Prevalence and Pattern of Adult Maxillofacial Injuries: An Institution-based Retrospective Study

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ABSTRACT

Introduction: Maxillofacial injuries are more prevalent in road traffic accidents (RTAs). The incidence of RTAs tends to vary with geographical location, socioeconomic status, religion etc. Aim: The main aim of this study is to determine the pattern and prevalence of maxillofacial injuries reported to our institution.

Materials and Methods: Data were obtained from medical records of the patients from January 2007 to December 2017 reported in CSI College of Dental Sciences and Research, Madurai, Tamil Nadu were retrieved and analyzed. Data include age, gender, etiology, site of injury, anatomical site associated injuries and their management were recorded and analyzed with STATA software version 14 (StataCorp LLC, College Station, TX, USA).

Results: Maxillofacial injuries occur more commonly in 2nd and 3rd decade (40.44%) with mean age of 32.58 ± 11.15 years. RTA (77.21%) and alcohol influence (51%) were considered as the most common cause of maxillofacial injuries and was statistically significant. Mandible (44.85%) was most commonly involved and 62.5% required a surgical intervention.

Conclusion: RTA with mandibular fracture is predominant in men between the age group of 20-30 years. Expansion in road network, increase in motorization, alcohol consumption and urbanization in developing countries had accompanied with rise in RTAs. Thus the use of safety devices and educating people by conducting preventive camps about traffic rules will reduce the number of RTA.

KEYWORDS: Madurai, maxillofacial injuries, road traffic accident

INTRODUCTION

Trauma is one of the primary causes for death in humans during the first four decades. According to World Health Organization, around 15–20 million individuals got injured and nearly 1 million people die annually in road traffic accidents (RTAs). World Health Statistics, in 2008, stated that RTA was the leading cause for death, and it will be the fifth leading cause for death by 2030.[1,2] In developing countries, 7.4%–8.4% maxillofacial injuries require emergency medical care, and it poses a great threat to life.

Many epidemiological studies on the pattern of maxillofacial injuries from different countries reported that the etiology of these injuries may vary with geographic location, economic status, culture, and alcohol consumption.[3,4] Trauma may occur in a workplace, RTA, assault, and sports. It can either occur alone or associated with the injuries of upper and lower extremities. In RTA, face is the most frequently injured region. Introduction

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of high-speed engines in two-wheelers, alcohol addiction, lack of sufficient infrastructure of roads, and disproportionate increase in two-wheelers are considered as major causative factors for an increase in maxillofacial trauma in India. This study aimed to determine the prevalence and pattern of maxillofacial injuries reported in our institution.

**MATERIALS AND METHODS**

Patient reports with medical record of maxillofacial injury, between January 2007 and December 2017, in the department of Oral and Maxillofacial Surgery, CSI College of Dental Sciences and Research, Madurai, Tamil Nadu, India, were retrieved and analyzed retrospectively. Data include age, gender, etiology, fracture site, associated injuries, and treatment modalities. All these data were recorded and analyzed using STATA software, version 14.0 (StataCorp LLC, College Station, TX, USA). For this study, approval from institutional ethics committee and institutional review board of CSI College of Dental Sciences and Research were obtained.

**RESULTS**

In our retrospective analysis, we recorded maxillofacial trauma of approximately 136 cases, among them, 117

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**Figure 1:** Gender-wise distribution of maxillofacial injuries

**Figure 2:** Year-wise distribution
were males and 19 were females [Figure 1]. Year-wise distribution of prevalence in maxillofacial injuries is depicted in Figure 2. Maxillofacial trauma was more prevalent among the second and third decade and accounts for approximately 40.44%. The age-wise distribution of maxillofacial trauma is depicted

Figure 3: Age-wise distribution

Figure 4: Etiology of injuries
In Figure 3. The mean age for this study population was 32.58 ± 11.15 years. The least age recorded in this study was 17 years and the highest age was 69 years.

In this retrospective study, maxillofacial injury more commonly occurs in RTAs (77.21%), among them 67.65% were two-wheelers [Figure 4]. Trauma due to falling accounts for 22.79%, and sports-inflicted injuries
Figure 7: Site of injury

Figure 8: Management of maxillofacial injuries
account for 2.94% of all cases as shown in Figure 5. Approximately 51% of the study population consumed alcohol during injury, and it was statistically significant [Figure 6].

Mandibular fracture was the most common to occur with a percentage of 44.85%, maxillary fracture accounted for 19.12%, and 34.56% fractures occurred in both maxilla and mandible [Figure 7]. Of them, 85 patients were treated surgically, 34 were treated conservatively, and 16 were treated by both surgical and conservative methods [Figure 8].

The proportion between etiology and the maxillofacial injury was statistically significant with a high proportion to RTA followed by other injuries ($P = 0.023$) [Table 1]. Association between alcohol consumption and maxillofacial injury is shown in Table 2, and it is found that there is a statistical significance between these variables ($P = 0.046$).

The proportion between the facial soft tissue injuries and the site of the fracture is statistically significant ($P < 0.001$) [Table 3]. The association between the fracture site and treatment modalities is shown in Table 4, and it is statistically significant ($P < 0.001$).

