International Surgery Journal
Ravikumar G et al. Int Surg J. 2017 Aug;4(8):2450-2454
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20173108

Original Research Article

A study on faciomaxillary injuries in a tertiary care hospital

Ravikumar G.*, Manoharan, Sugapradha G. R.

Department of Plastic and Reconstructive Surgery, Thanjavur Medical College, Thanjavur, Tamil Nadu, India

Received: 01 June 2017
Accepted: 24 June 2017

***Correspondence:**
Dr. Ravikumar G.,
E-mail: gravikumar1962@gmail.com

ABSTRACT

Background: Faciomaxillary injuries are increasing in frequency and severity due to road traffic accidents and violence among the people of the delta districts of Tamilnadu. Alcohol plays a major role both in road traffic accidents and assaults resulting in faciomaxillary injuries. Human bites play a significant role in the soft tissue injuries of the face resulting in loss of lobule of ear, nasal tip loss and partial loss of lower lip. The purpose of this study was to evaluate the aetiology, incidence, patterns and treatment modalities of faciomaxillary injuries which include both soft tissue and bony injuries.
Methods: The study was conducted in the Department of Plastic and Reconstructive Surgery of Thanjavur Medical College, Tamil Nadu, India between 2012-2015. About 850 patients in and around the delta districts of Tamilnadu admitted with various soft tissue and bony injuries of the faciomaxillary region were studied. Age, sex, time, mechanism and aetiology of injury, history of bleeding, unconsciousness and prior first aid, type of vehicle and use of preventive measures, type of fracture, associated injuries and treatment modalities were evaluated.
Results: Faciomaxillary injuries were mostly due to road traffic accidents. Highest number of fractures was predominantly occurring in the age group of 21-30 years. Males incurred more fractures with a male to female ratio of 7.4:1.1. Fracture mandible was the most common followed by zygoma, nasal and naso ethmoid fractures. Pan facial fractures were more common among alcoholics. 28 patients had associated head injury and 14 patients had cervical spine injuries. Open reduction and internal fixation was the preferred modality for mandible whereas the mid face fractures were treated more often by closed methods. Soft tissue injuries involving ear, nose, lip and eyelids were more common.
Conclusions: Drunken driving should be curbed in the society. Educating the people about road safety rules will bring down the faciomaxillary injuries. Motivating the public against violence will reduce human bites and soft tissue injuries of the face.

Keywords: Alcohol, Faciomaxillary fractures, Soft tissue injuries

INTRODUCTION

Faciomaxillary region involves soft and bony tissues and being the most exposed part of the body, it is particularly prone to trauma. Faciomaxillary injuries represent one of the most life-threatening problems in developing and developed nations representing 7.4-8.7% of the emergency medical care.[1,2] These injuries are often associated with severe morbidity due to their close, proximity to vital organs such as brain and cervical vertebrae causing loss of function and death. The pattern of faciomaxillary injuries varies with geographical area, socioeconomic condition, enforcements of law and order of a country. Road traffic accidents, interpersonal conflicts, assaults, and sports injuries are responsible for faciomaxillary injuries.[3] Road traffic accidents constitute an important cause of preventable morbidity, mortality,

and disability. High-velocity trauma is usually seen in urban and semi-urban areas while low-velocity trauma is seen in rural areas. Alcohol consumption has become a daily habit of every third individual in the country and is responsible for accidents and assaults. Because of high morbidity of faciomaxillary injuries, an epidemiological analysis is necessary to implement strict protocols and conduct prevention programs for public health awareness.

Objectives of this study was to evaluate the aetiology of trauma and incidence of faciomaxillary injuries, the relation between alcohol intake and faciomaxillary injuries, the pattern of maxillofacial injuries sustained by two wheelers and four-wheeler, to identify anatomical site of fracture and associated injuries and to evaluate different modalities of treatment rendered.

