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A Retrospective Study of 2,536 Mandibular Fractures in Different Ages Over a Period of 9-Year

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Abstract

Aims and Objectives: This study aims to evaluate the incidence and patterns of mandibular fractures in patients

Material and Methods: The patient records and radiographs for mandibular fractures were retrieved during the 9 year from June 2009 to April 2017. 2536 patients were assessed on the basis of age, gender, anatomic site and side of fractures.

Results: During the period of January 2009 to December 2017, 2536 patients of mandibular fractures were reported. Out of the total sample of 2536 patients, 2132 (84.0%) were males and 404 (15.9%) were females. Majority were in the age group of 21 - 40 years (n = 1064) 41.95% followed by 11 - 20 years (n = 772) 30.4%. The parasymphysis was most frequently involved site with (n = 836) 32.9% of the total mandibular fractures. Chi square test was used to measure the potential association between different categorical variables.

Conclusion: We have concluded that mandibular fractures occur in people of all ages. The highest incidence of mandibular fractures was observed in 2nd and 3rd decade of life and that the Parasymphysis was the most commonly involved site.

Keywords: *Mandibular Fractures; Anatomical Sites; Epidemiology*

Introduction

The maxillofacial region is one of the most commonly fractured sites in the human body. The management of these fractures is a challenge requiring skill and experience. In the repair of maxillofacial trauma, functional and aesthetic reconstruction is a prime concern [1]. Injuries of the maxillofacial area can be psychologically disturbing for patients with a functional impact [3]. Although the mandible is the largest and strongest facial bone, it is fractured in up to three-quarters of patients with maxillofacial fractures [2,4]. According to several studies, they account for 15.5 - 59% of all facial fractures [3]. Mandibular fractures may occur alone or in combination with other facial and skeletal bones. The etiology of mandibular fractures can be due to road traffic accidents (RTAs), accidental falls, industrial mishaps, assaults, sports injuries and gun-shoot injuries [5]. Patterns and frequency of mandibular fracture vary according to the cultural and social factors that affect the study population in contrast to different trends which have been reported in the developing world [6-8]. Different studies around the world have shown that assaults are the predominant cause of maxillofacial fractures in developed countries, while in developing countries, motor vehicle accidents (MVAs) are the most common cause [9,10]. Considering the literature and little published research work on epidemiology of mandibular fractures in Pakistan the current study was designed to unveil the epidemiology of the mandibular fractures which is important in control and prevention of such fractures.

Aim of the Study

This article aims to analyze retrospectively the frequency of age and gender distribution, etiology, and anatomic distribution of mandibular fractures among patients of different ages who visited Mayo Hospital, Lahore from all over Punjab in a period of 9-year.

Materials and Methods

The present study was conducted in Punjab province during the period of 9 years (January 2009 to December 2017). The data of 2,536 cases were taken from Mayo hospitals, Lahore in a standardized and systematic pattern. A retrospective study was conducted to pile up the descriptive data regarding mandibular fractures in all age groups by using predesigned epidemiological questionnaire with informed consent. The patients with primary mandibular fractures were included in this study, either underwent surgery or treatment in the department of Oral and maxillofacial surgery, Mayo hospital, King Edward medical university Lahore.

A convenient hospital based sampling technique was used. Only mandibular fractures patients confirmed by radiographs, were included irrespective of age, race, gender, ethnic background and geography.

Radiographic examinations were used to confirm the site of fracture. Fractures of mandible were described by using the classification of Dingman and Natvig [11].

The data was collected on a predesigned questionnaire. Data was entered into excel spread sheet. The data was analyzed through SPSS version 23. Chi square test was used to measure the potential association between different categorical variables studied at a significance level of 95% confidence interval. Linear logistic regression model was used to identify the relationship and co-linearity of different variables with respect to the mandibular fractures.

Results

During the period of January 2009 to December 2017, 2536 patients of mandibular fractures were reported. Out of the total sample of 2536 patients, 2132 (84.0%) were males and 404 (15.9%) were females (Table 1). The difference between both groups was found to be statistically significant ($P < 0.05$). Majority were in the age group of 21 - 40 years (n = 1064) 41.95% followed by 11 - 20 years (n = 772) 30.4%. This shows that the young adults are mostly affected (Table 2).

