

RETROSPECTIVE ANALYSIS ON THE PREVALENCE OF MANDIBULAR FRACTURES AND ITS PATTERN

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ABSTRACT:

INTRODUCTION - Mandible is the largest and strongest of all the facial bones. Mandible is the second most commonly fractured bone after nasal bone,¹⁻⁴ Mandibular fractures most commonly involve only one site or involve multiple anatomic sites simultaneously. The type and direction of impact can be extremely helpful in diagnosis. Fractures resulted from vehicular accidents are usually far different from those resulted in personal altercation.

MATERIALS AND METHODOLOGY - The medical records of patients with facial trauma treated over the last 3 years (January 2018 to January 2021) were retrieved and reviewed. A total of 600 facial trauma cases were identified, of that 150 were having some sort of mandibular fractures. Then the collected data were analysed through the following parameters-age, and sex, mechanism of trauma, seasonal variation, drug/alcohol abuse at the time of trauma, number and anatomic location of fractures with the help of descriptive statistical measures.

RESULTS - Out of the total 600 patients suffering from panfacial injury, 150 patients (25%) recorded mandibular fractures with their age ranging from 7 to 89 years and there have been 475 men (79.1%) and 125 women (20.9%). The main cause was RTA (68%) particularly in those travelling by motorcycles followed by falls (17%), assaults (11%) and miscellaneous (4%). The most common mandibular fracture was found in the location of parasymphysis region (60, 39.8%), and the next most common location was shared by condyle and angle with equal distribution (27, 28 respectively) at 18% for both.

CONCLUSION - Further Epidemiological studies are needed to be carried out to know the prevalence, to identify particular aetiology and to formulate ideal preventive measures.

Keywords: Panfacial fractures, RTA, Mandibular fractures, Etiology, Location, Incidence.

INTRODUCTION

Mandible is the largest and strongest of all the facial bones. Mandible is the second most commonly fractured bone after nasal bone,¹⁻⁴ Mandibular fractures most commonly involve only one site or involve multiple anatomic sites simultaneously.

The aetiology and pattern of mandibular fractures vary considerably among different study populations. Latest overall shift in the mechanism of injury and age distribution of patients sustaining these injuries are well- recorded and published. There is noted variability in the pattern of mandibular fractures resulting from various causes of injury, such as road traffic accidents (RTAs), assaults, and falls.^{5,6} Increase in the frequencies of RTA and domestic violence have emerged as the major etiological factors contributing to mandibular fractures in developing countries like India. Furthermore, there is an increase in the ratio of adolescent and young adults sustaining these injuries.

The type and direction of impact can be extremely helpful in diagnosis. Fractures resulted from vehicular accidents are usually far different from those resulted in personal altercation. Since the magnitude of impact can be much greater, victims of automobile and motorcycle accidents tend to have multiple mandibular fractures, whereas the patient hit by a fist may result with single, undisplaced fracture. Despite many articles about the incidence, diagnosis and treatment of mandibular fractures there is limited knowledge about the specific type or pattern of mandibular fractures in South Asian countries. This study attempts to define current, predictable patterns of fracture based on patient demographics and mechanism of injury in the northern part of the country. Furthermore, in cases of multiple fractures of mandible, association between specific anatomic sites is also taken into account. The development of reliable predictors of injury pattern will be a useful guide for prompt and accurate diagnosis in the management of mandible fractures.

MATERIALS AND METHODOLOGY

This study is a retrospective analysis of all the medical records available with different secondary and tertiary trauma centers located at various selected metropolitan cities of Northern India. The medical records of patients with facial trauma treated over the last 3 years (January 2018 to January 2021) were retrieved and reviewed. A sum of three principal maxillofacial surgeons was appeared as investigators, who were maxillofacial surgeons; carried out this study so as to minimize bias in the study. A total of 600 facial trauma cases were identified, of that 150 were having some sort of mandibular fractures. The complete medical records of those 150 patients were gathered viz., history, clinical notes, radiographs, photographs, if any, surgical notes etc., Then the collected data were analysed through the following parameters-age, and sex, mechanism of trauma, seasonal variation, drug/alcohol abuse at the time of trauma, number and anatomic location of fractures with the help of descriptive statistical measures as well as chi square test for inter group variability analysis utilizing SPSS 25.0 software.

RESULTS

Out of the total 600 patients suffering from panfacial injury, 150 patients (25%) recorded mandibular fractures with their age ranging from 7 to 89 years and there have been 475 men (79.1%) and 125 women (20.9%). Male: Female was 3.7:1. The highest incidence of mandibular trauma was in the age group of 21–30 years (37.5%), followed by the age group of 31–40 (22.4%) (Table 1)

The main cause was RTA (68%) particularly in those travelling by motorcycles followed by falls (17%), assaults (11%) and miscellaneous (4%) which included animal bites, gunshot injuries, sports, pathological fractures, natural calamities etc.. The most common mandibular fracture was found in the location of parasymphysis region (60, 39.8%), and the next most common location was shared by condyle and angle with equal distribution (27, 28 respectively) at 18% for both. Rather astonishingly dentoalveolar fractures were amongst the least common fractures (9, 6%). The parasymphysis fractures was found to be most commonly affected area in RTAs (60, 39.8%), followed by free fall resulting in maximum fractures at the condylar region (69, 46%) and was statistically significant as

well (p=0.093). (Table 3) Mandibular angle fractures were frequently seen in assault cases (36%), although symphysis and condyle fractures were mostly uncommon. Of the total number of mandibular fractures, 44.5% patients had only one fracture, while 49.5% had two fractures and 6% had three fractures. There was history of drug/alcohol abuse in 36% of total patients of which 98% were males.