METHODS

The patients with faciomaxillary injuries managed in the Department of Plastic and Reconstructive Surgery, Thanjavur Medical College, India in a time span of three years (2012-2015) were selected for the study. All patients were treated irrespective of age, sex, caste, religion and socioeconomic status. Patients were evaluated for soft tissue injuries of the face and any maxillofacial fracture by assessing clinically the displacement of fractured fragments, functional and cosmetic deficits, patient's age and patient's medical status. Exact determination of the site and pattern of bony injury was determined by correlating it radio graphically. The parameters on which patients were evaluated included; age of patient, gender distribution of patient, time of injury, aetiology of fracture, mechanism of injury, type of vehicle, type of passenger (driver/pillion rider), use of helmet or seat belts, under the effect of alcohol or drugs, history of bleeding, history of unconsciousness, any prior first aid, X-rays advised, site of fracture, associated injuries and treatment modalities. The significances of the findings were evaluated using Pearson Chi-Square test.

RESULTS

Out of 850 patients of faciomaxillary injuries 740 were males (87.05%) and 110 were females (12.95%), giving a male to female ratio of 7.4:1.1 (Table 1).

Faciomaxillary injuries were more common in the age group of 21-30 years. About 181 patients (21.29%) had soft tissue injuries of the face, 294 patients (34.59%) had faciomaxillary fractures alone and 375 patients (44.12%) had both soft tissue and bony injuries of the face (Table 2).

Most of the injuries occurred at midnight (51.52%). Injuries occurred at mid-day and morning with almost equal frequency (22.83%) and (25.65%) respectively (Table 3).

Based on statistical analysis (Chi-Square Tests) it was concluded that majority of the injuries occurred during midnight (51.52%), and based on Lindahl's classification of mechanism of injury, 20.47% patients were static individuals, 37.65% patients were moving and 41.88% patients were under combination group (Figure 1). Among the various etiological factors responsible for maxillofacial fractures, road traffic accidents (73.65%) were found to be the major etiological factor (Figure 2).

Table 1: Age wise distribution of patients.

Age group (years)	Number of patients	Percentage
10-20	26	3.09%
21-30	432	50.82%
31-40	186	21.88%
41-50	84	9.88%
51-60	65	7.64%
61-70	43	5.05%
71-80	14	1.64%

Table 2: Pattern of faciomaxillary injuries.

Gender	Soft tissue injuries	Bony injuries	Both soft tissue and bony injuries
Male	158 (21.36%)	226 (30.54%)	356 (48.10%)
Female	23 (20.92%)	68 (61.81%)	19 (17.27%)

Table 3: Time of injury.

Time	Number of patients	Percentage
Morning	218	25.65%
Midday	194	22.83%
Midnight	438	51.52%

Out of 626 road traffic accidents, 536 patients (85.62%) were on two wheelers, 46 patients (7.35%) on four wheelers and 44 (7.03%) were pedestrians. Out of these 536 patients on two wheelers, 424 patients (79.10%) were drivers and 112 (20.9%) were pillion riders.

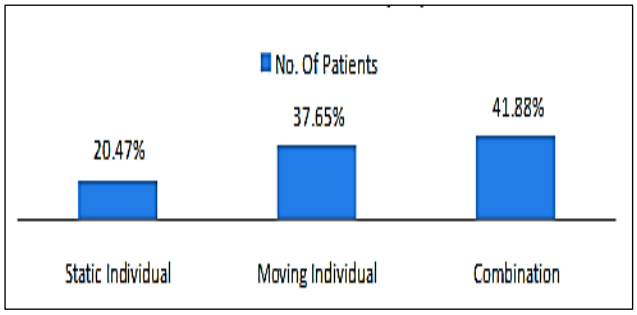

Figure 1: Mechanism of injury.

