

ORIGINAL ARTICLE

## A study of incidence and prevalence of Facial Fracture associated with fracture of Upper or Lower Limbs

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### Abstract

**Background:** Facial fractures patients may also experience numerous injuries of other regions of the body. These associated injuries can worsen the facial trauma prognosis as some of these can result in various functional disabilities. The present study was done to evaluate the incidence and prevalence of the facial fractures associated with the fracture of the limbs, either upper or lower limbs. **Methods:** The present study was carried out on 178 accident patients having facial trauma. Detail history was recorded from patients affected with facial trauma along with 2 or 3 diagnostic radiographs. Age, gender, cause, type of injury and fractures elsewhere in the body particularly limbs were recorded. The study was carried out at emergency department of the hospital over a period of 1 and half year. **Results:** A total of 178 patients were included in the study. Out of these males were predominantly affected (67.97%), with mean age found to be 38.8 years. Road traffic accidents were the most common cause of injury (53.93%) and among facial bones, mandible was the most common bone involved (73.03%). In % of patients were associated with the other associated injuries of the upper or lower limbs. Out of the associated injuries of the limbs, fracture of the tibia (32.35%) and ulna (26.47%) were the most common orthopedic injuries. **Conclusion:** Our study showed a high frequency of trauma in males in 3rd decade of life. Road traffic accident (RTA) was the most common cause and mandible the most common bone affected. Tibia and ulna were common associated injuries with facial trauma.

**Keywords:** Facial fractures, Road Traffic Accidents, Fractures of the limbs.

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### Introduction

There has always been a great diversification of human exposure to aggressive agents, making them progressive targets of numerous types of trauma, including maxillofacial fractures.<sup>1</sup> Trauma is a common worldwide problem which has importance in public health. It is one of the causes of morbidity and mortality.<sup>2</sup> Among the various injuries during the trauma, facial fractures are common, as it is positioned at the anatomically exposed position and also the fragility of the facial bones makes it more vulnerable to the fractures.<sup>3,4</sup> Facial fractures may result in functional and aesthetical

impairments. Furthermore, facial fractures patients may experience a variety of concomitant injuries with some of them being life threatening such as head injury. These associated injuries worsen the facial trauma prognostic as some of them may result in functional disabilities or even death.<sup>4,5</sup> Victims of facial injury often sustain multiple injuries to other organ systems.<sup>6</sup> Road traffic accidents (RTAs) are most commonly responsible for multiple injuries.<sup>7</sup> Orthopedic injuries are commonly associated with maxillofacial trauma and road traffic accidents are particularly at risk. Most often, bones of the lower limb are involved.<sup>4,7</sup> The initial assessment of a person who is injured significantly from poly trauma is

a challenging task and each minute makes a difference between life and death. So immediate diagnosis and intelligent cooperation between anesthetist, general surgeon, orthopedic surgeon, plastic surgeon, maxillofacial and neurosurgeon may greatly affect the outcome and hence lessen the mortality and morbidity in poly trauma patients.<sup>8</sup>

The purpose of this study was to evaluate the rate of associated limb injuries with maxillofacial fractures and most common limb bones involved with poly trauma patients.<sup>8</sup>

## Materials & Methods

This descriptive cross-sectional study was conducted at emergency department of the hospital over a period of 1 an half year. All the facial trauma patients coming to the department were evaluated during this period and detailed case history was recorded. All the procedures of the study were explained to the patient and informed consent was taken from all the patients. Approval from the ethical committee was obtained before start of the study. At least two diagnostic radiographs (Plane X-rays like Orthopantomograms (OPG), postero-anterior view face, paranasal sinus view (PNS), right and left lateral oblique view of the mandible) were taken for every case and advance imaging like computed tomography (CT scan) was done where needed. Associated injuries were recorded especially injuries or fractures of the upper or lower limbs. Statistical analysis was done in IBM SPSS version 20.0. The frequency and percentage was computed for qualitative variables, like gender, causes, and associated injuries. Mean± standard deviation was computed for qualitative variables, like age. No inferential test was applied due to descriptive statistics.

## Results

A total of 178 cases of facial fractures were registered in emergency department during the study period; out of these 34 (19.10%) were associated with the 39 limb fractures with 4 patients having more than one bone fracture. Only the patients having alone facial fractures and along with limb fractures were included in the study. A total of 289 fractures were seen in these polytrauma patients. The age range of the

patient was from 10 years to 67 years with the mean age of 38.8 years. Males were predominantly affected (121 patients, 67.97%) than females. (Table 1)

**Table 1:** Distribution of the facial trauma patients according to age.

Age	Frequency (n=178)	Males n=121	Females n=57	%
11-20 years	21	14	07	11.79
21-30 years	50	36	14	28.08
31-40 years	39	25	14	21.91
41-50 years	31	21	10	17.41
51-60 years	23	17	06	12.92
61-70 years	14	08	06	07.89

Various causes of the polytrauma was found like road traffic accidents, assault, falls, fire arm injuries and sports injuries, with most common being road traffic accidents (53.93%). (Table 2)

**Table 2:** Table showing the etiology of the trauma.

Etiology	Frequency	%
Road traffic accidents	96	53.93
Assault	49	27.52
Fall	23	12.92
Fire arm injuries	07	3.93
Sports injuries	03	1.68

**Table 3:** Distribution of the patient according to the various limb bone involved.

Limb bone involved	Frequency	%
Tibia	11	32.35
Ulna	09	26.47
Humerous	07	20.58
Radius	05	14.70
Femoral	04	11.76
Fibula	03	8.82
Total	39	100

