state of eruption of lower third molar. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1995;79:680–4.
7. Busuito MJ, Smith DJ Jr, Robonson MC. Mandibular fractures in an urban trauma center. J Trauma 1986;26:826–9.
8. Meisami T, Sojat A, Sandor GKB, Lawrence HP, Cloike CML. Impacted third molars and risk of angle fractures. Int J Oral Maxillofac Surg 2002;31(2):140–4.
9. Lee JT, Dodson TB. The effect of mandibular third molar presence and position on the risk of an angle fracture. J Oral Maxillofac Surg 2000;58:394–8.
10. Abubaker AO, Benson KJ, Mcdonald I, Ziccardi VB. Mandibular trauma. In: Abubaker AO, Benson KJ, (Eds). Oral and Maxillofacial Surgery Secrets. St. Louis: Mosby; 2007;262–9.
11. Ma'aita J, Alwrikat A. Is the mandibular third molar a risk factor for mandibular angle fracture? Oral Surg Oral Med Oral Patho Oral Radio Endod 2000;89:143–6.
12. Iida S, Hassfeld S, Reuther T, Nomura K, Mühling J. Relationship between the risk of mandibular angle fractures and the status of incompletely erupted mandibular third molar. J Craniomaxillofac Surg 2005;33:158–63.
13. Hanson BP, Cummings P, Rivara FP, John MT. The association of third molars with mandibular angle fractures: a meta-analysis. J Can Dent Assoc 2004;70:39–43.
14. Tevepaugh DB, Dodson TB. Are mandibular third molars a risk factor for angle fractures? J Oral Maxillofac Surg 1995;53:646–9.
15. Rutges JPHJ, Kruizinga EHW, Rosenberg A, Koole R. Functional results after conservative treatment of fractures of the mandibular condyle. Br J Oral Maxillofac Surg 2007;45:30–4.
16. Metin M, Sener I, Tek M. Impacted teeth and mandibular fracture. Eur J Dent 2007;1(1):18–20.
17. Ugboko VI, Oginni FO, Owotade FJ. An investigation into the relationship between mandibular third molars and angle fractures in Nigerians. Br J Oral Maxillofac Surg 2000;38:427–9.
18. Halmos DR, Ellis E III, Dodson TB. Mandibular third molars and angle fractures. J Oral Maxillofac Surg 2004;62:1076–81.
19. Fuselier JC, Ellis E III, Dodson TB. Do mandibular third molars alter the risk of angle fracture? J Oral Maxillofac Surg 2002;60:514–8.
20. Aslam A. Relationship between the risk of mandibular angle fractures and status of mandibular third molars. [Dissertation]. College of Physicians and Surgeons Pakistan;2007.
21. Yamada T, Sawaki Y, Tohnai I, Takeuchi M, Ueda M. A study of sports-related mandibular angle fracture: relation to the position of the third molars. Scand J Med Sci Sports 1998;8:116–9.
22. Schwimmer A, Stern R, Kritchman D. Impacted third molars: A contributing factor in mandibular fractures in contact sports. Am J Sports Med 1983;11:262–6.

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