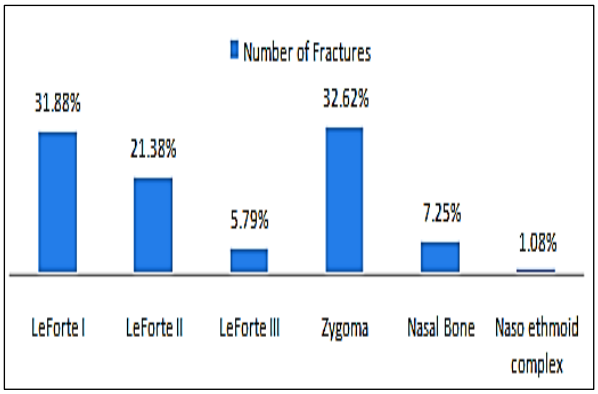

Figure 2: Fracture pattern in Maxilla 276.

Out of 46 patients on four wheelers, 32 patients (69.57%) were drivers, 10 (21.73%) were front seaters and 4 (8.7%) were rear seaters. Out of 536 patients driving two wheelers, 63 (11.75%) were wearing helmet. None of the pillion rider was wearing helmet. Out of 46 patients driving four wheelers, 4 (8.7%) were wearing seat belts. None of the front seater or rear seater passengers was wearing seat belts.

Among the 850 patients, 54 (6.35%) were under the effect of alcohol. Out of total 850 patients, 208 patients (24.47%) reported history of unconsciousness.

The fracture mandible was the most common faciomaxillary injury, followed by fracture zygoma, fracture maxilla and nasal bone injuries. Among the soft tissue injuries eyelid injuries, lip tears and avulsion injuries of the ears were common.

In the mandible, fractures occurred most commonly in the parasymphyseal region (186, 37%), followed by condylar region (126, 25%). Among the condylar fractures 12.7% (16), were bilateral whereas 87.3% (110) were unilateral condylar fractures. Third most common site for the fractures was angle (92, 18.3%), followed by body (68, 13.51%), dentoalveolar (15, 2.98 %) and symphysis (9, 1.79%). Least common fractures reported were ramal fractures (3, 0.6%) and coronoid fractures (4, 0.8%) (Table 4).

Table 4: Fracture pattern in mandible.

Fracture Site	Number of Fractures	Percentage
Parasymphysis	186	37%
Angle	92	18.3%
Condyle	126	25%
Coronoid	04	0.8%
Symphysis	09	1.79%
Body	68	13.51%
Ramus	03	0.6%
Dentoalveolar	15	3%

About 110 patients had pan facial fractures with fractures of both maxilla and mandible. About 88 patients had Lefort I fractures, 59 patients had Lefort II fractures and 16 patients had Lefort III fractures. 90 patients had fracture zygoma and 20 patients had nasal bone fracture (Figure 3). Sixty-eight patients were having associated limb injuries (8%). About 3.29% patients had head injuries (Table 5).

Table 5: Associated injuries.

Associated injuries	Number of patients	Percentage
Cervical spine injury	14	1.65%
Head injury	28	3.29%
Thoracic injury	02	0.24%
Limb injuries	68	8%
Abdominal injury	12	1.41%

DISCUSSION

The effectiveness of various preventive and educational programs with respect to maxillofacial trauma may be reflected through continuing audit of the pattern of such trauma in different parts of the world. Considerable variation has been reported in the profile of facial injuries with respect to the geographical location, socioeconomic status, and cultural background.

The pattern of age distribution in maxillofacial injuries demonstrated that people of all ages were affected; the peak incidence was, however, observed in the age group of 21-30 years (50.82%). This finding is in accordance with a number of previous studies in India as well as other parts of the world.[1,2,3] The third decade is perhaps the most active period of life in which people tend to remain outdoors in search of their livelihood and are thus more vulnerable to vehicular accidents, falls, and assault-related injuries. Individuals in the extremes of life were found to be least affected.