Sr #	Age groups	Gender distribution		Total
		Male	Female	
1	1 - 5 years	75	46	121
2	6 - 10 years	153	79	232
3	11 - 20 years	673	99	772
4	21 - 40 years	940	124	1064
5	More than 40 years	291	56	347
Total		2132	404	2536

Table 1: *Gender distribution according to age groups in mandibular fractures.*

Sr #	Age groups	Year of Study									Total
		2009	2010	2011	2012	2013	2014	2015	2016	2017	
1	1 - 5 years	1	20	24	8	14	18	17	10	9	121
2	6 - 10 years	1	30	36	24	26	37	22	20	36	232
3	11 - 20 years	5	91	90	87	78	71	106	79	165	772
4	21 - 40 years	12	134	134	115	117	101	109	79	165	1064
5	More than 40 years	3	35	36	33	44	42	34	40	80	347
	Total	22	310	320	267	279	269	288	280	501	2536

Table 2: *Frequency of mandibular fractures.*

The parasymphysis was most frequently involved site with (n = 836) 32.9% of the total mandibular fractures. This was followed by body (n = 708) 27.9%, angle (n = 487) 19.2%, Sub-condylar fractures accounted for (n = 262) 10.3%, Symphysis for (n = 152) 5.9%, and the remaining 3.58% was involving the condyle of mandible (n = 91) of the mandible (Table 3). With regard to the frequency of distribution of injuries by the side of the fractured bone, right side of mandible appeared to be the side on which maximum injuries were sustained (n = 912) 35.9%, followed by left side of fractured bone (n = 625) 24.6%. Remaining (n = 999) 39.3% were bilaterally involved (Table 4). Road Traffic Accident (RTA) was the most common cause of mandibular fracture (Table 5).

Sr #	Age groups	Sites of Mandibular Fractures						
		Symphysis	Para symphysis	Body	Condyle	Sub-condyle	Angle of mandible	Total
1	1 - 5 years	9	48	24	5	22	13	121
2	6 - 10 years	7	71	69	23	29	33	232
3	11 - 20 years	71	197	208	28	63	205	772
4	21 - 40 years	54	359	334	20	87	210	1064
5	More than 40 years	11	161	73	15	61	26	347
Total		152	836	708	91	262	487	2536

Table 3: *Sites of Mandibular Fractures in different age groups.*

Sr #	Age Groups	Areas of fracture sites			Total
		Right	Left	Bilateral	
1	1 - 5 years	41	44	36	121
2	6 - 10 years	87	53	92	232
3	11 - 20 years	267	183	322	772
4	21 - 40 years	387	266	411	1064
5	40 - 75 years	130	79	138	347
	Total	912	625	999	2536

Table 4: *Areas of fracture sites in different age groups.*

Sr #	Age Groups	Causes of mandibular fracture					Total
		RTA	Falls	Assaults	Sports Injuries	Gunshot Injuries	
1	1 - 5 years	28	79	5	8	1	121
2	6 - 10 years	94	82	40	12	4	232
3	11 - 20 years	269	344	129	19	11	772
4	21 - 40 years	774	159	49	23	59	1064
5	40 - 75 years	167	84	61	9	26	347
	Total	1332	748	284	71	101	2536

Table 5: *Causes of mandibular fractures in different ages.*

Discussion

Mandible after nasal bone is the second most commonly fractured bone, despite the fact of being largest and strongest bone of facial skeleton [11]. Mandibular fractures can involve only a single site or can often involve multiple anatomic sites simultaneously. There is limited knowledge about specific types and patterns of mandibular fractures in Pakistani literature. This study attempts to delineate different expected patterns including their demographic feature and mechanism of their injury.

The incidence of mandibular fractures varies with geographic region, socioeconomic condition, and cultural characteristics [12]. Various studies on the incidence of mandibular fractures in different countries have been studied. The sheer pace of modern life with high-speed travel as well as an increasingly violent and intolerant society has made facial trauma a form of social disease from which no one is immune [13,14].

In the present study, Males were predominantly affected with 84.0% (2132/2536), which is in agreement with other studies due to more involvement in outdoor activities. The predominance of male gender is because of the fact that this group make up the most active group in society [15]. The majority of the reports published during the new millennium have shown male preponderance ranging from 68% to 91.7%. Our study is in accordance with other published data [16]. Most frequent cause of fracture mandible in this study was RTA

with 52.5% (1332/2536) and fall from height is the second common etiologic factor accounting for 29.4% (748/2536) of the cases. In our study the incidence of mandibular fractures found that majority of the reported cases were caused by RTA between the age group 21 - 40 years (58.10%) that were 1064/2536 followed by 2nd decade (20.1%) that included 772/2536, 40 - 75 years (12.5%) included 347/2536, 6 - 10 years (7.5%) included 232 patients out of total 2536 and 1 - 5 years (2.1%) that included 121 children patients in this age group.