**DISCUSSION**

Trauma is the leading cause of death below the age of 40 years, and maxillofacial area is more likely to get injured during trauma when compared with other parts of body.[5] In this study, second and third decades are more commonly affected with male predominance.[2,3,6–11] A study conducted by Agrawal et al.[9] reported that maxillofacial injuries are prevalent among third and

| Etiology | Fracture Site | Total N (%) | $P$ value |
|----------|---------------|-------------|-----------|
| Assault  | Nil N (%) | Mandible N (%) | Maxilla N (%) | Combined N (%) | |
| Assault  | 0 | 0 | 2(50) | 2(50) | 4(100) | 0.023 (S) |
| Fall     | 1(3.23) | 10(32.26) | 10(32.26) | 10(32.26) | 31(100) |
| Pediatric| 0 | 5(100) | 0 | 0 | 5(100) |
| Sports   | 0 | 4(100) | 0 | 0 | 4(100) |
| Two Wheelers | 1(1.09) | 42(45.65) | 14(15.22) | 35(38.04) | 92(100) |
| Total    | 2(1.47) | 61(44.85) | 26(19.12) | 47(34.56) | 136(100) |

| Alcohol Consumption | Fracture Site | Total N (%) | $P$ value |
|---------------------|---------------|-------------|-----------|
| Nil N (%) | Mandible N (%) | Maxilla N (%) | Combined N (%) | |
| No | 2(3.03) | 34(51.52) | 14(21.21) | 16(24.24) | 66(100) | 0.046 (S) |
| Yes | 0 | 27(38.57) | 12(17.14) | 31(44.29) | 70(100) |
| Total | 2(1.47) | 61(44.85) | 26(19.12) | 47(34.56) | 136(100) |

| Soft Tissue Injury | Fracture Site | Total N (%) | $P$ value |
|-------------------|---------------|-------------|-----------|
| Nil N (%) | Mandible N (%) | Maxilla N (%) | Combined N (%) | |
| Abrasion | 1 (1.56) | 25 (39.06) | 19 (29.69) | 19 (29.69) | 64 (100) | < 0.001 (S) |
| Laceration | 1 (16.67) | 1 (16.67) | 3 (50) | 1 (16.67) | 6 (100) |
| Abrasion and Laceration | 0 | 12 (41.38) | 0 | 17 (58.62) | 29 (100) |
| Nil | 0 | 23 (62.16) | 4 (10.81) | 10 (27.03) | 37 (100) |
| Total | 2 (1.47) | 61 (44.85) | 26 (19.12) | 47 (34.56) | 136 (100) |

| Management | Fracture Site | Total N (%) | $P$ value |
|------------|---------------|-------------|-----------|
| Nil N (%) | Mandible N (%) | Maxilla N (%) | Combined N (%) | |
| Conservative | 1(2.94) | 17(50) | 10(29.41) | 6(17.65) | 34(100) | <0.001 (S) |
| Surgical | 1(1.18) | 44(51.76) | 16(18.82) | 24(28.24) | 85(100) |
| Surgical and Conservative | 0 | 0 | 0 | 17(100) | 17(100) |
| Total | 2(1.47) | 61(44.85) | 26(19.12) | 47(34.56) | 136(100) |
fifth decade. Fasola et al.\textsuperscript{[4]} stated that RTA was more common among older adults. The mean age in our study was 32.58\% similar to the results of Agrawal et al.\textsuperscript{[9]} and higher than that of Gupta et al.\textsuperscript{[1]} Factors determining the prevalence and pattern of maxillofacial trauma get varied according to geographic, culture, and economic status of a particular region.\textsuperscript{[4]} Worldwide, it has been reported that maxillofacial trauma occurs due to RTA, self fall, assault, and during sports.\textsuperscript{[12]}

Two-wheelers have a great impact on maxillofacial injuries. Our study reports that RTA accounts for 77.21\% in maxillofacial injuries, of which 67.65\% were motorcycles, which was found to coincide with other studies as it contributes to 45\%–65\% of RTA.\textsuperscript{[4,7,8,13,14]} Due to RTA, around 60\%–80\% pedestrians, bicyclers, and two-wheelers got injured in India.\textsuperscript{[15]} Zamani-Alavijeh et al.\textsuperscript{[10]} in their study reported that motorcycle riders with a lack of awareness of wearing helmet and other protective aids had the highest risk of being injured in head, face, and neck region. These injuries usually occur due to a skid or fall from the motorcycle, colliding with other vehicle due to loss of control.\textsuperscript{[17]}

In our study, half of the population was intoxicated with alcohol, similar to that of other studies.\textsuperscript{[3,7,10,12,18]} Prabhu et al.\textsuperscript{[11]} suggested that alcohol consumption between 21 and 35 years of age tends to be increasing in developing countries.

Laceration and abrasion were the most prevalent soft tissue injuries.\textsuperscript{[5,19]} Gassener et al.\textsuperscript{[5]} in their study reported that soft tissue injuries were commonly seen in lips extraorally. Intraorally, it is more common in gingiva, buccal mucosa, palate, and tongue.\textsuperscript{[5]} In this report, the incidence of fracture in mandible bone was higher when compared to midface fractures.\textsuperscript{[6,7,8,10,19,20]} Bbte et al.\textsuperscript{[19]} reported that mandibular fractures were more prevalent in developing countries.

**Conclusion**

Our study concludes that RTA with a mandibular fracture is predominant in men between the age-group of 20 and 40 years. Alcohol influence followed by increased passion to use two-wheelers among youngsters and high-speed driving without proper safety measures such as helmets during driving are considered as important factors contributing to trauma. Strict enforcement of traffic rules and safety regulations along with improved emergency medical service will reduce the death rate and minimize the disability that occurs during RTA. In addition to this, use of improved safety devices in automobiles such as strict wear of helmets by motorcyclists, wearing of seat belts in four-wheelers, and educating people by conducting preventive camps to obey traffic rules, especially at the level of schools, colleges, and in rural areas, would reduce the number of RTA and maxillofacial trauma.

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**Conflicts of interest**

There are no conflicts of interest.

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