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# "Etiology, Clinical Presentation, Pattern of fracture and Treatment Modalities rendered for Maxillofacial Injuries in Government Medical College and Hospital, Nizamabad, Telangana, India: A Prospective Study"

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**Abstract:**

**Introduction:**

Background: India accounts for around 6% of the world's road traffic accidents (RTA's). The incidence of maxillofacial fractures differs from one country to another and significant variations depend on socio-economic, cultural, and environmental. Maxillofacial injuries can occur as an isolated injury or may be associated with multiple injuries to the head, chest, abdomen, spine and extremities.

Aims & Objectives: This paper aims to highlight the pattern of maxillofacial fractures in Nizamabad district of Telangana state, India. Maxillofacial fractures are classified according to etiology, age group, gender and involvement of mid-face or mandible, treatment modalities rendered at our center.

This is a prospective study with descriptive analysis of data.

Material & Methods: This is a cross sectional study with descriptive analysis of the data. Demographic data included gender, age group, the region from where the patient represented. The clinical presentation of the fracture site, etiology, and associate injuries were included in the study. Data is analyzed using Microsoft software and results are presented as frequency tables and percentages.

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Inclusion Criteria: All patients presenting with maxillofacial trauma with or without associated injuries were included in the study.

Exclusion Criteria:

1. Patients reporting for cosmetic improvement
2. Dento-facial deformities for Orthognathic surgery
3. Old cases of fractures
4. Results: Males are predominantly affected in the age group of 35-50 years of age contrary to other studies wherein younger age group is affected. Mid-face fractures had higher incidence. Open Reduction and Direct fixation using mini-plates remained the main stay of treatment.

Discussion: Road traffic accidents is the main etiological factor for maxillofacial injuries. Influence of alcohol while driving creates a cumulative effect in causing accident and trauma. Patients are predominantly affected in the age group of 31-40 years of age. Mid-face fractures involving zygomatico-maxillary complex had higher incidence. Open Reduction and Direct fixation using mini-plates was used in majority of the patient's.

**Keywords:** Pattern of fracture, maxillofacial injuries, Alcohol

**Introduction:**

World Health Organization has estimated that nearly 25% of all injuries fatalities worldwide are a result of road traffic crashes with 90% of the fatalities occurring in low and middle income countries[1]. World Health Organization (WHO), reports Road traffic accidents as one of the leading cause of death worldwide with over 1.27 million deaths[2]. India accounts for around 6% of the world's road traffic accidents (RTA's)[3]. The incidence of maxillofacial fractures differs from one country to another worldwide and even within the same country, and significant variations depend on socio-economic, cultural, and environmental factors besides age also being influencing the variation[6,7,8,9,10,11,12,13]. Maxillofacial injuries can occur as an isolated injury or may be associated with multiple injuries to the head, chest, abdomen, spine and extremities causing both emotional and physical trauma to the patient[14,15]. Maxillofacial injuries can affect both skeletal and soft tissue structures of the facial region[17,18]. The management of trauma involves multi-disciplinary approach. Proximity to vital structures, involvement of cervical spine, ocular injuries and most importantly airway involvement; significantly compromise and dictate treatment principles. Golden hour of trauma within the first 24 hours has high significance in management of maxillofacial injuries and reducing the mortality rate. Death and disability is almost instantaneous in severe maxillofacial injuries. Another important concern is the head injury sustained in such accidents. The accident victim may escape with facial deformity in mild to moderate maxillofacial injuries, but with the involvement of head injuries, fatalities are more of significance. The amount of finances lost is definitely significant, not more so the psychological impact on family members is of distressing significance. The loss of a family member leads to a change in the family dynamics and the society they belong[19]. Treatment principles for maxillofacial region remain the same as that of long bones. These include: reduction, fixation and immobilization. However, the treatment strategies,

armamentarium used and type of fixative devices have evolved with time and research. Treatment outcome of maxillofacial fractures is dependent on the degree of injury, type of fracture, the expertise of the surgeon, and available technology[20,21].

This paper aims to highlight the pattern of maxillofacial fractures in Nizamabad district of Telangana state, India. We have divided the maxillofacial fractures according to etiology of injury, age group, gender and involvement of mid-face or mandible, treatment modalities rendered at our center. Nizamabad is a major urban agglomeration and third largest city in the state. Patients with maxillofacial injuries are referred to us from Primary Health Centers, Area Hospitals and District Hospitals. A systematic approach to the patient's is implemented at the center with a multi-disciplinary approach and protocol. Since, this center is a teaching medical college hospital, team approach with inter-disciplinary approach is followed.

