

Prevalence of Maxillofacial Fractures in Southern Provinces of India

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ABSTRACT

Objective: The study was conducted to evaluate the prevalence of maxillofacial fractures in southern provinces of India.

Materials and methods: Data of a total of 2,037 patients were analyzed retrospectively over a period of 3 years, i.e., from 2010 to 2013, from various maxillofacial trauma centers of Karnataka, India.

Results: Study revealed that the maxillofacial fractures had male (87.5%) preponderance and its peak incidence was during 20 to 30 years of age. Isolated mandibular fractures were the most common type of fractures with 1,035 patients (50.81%), followed by isolated midface fractures in 526 patients (25.82%). Among midface fractures, zygomatic bone and arch were most frequently involved.

Conclusion: Mandible was the frequent site involved. Among maxillary fractures, zygomatic bone and arch were more often involved.

Keywords: Fractures, Mandible, Maxillofacial fractures, Prevalence.

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INTRODUCTION

The anatomy of the head is complex; skin, bone, and brain have very different physical properties. In view of the fact that the facial skeleton components articulate and interdigitate in a complex fashion, it is difficult to fracture one bone without disrupting its neighbor.^{1,2} The severity of the fracture will depend on the magnitude of the impacting force, impact duration, the acceleration imparted by it to the part of the body struck, and the

rate of acceleration change. The surface area on which the impact strikes is also relevant.^{3,4}

Several studies have investigated the epidemiology of facial injuries in different countries and populations. However, there are still limited data regarding the epidemiology of facial injuries in developing countries. The incidences and demographic distribution of the fractures vary depending on the geographical area, socioeconomic trends, road traffic accidents, alcohol and drug abuse, and seasons.² Fracture of the facial skeleton varies in pattern of presentation, depending on the etiology of injury. Common etiologies for facial bone fractures are traffic accidents (motorcycle, automobile, bicycle, pedestrian hit), assault, fall from a height, sports, industrial/work-related accidents, others/miscellaneous (gunshot injuries, train accidents, pathological fractures).⁵

Such epidemiological information can also be used to guide the future funding of public health programs geared toward their prevention.

MATERIALS AND METHODS

Data of 2,037 patients were analyzed retrospectively over a period of 3 years, i.e., from 2010 to 2013. Data were obtained from the records of inpatients admitted under maxillofacial surgery units of trauma centers located at various districts of Karnataka state. The diagnosis of fracture was based on the clinical history, signs and symptoms, visual findings, manual examination, and correct interpretation of radiographs. Associated injuries were noted. Fractures including the base of the skull were not included in the present study.

RESULTS

The data of the study were analyzed on percentage basis. The annual incidence of facial fractures is comparatively increased in the year of 2013 than the previous years (Table 1). There was a male preponderance, with the male to female ratio being 7:1. Predictably, the most susceptible

Table 1: Annual incidence of fractures of facial skeleton

Year	Percentage
2010	20.88
2011	23.28
2012	25.03
2013	30.81

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Table 2: Age and gender distribution

Age group (years)	Males	Females	Total	Percentage
0–10	53	26	79	3.89
11–20	331	50	381	18.79
21–30	683	101	784	38.67
31–40	429	27	456	22.49
41–50	158	24	182	8.97
51–60	77	18	95	4.68
>60	44	6	50	2.46
Total	1,775	252		

Table 3: Prevalence of facial fractures

Causes	Mandible	Maxillary	Mandible+Maxillary	Dentoalveolar	Nasal	Orbital blowout	Total
Total	1,035	526	305	73	57	41	2,037
Percentage	50.81	25.82	14.97	3.58	2.84	1.98	

age group in both the genders was 21 to 30 years (Table 2). The most common fracture which was noted in the present study was mandibular fractures. Among 1,340 patients with mandibular fractures, 1,035 (50.81%) were with isolated mandibular fractures and 305 (14.97%) with associated midface fractures. This is followed by isolated midface fractures in 526 patients (25.9%) (Table 3).

