

# Prevalence and Patterns of Maxillofacial Fractures - a Retrospective Descriptive Study of 188 Cases

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## ABSTRACT

**Introduction:** Maxillofacial fractures form a substantial proportion of reported cases of trauma world wide and show varying etiology and demographics. The main aim of this study was to evaluate the prevalence and pattern of maxillofacial fractures in our setting.

**Material and methods:** Data of 188 patients with maxillofacial fractures during the period of January 2018 to June 2020 was retrospectively analyzed based on gender, age group, etiology, anatomical distribution and treatment modalities.

**Results:** Out of 188 patients, 139 (73.94%) were males and 49 (26.06%) were females with a male to female ratio of 3:1. Majority of the patients were in the age group of 21 to 30 years (38.29%) and the mean age of the patients was 29.3 years. Road traffic accidents were the most common etiological factor accounting for 70.74% cases alone with mandible being the most common fractured bone (39.89%) followed by zygoma (36.17%). Open reduction internal fixation was employed in 48.94% patients, closed reduction in 39.89% and 11.17% patients received conservative treatment.

**Conclusion:** Strict implementation of traffic laws, improved legislation and awareness programs are needed to counter the increasing trend of maxillofacial injuries.

**Keywords:** Trauma, Maxillofacial Fractures, Road Traffic Accidents, Mandible, Zygoma

## INTRODUCTION

Maxillofacial injuries remain as one of the most common presentation in Trauma and Emergency Care settings worldwide.<sup>1</sup> Trauma in maxillofacial region necessitates special consideration because of close proximity to airway, brain and other vital structures and may be associated with serious concomitant injuries such as traumatic brain injury.<sup>2,3</sup> Maxillofacial fractures can subsequently lead to morbidity, mortality, esthetic and functional deficits.<sup>4,5</sup> Road traffic accidents (RTAs) are considered to be the most common cause of maxillofacial fractures followed by falls, assaults, sports, firearm injuries and industrial trauma.<sup>6-8</sup> However, demographics and pattern of maxillofacial fractures may vary from one geographical area to another depending on location, socioeconomic, cultural and environmental factors.<sup>9</sup> Most of maxillofacial fractures occur in younger age group between the ages of 21 and 30 years and predominate in males with male-to-female ratio ranging from 2:1 to 11:1.<sup>10-12</sup> The most common site of fracture in maxillofacial area is the mandible followed by maxilla, zygomatic complex and alveolar process. However, some authors have reported zygoma to be more commonly fractured bone

than the maxilla.<sup>13,14</sup> Various studies have been carried out throughout the world including different states of India to understand the demographics and epidemiology with the purpose of improving management and creating more public awareness to prevent maxillofacial trauma.<sup>1,10,12,15,16</sup> It is therefore important to study the etiology, incidence, pattern and mechanism of maxillofacial fractures for appropriate planning and effective management. Thus main aim of our study was to evaluate the prevalence and pattern of maxillofacial injuries in our center which is a major trauma referral center in Thrissur Kerala, India.

## MATERIALS AND METHODS

This retrospective study was carried out in the department of Oral and Maxillofacial Surgery, Elite Mission Hospital Thrissur, Kerala. A retrospective review of data of all the patients diagnosed and treated for maxillofacial fractures from January 2018 to June 2020 was conducted. Patients with soft tissue injuries and incomplete data were excluded. Various parameters like patient's age, gender, etiology of trauma (RTA, fall, assault and sport), anatomic site of fracture, associated injuries and different treatment modalities employed in these patients were recorded. As per the available data, maxillofacial fractures were classified on the basis of anatomical location involved as Nasal, Naso-orbito-ethmoidal, Zygomatic complex, Orbital wall, Maxillary (dentoalveolar, Lefort I, II and III) and mandibular (dentoalveolar, symphysis, parasymphysis, body, angle, ramus, condyle and coronoid) fractures.

## RESULTS

A total of 188 patients had been diagnosed and treated for maxillofacial fractures during the study period. Out of 188 patients, 139 (73.94%) were males and 49 (26.06%) were females with a male to female ratio of 3:1. The age of the patients varied from 9 to 70 years but most of the patients

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were in the age group of 21 to 30 years (38.29%) followed by 30-40 year age group (28.72%) (Table 1). The mean age of the patients was 29.3 years. The most common cause of maxillofacial fractures was RTA which alone accounted for 70.74% of cases. Among RTA cases, motorcycle accidents were most common (43.61%) followed by motor vehicle accidents (29.32%). The second most common cause of fractures was assaults (18.09%) followed by falls (.6.91%) and sports injuries (4.26%) (Table 2 & 3).

Mandible was the most common fractured bone accounting for 39.89% of all the cases followed by zygoma (36.17%), maxilla (15.96%), nasal (4.78%), orbit (2.13%) and naso-orbito-ethmoid (1.06%) (Table 4). Among mandibular fractures, the body of the mandible was the most common site involved, accounting for 25.33% of the mandibular fractures. The angle of the mandible was fractured in 20% patients followed by condylar fractures in 17.33%, parasymphysis in 13.33%, dentoalveolar in 12% and symphysis in 6.67%

Age group (years)	Number of patients	Percentage
1-10	4	2.13%
11-20	27	14.36%
21-30	72	38.29%
31-40	54	28.72%
41-50	16	8.51%
51-60	11	5.85%
61-70	4	2.13%

**Table-1:** Age distribution of the patients

Cause of injury	Number of patients	Percentage
Road traffic accidents	133	70.74%
Assaults	34	18.09%
Falls	13	6.91%
Sports	8	4.26%
Total	188	100%

**Table-2:** Distribution of patients as per etiology

Type	Number of patients	Percentage
Motorcycle	58	43.61%
Motor vehicle	39	29.32%
Pedestrian	22	16.54%
Three-wheeler	8	6.02%
Bicycle	6	4.51%
Total	133	100%