Material and Methods:

A prospective study was conducted for patients reporting with maxillofacial injuries over a period of 2 years. This is a cross sectional study with descriptive analysis of the data. The study included patients who directly reported to the Dental Department and also patient's referred from Peripheral health centers and District Hospitals of adjoining areas/districts. Demographic data included gender, age group, the region from where the patient represented. The clinical presentation of the fracture site, etiology, and associate injuries was included in the study. Data is presented as frequency tables and percentages.

Inclusion Criteria: All patients presenting with maxillofacial trauma with or without associated injuries were included in the study.

Exclusion Criteria:

5. Patients reporting for maxillofacial surgeries for cosmetic improvement
6. Patients with Dento-facial deformities indicated for Orthognathic surgery
7. Old cases of fractures with malunion and non-union
8. Patient's treated elsewhere and referred to our center for secondary surgeries or for inter-maxillary fixation removal.

**Results:**

A total number of 271 patients reported to our department with Maxillofacial injuries. As shown in Graph 1, Of these, 194 patients had reported directly to our institution and the rest 77 were referred from other hospitals/health centers.

Table 1 and Graph 2 shows distribution of maxillofacial injuries according to age group and gender. Of the 271 patients, 204 were males and rest 67 were females. Significant male preponderance was observed among all age groups and for varied etiologies.

Road traffic accidents remained to the primary cause of these injuries (n=162), followed by Inter-personal assaults (n=84), falls from height accounted to 21 and the rest 6 patients etiology was not known (Table 2, Graph 3). Among the patients with Road traffic accidents (i.e 162 out of 271), 117 were under the influence of alcohol. Similarly, 59 of the 84 patients with inter-personal violence and 13 of the 21 patients with falls were under the influence of alcohol.

Table 3 shows the distribution of maxillofacial fractures according to the site. 169 patients presented with middle third fractures and the rest 102 patient's had sustained mandible fractures. Majority of the fractures (131 out of 169) had zygomatico-maxillary complex fractures and the rest 38 had Le-fort fracture pattern. Among the 102 mandible fractures, 41 had body of the mandible fracture, 12 had angle fractures, 17 had parasymphysis fracture, 14 presented with symphysis fractures, and the rest 18 sustained condyle fractures.

Distribution of maxillofacial injuries according to the treatment rendered is shown in Graph 4. Conservative treatment was advised in 41 patients. Closed reduction and indirect fixation done in 91 cases. Open Reduction and Direct fixation was done in 62 patients. 51 patients were treated with Open Reduction and Direct Fixation and Intermaxillary Fixation. 26 patients were referred to higher center with neuro-surgical facility.

As shown in Graph 5, 93 of the 271 patient's had other fractures involving long bones. 8 patients had associated rib fractures. 11 patients has sustained blunt addominal trauma along with maxillofacial injuries. Rest 159 patients had sustained only maxillofacial injuries. None of the patients had C-Spine injury and head injury.

**Discussion:**

Maxillofacial Injuries and Road Traffic Accidents have become an integral part of trauma. Reasons behind high incidence of fractures of the craniofacial area are prominence of facial bones, position and anatomic configuration[22]. Road traffic accidents, falls, sports, domestic violence, assaults, suicide and gunshot injuries represent the leading cause of maxillofacial fractures[23]. Abhinav RP *et al.,* in their retrospective study of 7 years involving 944 patients with maxillofacial trauma, highest incidence of maxillofacial trauma was observed in third and fourth decades of life[14]. They stated that excessive consumption of alcohol is strongly associated with maxillofacial trauma. Shah A *et al.,*in their evaluation of maxillofacial fractures involving hilly region of Garhwal Himalyas conducted a prospective study involving 102 patients[24]. Higher incidence of maxillofacial fractures were reported in the months of april to june due to tourist visit, pilgrimage during these months. This is an interesting finding as none of the literature mentioned specific months in their study design including the current study. In their study, concomitant with other studies and similar to findings of this present study, Road traffic accidents were the main cause of maxillofacial fractures and the highest incidence in their study was in the age group of 20-40 years. In the present study, highest incidence was in the age group of 35-50 years of age group. Assiri ZA *et al.,* conducted a retrospective radiological evaluation to study the prevalence and pattern of maxillofacial fracture involving 263 patients over a period of 9 years. Males were predominantly affected, mean age of occurrence was 26.2 years and mandible fracture was the reported type among all fractures[4]. In the present study, Zygomatico-maxillary complex fractures were the predominant type followed by mandible fractures.