A total of 929 fractures were seen in the middle third facial skeleton, in which zygomatic bone and arch accounted for 50.2% (447 patients) followed by LeFort II fracture in 16.8% (114 patients), and then unilateral LeFort II, nasal complex fractures, LeFort I and II, unilateral LeFort I, LeFort I, blowout fractures in descending order. And LeFort III isolated and in combination with LeFort I and II were the least encountered fractures.

Fall from height was the common cause for isolated alveolar fracture accounting for 73 patients; next common causes included fractures due to motorcycle accident, assault, and bicycle accident in decreasing order (Table 4).

Table 4: Sites of fractures of the middle third of facial skeleton

Types of fracture	Number of cases	Percentage
Zygomatic bone and arch	447	50.28
Unilateral LeFort I	45	5.06
Unilateral LeFort II	58	6.52
LeFort I	43	4.83
LeFort II	114	16.82
LeFort I and II	46	5.17
LeFort III	15	1.68
LeFort I and III	16	1.79
LeFort I, II, and III	8	0.89
Nasal complex	57	6.41
Orbital blowout	40	4.49
Total	929	45.60

DISCUSSION

Epidemiologic surveys will vary with geographic region, population density, socioeconomic status, regional government, era in time, and type of facilities in which the study was conducted.⁵ The present study was carried out in different districts located within Karnataka, India, to evaluate the prevalence of fracture of facial skeleton.

The finding that patients were aged between 21 and 30 years indicates that young people suffer more trauma, which constituted the group with the highest frequency of jaw fracture. This finding was inconsistent with the previously published reviews by Al Ahmed et al,⁶ Adekeye,⁷ Holmes et al,⁸ and Erol et al.⁹

As would be expected, there was a male preponderance: 87.5% of the cases were men and 12.4% were women in the ratio of 7:1, which can be explained by the fact that Indian subcontinent has lot of social and religious limitation encountered by females, especially in southern India. Similar results were reported by Shankar et al⁵ and Adekeye.⁷ Further, Bakardjiev and Pechalova¹⁰ and Lee and Steenberg¹¹ in retrospective studies investigated the prevalence of maxillofacial fractures in southern Bulgaria and Jeju in Korea respectively. Correspondingly, they reported a higher number of injuries in males, compared with females.

In the present retrospective study, mandibular fractures were more common of all of the facial fractures accounting for about 65.78%, which included both isolated and combined mandibular and midfacial fractures. These findings were similar to previous studies. Following the mandibular fractures, the midface fractures were more common. This finding is similar to previous studies reported in the literature.^{5,9,10} This ratio has become smaller as fractures of the midface have increased with road traffic accidents, falls, and assault.⁹

Shankar et al⁵ in a retrospective analysis showed that the second most common type of fracture in the maxillofacial region was maxillary fracture. In the present research, majority of the midface fractures were zygomatic bone and arch fractures, accounting for 50.2%, followed by LeFort II, unilateral LeFort II, nasal complex, LeFort I and II, unilateral LeFort I, LeFort I, blowout fractures, in descending order. This finding is in contrast with the reports of previous studies. Zandi et al¹² and Hussain et al¹³ showed that nasal bone fractures were the most prevalent type of trauma of nasal bone fractures that comprised only 2.84% in the present study. Some other studies found that facial fractures in the zygomatic complex were more frequent. Minor differences in the frequency of fractures can be caused by variations in the etiology of fractures in various studies.

Facial injuries of all severity levels can be reduced by 25% by the use of restraints, thereby decreasing the frequency of health care services.¹⁴ Preventive measures, such as the obligatory wearing of a crash helmet, use of seat belt, and the accentuated enforcement of the law regarding "drinking and driving," educating individuals about the dangers of all-terrain injuries, and providing proper safety guidelines before the purchase of a vehicle,¹⁵ showed striking reduction in road traffic accidents. Traffic accidents are the leading cause of maxillofacial fractures from observations made from the study. Citizen awareness programs have to be initiated. Legislative preventive measures are to be enforced and abided by every citizen.

CONCLUSION

Considering the geographic and cultural indices of the evaluated population, it can be concluded that the patients age and gender are trauma causes. Mandible was the frequent site involved. Among maxillary fractures, zygomatic bone and arch were more often involved. These findings will be helpful for appropriate health care policy and management setup in every society.

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