The incidence and anatomic distribution of mandibular fractures are widely variable [17]. Many studies reported Symphysis [18] as the most frequently affected site whereas, others reported this to be mandibular body [12,19], angle [20] and condyle [21]. In the present study, the parasymphysis was the most commonly fractured site in mandible that included a percentage of 836/2536 (33%) because of the presence of permanent tooth buds in the pediatric mandible making higher tooth to bone ratio, while in adults canine root making this bone anatomically weak in this area that made it leading fracture site. Among multiple fracture site we observed that the parasymphysis was commonly associated with angle 487/2536 (19%), while in the present study body of mandible 708/2536 (28%), which is in accordance with the study by Dongas and Hall [19] and contrary to Ogundare., *et al.* [20] have reported body with angle as the most common combination. After that condyle was mostly fractured site 91/2536 (3.5%). Subcondyle in 260/2536 (10%) patients were fractured. At the last symphysis fracture occurrence was 162/2536 (6%) in our study.

Frequency of distribution of injuries by the side of the fractured bone, mandible appeared to be the side on which maximum injuries were sustained 999 (39.39%) is bilateral side followed by right side of fractured bone 912 (35.9%). Remaining 625 (24.6%) were involved left side in our study.

In this present study the bilateral mandibular fractures are most commonly encountered as right side included 912/2536 bilateral 999/2536 and left 625/2536. That showed bilateral mandibular fractures are more common. The prevalence recorded in this study represents only in cases received by general hospitals in Lahore coming from all over the Punjab. However these figures give an idea of their frequency of their occurrence that is increasing day by day.

The occurrence of mandibular injuries were more prevalent in the age groups between 20 - 40 years of age, that was collaborating with other literatures findings with a study that showed 20 - 29 years of age is most commonly affecting age in mandibular fracture [22]. Facial fractures are most commonly involving the mandible tends to increase with the age as it was declared by this present study. In comparison to other age groups e.g. 1 - 5 and 6 - 10 the number of cases was increased gradually which reaches a peak value in 21 - 40 age group for mandibular and other facial fractures. Lower incidence of mandibular fractures among children were might be explained by the protection taken by family, that leads to less injury exposures occurred by accidents. But in older aged people, social habits changed as the child grow by sports participations at schools and other activities that involve bodily contacts, thereby going to increase in number of mandibular fractures [23].

The mandible was commonly affected facial bone as showed by various studies [24]. Mandibular fractures were mainly related to motorcycle accidents as taken in this study RTA that is supported by other studies [25]. 52% were only contributed by RTA, 29.5% were by falls, 11.12% were by assaults, 2.7% were due to sports injuries, and 3.9% from gunshot injuries. Evolving patterns of fractures in urban trauma centers is showing an increase of interpersonal violence as a major factor [26].

Mandibular injuries have found to be common in people who had fallen from heights as in our study 29.5% as compared to other mandibular medical disorders that was also supported by another study [27].

Conclusion

We have concluded that mandibular fractures occur in people of all ages. The highest incidence of mandibular fractures was observed in 2nd and 3rd decade of life and that the Parasymphysis was the most commonly involved site. Mandibular injuries were sustained bilaterally.

Recommendations

Maxillofacial trauma may coexist with other injuries and conversely injuries elsewhere may exist in patients with maxillofacial trauma. So it is necessary for the maxillofacial surgeon to be a part of multidisciplinary trauma team. Furthermore, the results of our data will be helpful for the government agencies and health care professionals towards planning future programmes on prevention.

Bibliography

1. Vyas A., *et al*. "A study of mandibular fractures over a 5-year period of time: A retrospective study". *Contemporary Clinical Dentistry* 5.4 (2014): 452-455.

2. Chhabra S., *et al*. "Maxillofacial injuries due to animal bites". *Journal of Maxillofacial and Oral Surgery* 114.2 (2015): 142-153.

3. Li R., *et al*. "Analysis of 126 hospitalized elder maxillofacial trauma victims in central China". *Medicina Oral, Patologia Oral Y Cirugia Bucal* 20.4 (2015): e464-e470.