Dube A *et al.,* stated that Maxillofacial trauma leaves an everlasting impression on patient's psychological development and behaviour[3]. In their study involving 250 patients, adult males and concomitant to the finding of this present study, mid-face fractures were more

commonly affected than mandible. Udeabor SE *et al.*, in their study to assess the etiology, pattern of presentation and treatment in University of Port Harcourt, Nigeria mentioned mandibular fracture with 59.2% and closed reduction as main stay of treatment due to cost and non-availability of mini-plates for open reduction[16]. Contrary to their study, in the present study Open Reduction and direct fixation using mini-plates was the main treatment modality in majority of the patient's. Treatment choice is governed by site of fracture, displacement of fracture segments, ability to achieve occlusion by closed reduction, medical condition of the patient, expertise of the surgeon. Of course, economic condition of the patient, availability of the mini-plates also govern the choice of treatment. In our center, a Government run teaching hospital, though most of the patient's are from poor socio-economic status, Arogyasri – A Government run scheme covers the cost of treatment. As such, entire treatment rendered is free of cost and the surgeon has the choice of opting Open Reduction and direct fixation in indicated cases.

Ascani G *et al.*, in their study to assess the etiology and pattern of maxillofacial fractures in Italy stated that there is close association between maxillofacial injuries and alcohol consumption[6]. These results are similar to the present study wherein majority of patient's with road traffic accidents having sustained maxillofacial injuries were under the influence of alcohol. In their study, 6 of the 306 patients had sports related injuries affecting maxillofacial region. None of the patient's in the present study had sports related injury. Also, none of the patients in our study had C-spine injury. This may be due to the fact that we have included only those patient's who have reported to the department with maxillofacial injuries. Those patients who have been referred to higher center directly from causality have been excluded in the study.

Conclusion:

Road traffic accidents is the main etiological factor for maxillofacial injuries. Influence of alcohol while driving creates a cumulative effect in causing accident and trauma. Patients are predominantly affected in the age group of 31-40 years of age similar to other studies. Mid-face fractures involving zygomatico-maxillary complex had higher incidence than mandible fractures. Open Reduction and Direct fixation using mini-plates was used in majority of the patient's. Though this is a prospective study, the limitation is short duration of 2 years.