The gender distribution revealed a male preponderance in all the age groups as has been reported in other studies. The male: female ratio in the sample (7.4:1.1) was higher than other authors.[1] This is most likely due to the fact that in the lower socioeconomic group, which constitutes the bulk of the patients reporting to this particular hospital, men are often the primary bread winners of the family and tend to remain outdoors for a large period of time, thus making them susceptible to trauma in general and maxillofacial trauma in particular. Also, females drive less frequently and are thus less likely to be involved in vehicular accidents. They are also less vulnerable to sport-related injuries and to falls and violence related to alcohol consumption. Most of the male patients in the study were young adults who are often injured away from home, whereas female victims are more likely to be

assaulted in their homes by someone whom they know.[4,5,6]

The greatest incidence of maxillofacial trauma (51.52%) was observed in the evening hours between 6 pm and 12 am. This may be attributed to the substantial increase in traffic after the office hours, when people are returning home, and to a tendency to consume alcohol in the evenings.[7] The proportion of cases reporting between 2 am and 6 am and between 12 pm and 6 pm was similar, with the least number of cases reporting in the morning (6 am-12 pm). An analysis of the day of reporting revealed that the maximum number of facial injuries occurred on Saturdays followed by Sundays.

The etiology of maxillofacial injuries is known to vary from one geographical region to another. Road traffic accident is generally believed to be the most common cause of facial trauma in developing countries.[8] Road Traffic Accident constituted the most common causative factor in our study (73.65%) followed by alcohol (19.77%). Unemployment and the associated frustration and rage, particularly in youth of lower socioeconomic group, leads them to consume alcohol and they frequently end up in arguments and brawls, leading to violence.[8,9]

The most common type of maxillofacial injury in males was found to be soft tissue and bony injuries (48.10%). In females, bony injuries (61.81%) were more common. This finding is in accordance with that of Gassner et al, who demonstrated a very high frequency of soft tissue injuries in their comprehensive review of cranio-maxillofacial trauma and also with those of Le et al, who reported that soft tissue injuries were the most common type of injuries in cases reporting with domestic violence. Facial contusions and abrasions were the most frequent types of soft tissue injuries followed by lacerations.[9,10]

The incidence of dentoalveolar trauma and associated tooth fractures or avulsion was also significant. Among bony fractures, the mandible was the most frequently fractured bone. This finding is in accordance with those of Lida et al, in Japan, Motamedi in Iran, and of Erol et al. in Turkey.[11-13] The high incidence of isolated mandibular fractures in studies all across the world may be attributed to the prominence of the lower jaw and to its exposed anatomical position on the face. The mandibular condyle is a relatively weak anatomic area, which often gets fractured following a blow to the chin as the force of the blow is transferred through the mandibular body onto the condyle.[14,15] Also, the abrupt change in direction in the region of the angle of the mandible (from a relatively thicker body to a comparably thin ramus) also increases the chances of mandibular fracture following facial trauma. The midfacial skeleton was another frequent site of fracture in this study. Le et al, believe that the midfacial skeleton, especially the nasal bone stands a high risk of fracture following trauma due to its relative structural weakness and prominent location on the face.[10]

Mandible was the most common bone with 503 (59.1%) fractures due to its prominent position in maxillofacial skeleton. There were 186 (11.6%) parasymphisis fractures which was the most common site, followed by 126 (25%) fractures of condyle.

About 276 patients were having central thirds of the facial skeleton fractures 32.47%. 88 patients had (31.88%) Lefort I fracture, 59 patients had (21.38%) Lefort II fractures, and 16 patients had (5.79%) Lefort III fractures. Twenty (7.25%) Naso-orbito-ethmoidal fractures and three (1.08%) nasal bone fractures were seen. 90 patients had fracture zygoma (32.62%).

Open reduction with miniplates fixation and closed reduction were done in most of the cases. Stainless steel or titanium miniplates were used for rigid fixation. Postoperative complications were infection, malocclusion and malunion of fracture segments.