Mandible was the most common bone involved in the facial injuries (130, 73.03%), followed by maxillary region (49, 27.52%), isolated zygomatic complex (40, 22.47%) and dentoalveolar injuries (31, 17.41%). Among the limb bones involved along with the facial bone fractures, tibia was most commonly found

(32.35%), followed by ulna (26.47%) and humerus (20.58%). (Table 3)

## Discussion

Trauma registry in India is still in the developmental stages with relatively few published data, thus making documentation of injuries inadequate and posing great difficulty in assessing these data. Road traffic accidents are responsible for a substantial proportion of deaths & injuries and are responsible for more years of life lost than most human diseases.<sup>6</sup> It is expected that by the year 2020 RTA will rank third in the global burden of diseases. The world health organization's world health day for 2004 was dedicated to road safety.<sup>9</sup> Facial skeleton injuries may include upper third, middle third, lower third of the face, with or without soft tissues involvement and majority of the times dentition may also have injuries like intrusion, extrusion, luxation or tooth crown fractured. Among facial skeleton injuries most frequent site of fracture is mandible followed by maxilla, isolated zygomatic bone and nasal bone. The reason for mandible fracture to be most common is due to its position; prominence and mobility. Similar findings were found in the present study with mandible being involved in 73% of the patients. Facial skeleton injuries are hardly ever fatal, but these injuries definitely cause physical/psychological distress to the patient.<sup>8</sup> According to several previous studies it is highlighted that facial injuries occur alone or in combination with other fractures e.g. upper and lower limb injuries, hip bone injuries and chest injuries; these injuries occur due to high and low force of impacts like from road traffic accidents (RTA), assaults, gunshot, blasts, sports, fall, etc, and mostly all age groups are affected. More than 1 million peoples died and around 15 to 20 million peoples are affected in road traffic accidents (RTA) annually according to the statistics of World Health Organization (WHO).<sup>8</sup> Maxillofacial trauma is still no doubt a challenge, especially in early treatment stages in combined trauma patients. These injuries are a common pathology, which every physician can meet, regardless of the place they work. These maxillofacial trauma patients can be accompanied by various injuries that affect other organs and systems.<sup>10</sup> Considering the clinical aspects of the trauma, the high rate of

complex nasal fractures and zygomatic orbital fractures are obviously related to the prominent position of these anatomical structures inside the facial skeleton, and their greater exposure to the external trauma. Added to the facial trauma, it is possible to identify associated injuries and classify six organ systems related to these lesions: 1) brain, 2) chest, 3) abdomen, 4) pelvis, 5) spine, 6) limbs. There are considerable statistical differences in the occurrence of injuries associated among gender, age group, trauma mechanism, and type of fracture. The mechanism of these traumas may be through automobile accidents, falls, interpersonal violence, sports, and victims hit with objects.<sup>11</sup> Hands and arms are usually used by patient's victims of trauma as protection against a facial lesion, while legs and thorax are usually directly impacted in car accidents or falls.<sup>11</sup> Trauma able to fracture multiple facial bones is also likely to have velocity and distribution to cause injuries of other parts of the body like limbs than the facial skeleton. In single facial fractures, occurrence of AIs more in the mandible than in the maxilla and zygomatic complex.<sup>5,6</sup> The factors and concomitant injuries associated with maxillofacial trauma are diverse and vary from area to area depending on age, gender, ethnicity, culture and socio economic status. A wide age range was included in this study but the mean age was found to be in 3rd decade. This correlates with other studies done in Yoffee T et al<sup>12</sup> and Malara P et al<sup>13</sup>. Similar results were also obtained in Pakistan.<sup>15</sup> Reason may be due to the fact that people in young age are relatively more energetic and involved in activities, also this age group is mostly involved in violence and careless in following rules of traffic.<sup>8</sup>

In the present study the most common cause of facial injury was found to be road traffic accident (RTA) followed by assaults while sports was associated least with facial fractures. This finding has been proven consistently by many other studies done in Malaysia, Brazil, and Middle East.<sup>8</sup> Another finding in this study was the association of lower limb fractures which as compared to upper limb were more often involved. similar results were obtained by Thoren H et al<sup>14</sup> and Khan M et al<sup>15</sup> This however is not supported by various other international studies which show that limb

fractures are less commonly associated with facial trauma. This points to the fact that type of associated injury varies with difference in impact and cause of trauma.<sup>8</sup>

The diagnosis of maxillofacial fractures can be challenging, as haematoma and swelling can mask the extent of the underlying injury. Overlooking a fracture may not have immediate consequences, but can result in disfigurement and permanent disability. Not only does this result in a disgruntled patient, it may affect their ability to continue to perform their occupation.<sup>16</sup> The management of fractures of the maxillofacial complex remains a challenge for the oral maxillofacial surgeon, demanding both skill and expertise. The success of treatment and implementation of preventive measures are more specifically dependent on epidemiologic assessments.<sup>17</sup> In conclusion, injuries elsewhere may exist in patients with maxillofacial trauma and, conversely, maxillofacial trauma may coexist with other injuries in a high proportion of cases. This inter-relationship makes it necessary for the maxillofacial surgeon to be part of a multidisciplinary trauma team. This ensures that there are no delays in consultations and referrals and that maxillofacial injuries are managed promptly at the same time as the associated injuries. This is imperative for the best aesthetic and functional results.<sup>7</sup>

## Conclusion

Concomitant injuries of limb are not uncommon in facial fracture patients with some of them being lethal. Initial full examination of the patients particularly victims of violence, patients presenting with multiple facial fractures or single facial bone fracture involving the mandible, is recommended as well as multidisciplinary management and trauma prevention.

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