Conflict of Interest: Nil

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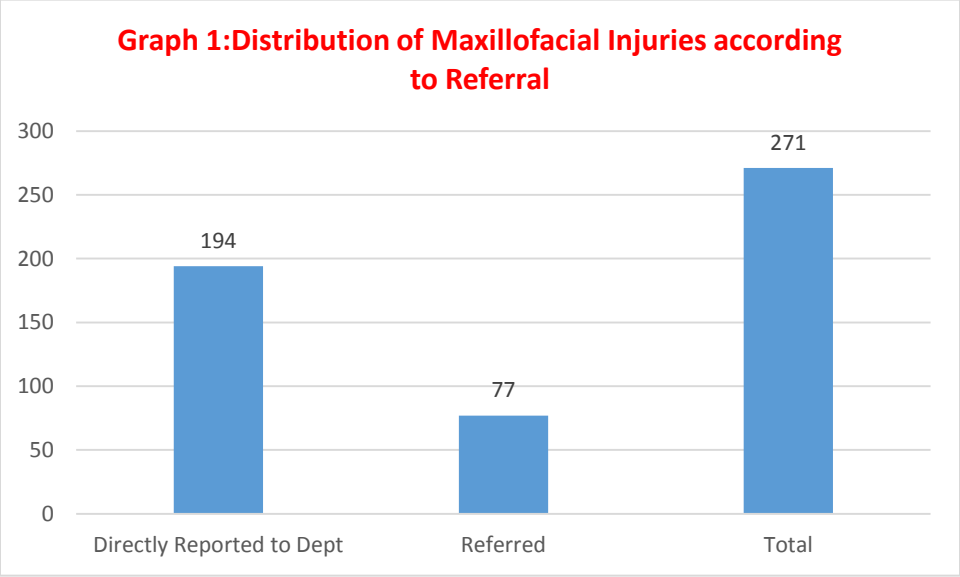
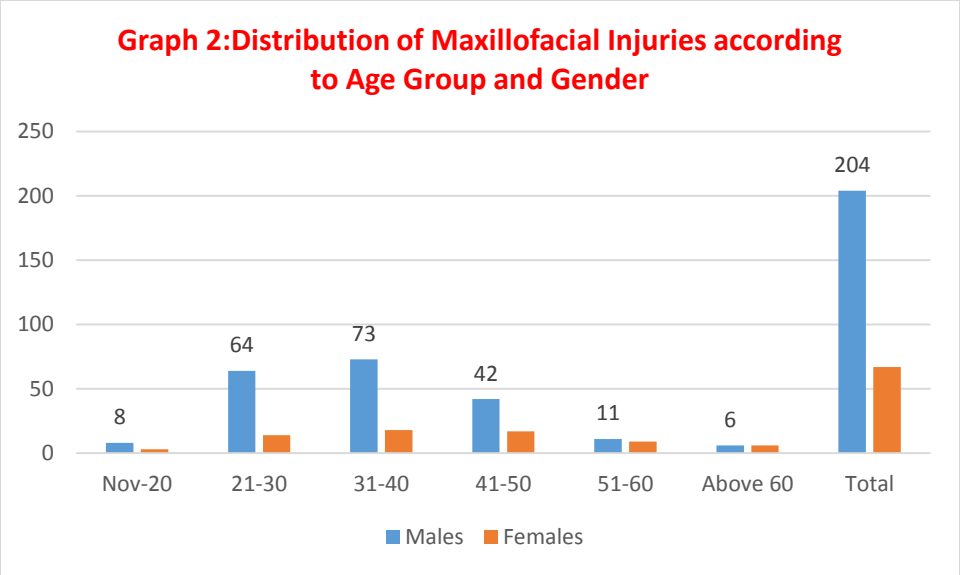
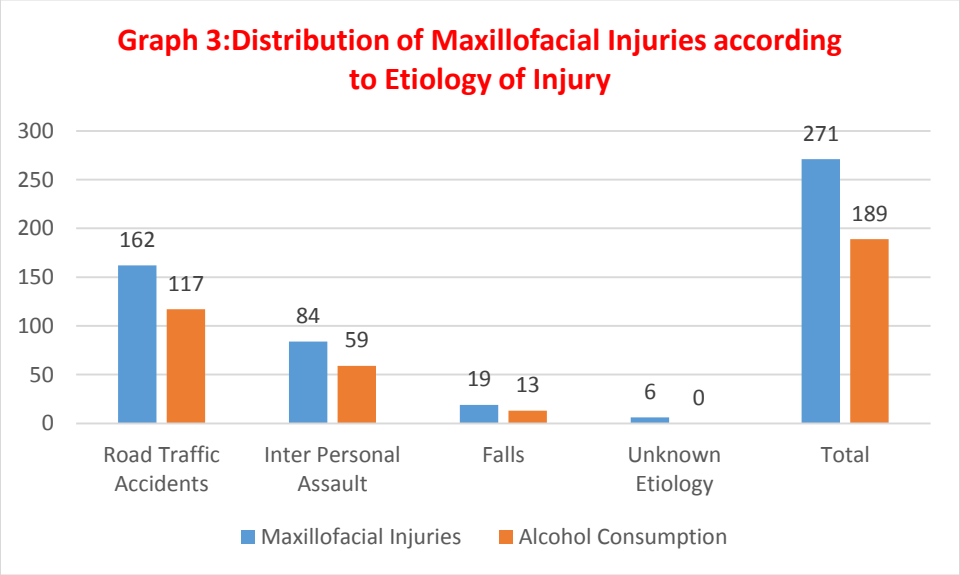
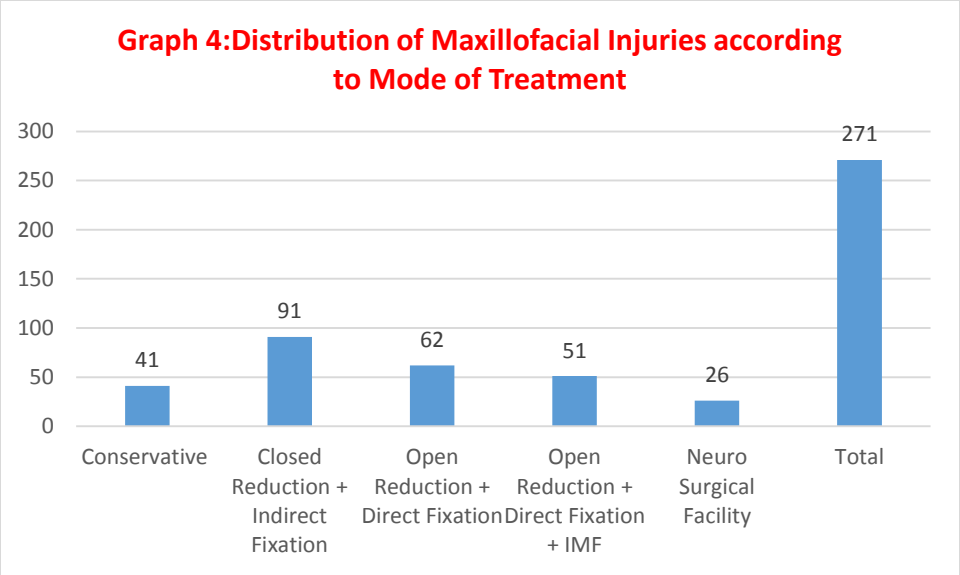