CONCLUSION

Faciomaxillary injuries occur most commonly due to road traffic accidents and interpersonal violence. Fracture mandible, zygomatic complex associated with soft tissue injuries of face are more common. Drunken driving should be curbed in the society. Educating the people about road safety rules will bring down the faciomaxillary injuries. Provision of pedestrian friendly paths, segregation of heavy and light motor vehicles and strict governance of traffic by authorities, especially during late evening hours and on weekends is a must to minimize the physical, psychological, and emotional distress associated with trauma in general and maxillofacial trauma in particular.

ACKNOWLEDGMENTS

Authors would like to thank the Department of Plastic and Reconstructive Surgery, Thanjavur Medical College, Thanjavur, Tamil Nadu, India.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Gali R, Devireddy SK, Kishore Kumar RV, Kanubaddy SR, Nemaly C, Akheel M. Faciomaxillary fractures in a semi-urban south Indian teaching hospital: a retrospective analysis of 638 cases. Contempary Clin Dentistry. 2015;6(4):539-43.
2. Wulkan M, Parreira JG, Jr, Botter DA. Epidemiology of facial trauma. Rev Assoc Med Bras. 2005;51:290-5.

3. Krug EG, Sharma GK, Lozano R. The global burden of injuries. Am J Public Health. 2000;90:523-6.
4. Fasola AO, Nyako EA, Obiechina AE, Arotiba JT. Trends in the characteristics of maxillofacial fractures in Nigeria. J Oral Maxillofac Surg. 2003;61:1140-3.
5. Zachariades N, Koumoura F, Konsolaki-Agouridaki E. Facial trauma in women resulting from violence by men. J Oral Maxillofac Surg. 1990;48:1250-3.
6. Saddki N, Suhaimi AA, Daud R. Maxillofacial injuries associated with intimate partner violence in women. BMC Public Health. 2010;10:268-73.
7. Subhashraj K, Nandakumar N, Ravichandran C. Review of maxillofacial injuries in Chennai, India: A study of 2748 cases. Br J Oral Maxillofac Surg. 2007;45:637-9.
8. Gassner R, Tuli T, Hachl O, Rudisch A, Ulmer H. Craniomaxillofacial trauma: A 10-year review of 9,543 cases with 21,067 injuries. J Craniomaxillofac Surg. 2003;31:51-61.
9. Rana ZA, Khoso NA, Arshad O, Siddiqi KM. An Assessment of maxillofacial injuries: A 5-year study of 2112 patients. Ann Pak Inst Med Sci. 2010;6:113-5.
10. Le BT, Dierks EJ, Ueeck AU, Homer LD, Potter BF. Maxillofacial injuries associated with domestic violence. J Oral Maxillofac Surg. 2001;59:1277-83.
11. Lida S, Kogo M, Sugiura T, Mima T, Matsuya T. Retrospective analysis of 1502 patients with facial fractures. Int J Oral Maxillofac Surg. 2001;30:286-90.
12. Motamedi MH. An assessment of maxillofacial fractures: A 5- year study of 237 patients. J Oral Maxillofac Surg. 2003;61:61-4.
13. Erol B, Tanrikulu R, Gorgun B. Maxillofacial fractures. Analysis of demographic distribution and treatment in 2901 patients (25 year experience) J Craniomaxillofac Surg. 2004;32:308-13.
14. Chandra-Shekhar BR, Reddy CV. A five- year retrospective statistical analysis of maxillofacial injuries in patients admitted and treated at two hospitals of Mysore city. Indian J Dent Res. 2008;19:304-8.
15. Zargar M, Khaji A, Karbakhsh M, Zarei MR. Epidemiology study of facial injuries during 13 months of trauma registry in Tehran. Indian J Med Sci. 2004;58:109-14.

Cite this article as: Ravikumar G, Manoharan, Sugapradha GR. A study on faciomaxillary injuries in a tertiary care hospital. Int Surg J 2017;4:2450-4.