**Table-3:** Type of road traffic accident

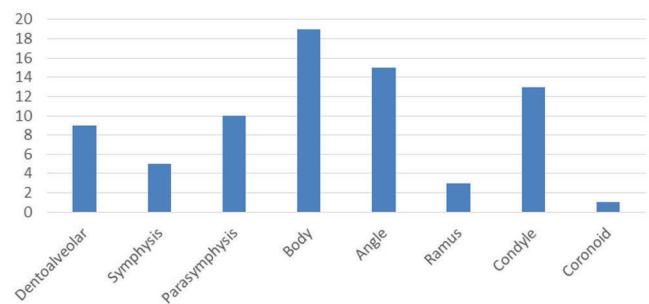
Fracture location	Number of patients	Percentage
Mandible	75	39.89%
Zygoma	68	36.17%
Maxilla	30	15.96%
Nasal	9	4.78%
Orbit	4	2.13%
Naso-orbito-ethmoidal	2	1.06%
Total	188	100%

**Table-4:** Site of maxillofacial fracture

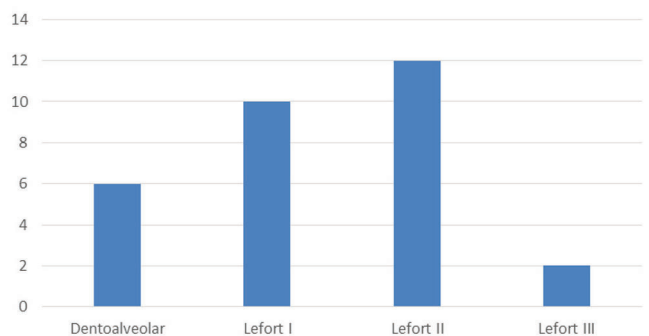
patients. The least fractured sites were ramus (4%) and coronoid (1.33%) (Figure 1). Patterns of maxillary fractures is illustrated in Figure 2. Out of 188 patients, 92 (48.94%) were treated with open reduction internal fixation, 75 (39.89%) patients were treated with closed reduction and 21 (11.17%) patients received conservative treatment (Figure 3).

**DISCUSSION**

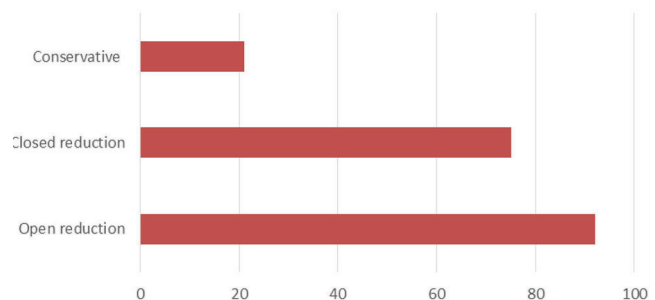
Trauma is one of the leading causes of death in people below 40 years of age.<sup>10</sup> Because of its prominent position in the body, the face is often prone to different types of injuries during traumatic events.<sup>17</sup> Although people of all the ages were seen to be affected in our study, peak incidence was seen in the third and fourth decades of life. This may be due to the involvement of these age groups in many outdoor activities, assaults, communal violence and criminal activities. Predominant use of motor vehicles by these age groups make them vulnerable to RTAs and also the lack of helmet use was one of the main reasons why most of the RTAs were motorcycle related. These findings are consistent with other studies carried out in different parts of the world and also



**Figure-1:** Distribution of mandibular fractures according to anatomical location



**Figure-2:** Maxillary fractures patterns



**Figures-3:** Treatment methods for maxillofacial fractures

many Indian states.<sup>15,16,18-21</sup> However, in the recent past, there is a decreasing trend of RTA related maxillofacial injuries in many developed countries with interpersonal violence and assault becoming the leading etiological factors.<sup>13</sup> This decrease has been attributed to strict enforcement of protective measures and various traffic rules.

Majority of the patients in our study were males with male to female ratio of 3: 1 which is in agreement with many other studies.<sup>15,16,19,20,22,23</sup> This can be explained by the fact that more males are involved in rigorous outdoor activities, more males are drivers and bike riders and also because drug and alcohol abuse is common in men.<sup>20,24</sup> Mandible was the most commonly affected bone in our study which was consistent with many previous studies.<sup>6,12,25</sup> This can be attributed to its prominent position, vulnerability during traffic accidents and greater exposure to external trauma.

Moreover, the osteology of mandible, various muscle attachments and their influence and the presence of developing or completed dentition all contribute to the weakness of mandible. Zygomatic bone was the 2<sup>nd</sup> most fractured bone overall and most involved bone in midface. This is due to its projection and multiple articulations with other facial bones making it very vulnerable to fractures on impact.<sup>26,27</sup>

Associated injuries were noted in 33.51% of patients out of which brain injury was the most common (58.73%) and others were related to orthopedics (23.81%), ophthalmology (14.29%) and general surgery (3.17%) and the findings were consistent with previous data.<sup>23</sup> Majority of the patients were treated with open reduction internal fixation which is considered to be the gold standard for the treatment of maxillofacial fractures. It results in improved oral hygiene, mouth opening, better speech and early return to function.<sup>28</sup>

## CONCLUSION

Road traffic accidents were the main etiological factor for maxillofacial trauma and most of them were motorcycle related. Males in 3<sup>rd</sup> decade of life were mostly affected and factors like lack of helmet and seat belt use, alcohol abuse, over-speeding and failure to follow other traffic regulations were the contributing factors. Therefore strict implementation of traffic laws especially on young people to curb reckless driving and over-speeding and creating awareness is the need of the hour.

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