Table 1- Distribution of mandibular fracture according to age

AGE	NUMBER (%)
0-10	9
11-20	35
21-30	43
31-40	23
41-50	15
51-60	13
61-70	8
>70	4
Total	150

Table 2- Distribution of location of mandibular fractures according to aetiology

Site of Fracture	Etiology				Total
	RTA	Assault	Fall	Misc	
Symphysis	19(12.5%)	9(6%)	19(13%)	10(6.8%)	17(11.7%)
Parasymphysis	60(39.8%)	31(20.4%)	15(10%)	31(20.6%)	48(32%)
Condyle	20(13.5)	5(3.6%)	69(46%)	15(10.3%)	28(18%)
Angle	21(14%)	54(36%)	18(12%)	31(20.6%)	27(18%)
Body	15(10%)	18(12%)	3(2.3%)	10(6.8%)	13(9%)
Ramus	7(5%)	12(8.4%)	7(4.6%)	15(10.3%)	8(5.5%)
Coronoid	1(0.5%)	-	2(1.5%)	5(3.4%)	1(0.8%)
Dentoalveolar	6(4.3%)	20(13.2%)	12(7.8%)	31(20.6%)	9(6%)

Table 3-Statistical Association of site of mandibular fractures with aetiology

Site of Fracture	Chi square value	P – value
Symphysis	0.189	0.658
Parasymphysis	0.015	0.093
Condyle	0.448	0.455
Angle	0.320	0.570
Body	0.320	0.570
Ramus	0.448	0.455
Coronoid	1.849	0.172
Dentoalveolar	1.849	0.172

*p<0.05= significant

DISCUSSION

Mandible is the strongest single unit facial bone which accounts for upto 15.5-59% of all facial bone fractures.⁷ Most common age group affected with mandibular fractures is 21-30 years with male predominance and the reportedly observed most common causes were revealed to be road traffic accidents and impatient with reckless driving, driving under the influence of alcohol, failure to wear helmets and poor road maintenance contribute to some of the major attributing factors.^{8,9} There is variability in the pattern of mandibular fractures resulting from different causes of injury, such as road

traffic accidents (RTAs), assaults and falls.¹⁰ Parasymphysis area is the most common site involved.^{11,12} This is in correspondence with the report of *Adi et al.*¹³ When multiple areas of fractures were considered, it was found that parasymphysis and condyle were the commonest group which associates with the study carried out by *Natu et al*¹⁴ and were conflicting to the study carried out by *Dongas and Hall*¹⁵ in which parasymphysis and angle is the most common combination. It is also contrary to the study by *Ogundare et al.* who concluded that the commonest combination as body and angle. The variable distribution of fractures according to aetiology may be related to factors associated with the way the injury occurs.¹⁶ The direction and magnitude of force, the nature of object resulting in impact, and the characteristics of the host bone are liable for the numerous clinical outcomes. Knowledge of the direction of the impact can assist the clinician to identify the associated fractures better which helped in arriving at a diagnosis & treatment plan. An anterior blow directed to the chin may result in bilateral condylar fracture and an angled blow to the parasymphysis may cause a contralateral condylar or angle fracture.¹⁷ Multiple modalities of treatment are being followed to manage mandibular fractures. It includes conservative methods with soft diet, inter-maxillary fixation, open reduction and internal fixation, closed treatment with external fixation and treatment with Kirschner wire.¹⁸ Most commonly used is open reduction and internal fixation in which the fractured fragment is anatomically reduced and fixed. Closed reduction treatment is carried out mainly in cases of condylar fractures as well as in cases of medically compromised patients. As *Bither et al* described, various causes for augmented RTAs in India mostly are associated with socioeconomic reasons such as meagre traffic sense of the drivers and pedestrians as well as poor road conditions, inadequate enforcement of road safety regulation and reluctance to use helmets, use of illicit drugs, decreasing tolerance, and increasing personal competitions among young, could be the possible explanations in particular in this part of the country.¹⁷

CONCLUSION

Further Epidemiological studies are needed to be carried out to know the prevalence, to identify particular aetiology and to formulate ideal preventive measures. Also, multiple fractures are becoming more common, so it is important for the clinician to do a clean & thorough examination not to miss out multiple findings and to provide appropriate care.

Mandatory seat belts, helmet and reduction in drunken driving has been shown to be effective in reducing the incidence of maxillofacial fractures. The diagnosis of angle fractures should arouse a suspicion of personal altercation, while the diagnosis of condyle fractures should be seen suspiciously for the victims of fall.

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