4. Amarista Rojas FJ., *et al*. "The epidemiology of mandibular fractures in Caracas, Venezuela: incidence and its combination patterns". *Dental Traumatology* 33.6 (2017): 427-432.

5. Akhtar MU., *et al*. "Mandibular fractures in different pediatric age groups and their current management modalities". *Annals of King Edward Medical University* 12.1 (2016).

6. Adeyemo WL., *et al*. "Management of mandibular fractures in a developing country: a review of 314 cases from two urban centers in Nigeria". *World Journal of Surgery* 32.12 (2008): 2631-2635.

7. Chrcanovic BR., *et al*. "1,454 mandibular fractures: a 3-year study in a hospital in Belo Horizonte, Brazil". *Journal of Cranio-Maxillo-Facial Surgery* 40.2 (2012): 116-123.

8. De Matos FP., *et al*. "A retrospective study of mandibular fracture in a 40-month period". *International Journal of Oral and Maxillofacial Surgery* 39.1 (2010): 10-15.

9. Lin FY., *et al*. "Mandibular Fracture Patterns at a Medical Center in Central Taiwan: A 3-year Epidemiological Review". *Medicine* 96.51 (2017): e9333.

10. King RE., *et al*. "Mandible fracture patterns: a suburban trauma center experience". *American Journal of Otolaryngology* 25.5 (2004): 301-307.

11. Adebayo ET., *et al*. "Analysis of the pattern of maxillofacial fractures in Kaduna, Nigeria". *British Journal of Oral and Maxillofacial Surgery* 41.6 (2003): 396-400.

12. Dingman RO and Natvig P. "Surgery of facial fractures". Philadelphia, WB: Saunders (1969): 11-42.

13. Mah DH., *et al*. "Relationship between mandibular condyle and angle fractures and the presence of mandibular third molars". *Journal of the Korean Association of Oral and Maxillofacial Surgeons* 41.1 (2015): 3-10.

14. Natu SS., *et al*. "An epidemiological study on pattern and incidence of mandibular fractures". *Plastic Surgery International* (2012): 834364.

15. Kadkhodaie MH. "Three-year review of facial fractures at a teaching hospital in northern Iran". *British Journal of Oral and Maxillofacial Surgery* 44.3 (2006): 229-231.

16. Pyungtanasup K. "The epidemiology of mandibular fractures treated at Chiang Mai University Hospital: a review of 198 cases". *Journal of the Medical Association of Thailand* 91.6 (2008): 868-874.

17. Imazawa T., *et al*. "Mandibular fractures treated with maxillomandibular fixation screws (MMFS method)". *Journal of Craniofacial Surgery* 17.3 (2006): 544-549.

18. Chuong R., *et al*. "A retrospective analysis of 327 mandibular fractures". *Journal of Oral and Maxillofacial Surgery* 41.5 (1983): 305-309.

19. Dongas P and Hall GM. "Mandibular fracture patterns in Tasmania, Australia". *Australian Dental Journal* 47.2 (2002): 131-137.

20. Ogundare BO., *et al*. "Pattern of mandibular fractures in an urban major trauma center". *Journal of Oral and Maxillofacial Surgery* 61.6 (2003): 713-718.

21. Desai J., *et al*. "Prospective audit of mandibular fractures at the Charlotte Maxeke Johannesburg Academic Hospital". *South African Journal of Surgery* 48.4 (2010): 122-126.

22. Zerfowski M and Bremerich A. "Facial trauma in children and adolescents". *Clinical Oral Investigations* 2.3 (1998): 120-124.

23. Brasileiro BF and Passeri LA. "Epidemiological analysis of maxillofacial fractures in Brazil: a 5-year prospective study". *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology* 102.1 (2006): 28-34.

24. Júnior SML., *et al*. "A comparison of motorcycle and bicycle accidents in oral and maxillofacial trauma". *Journal of Oral and Maxillofacial Surgery* 70.3 (2012): 577-583.

25. Iida S., *et al*. "Maxillofacial fractures resulting from falls". *Journal of Cranio-Maxillofacial Surgery* 31.5 (2003): 278-283.

26. Yamamoto K., *et al*. "Maxillofacial fractures resulting from falls". *Journal of Oral and Maxillofacial Surgery* 68.7 (2010): 1602-1607.

27. Khan A., *et al*. "Pattern of Mandibular fractures - a study". *Pakistan Oral and Dental Journal* 29.2 (2009): 221-224.

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