Graph 2:Distribution of Maxillofacial Injuries according to Age Group and Gender
250
200
150
100
50
0
8
64
73
42
11
6
204
Nov-20
21-30
31-40
41-50
51-60
Above 60
Total
Males
Females


Graph 3:Distribution of Maxillofacial Injuries according to Etiology of Injury
300
250
200
150
100
50
0
162
117
84
59
19
13
6
0
271
189
Road Traffic Accidents
Inter Personal Assault
Falls
Unknown Etiology
Total
Maxillofacial Injuries
Alcohol Consumption



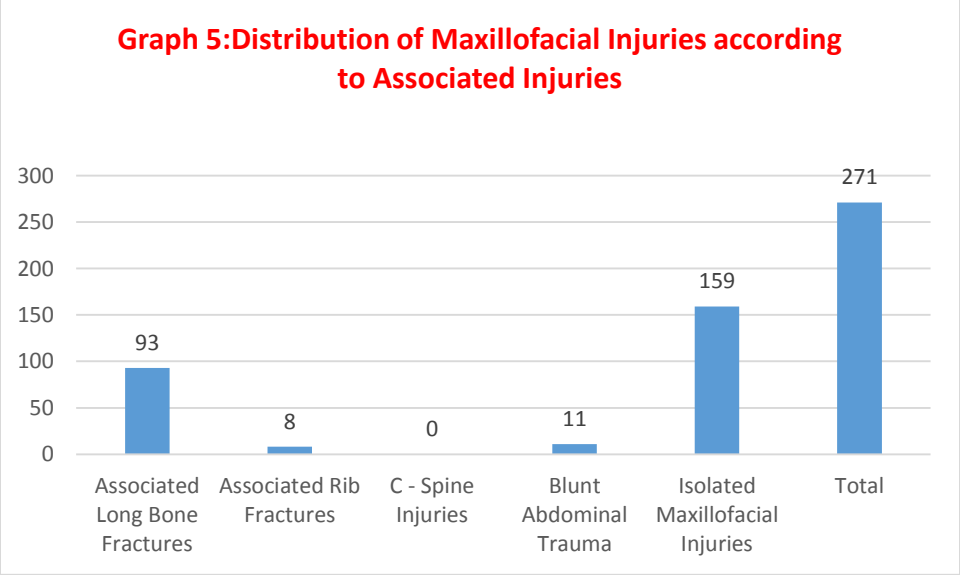




**Table 1:Distribution of Maxillofacial Injuries according to Age Group and Gender**

| Age Group | Males | Females |
|---|---|---|
| 11-20 | 8 | 3 |
| 21-30 | 64 | 14 |
| 31-40 | 73 | 18 |
| 41-50 | 42 | 17 |
| 51-60 | 11 | 9 |
| Above 60 | 6 | 6 |

| | | |
|---|---|---|
| Total | 204 | 67 |