

## Case Series

# Epidemiological analysis of facial fractures

Deepalakshmi Tanthry, Aisha Nehla\*, Mahesh Santhraya, Devan Poothatta Pannen

Department of Otorhinolaryngology, A.J. Institute of Medical Sciences, Mangalore, Karnataka, India

**Received:** 04 May 2021

**Revised:** 10 June 2021

**Accepted:** 14 June 2021

**\*Correspondence:**

Dr. Aisha Nehla,

E-mail: [smarty.nea@gmail.com](mailto:smarty.nea@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

Facial trauma occurs in significant proportion of trauma patients requiring prompt diagnosis of fractures and soft tissue injuries with possible emergency intervention. The epidemiology of facial fractures varies with regards to Injury type, severity, and cause depending upon the population studied. The aim of the study was to understand the cause, severity and temporal distribution of facial trauma and aims in focusing on clinical and research priorities for effective treatment and prevention. It was done in the department of otorhinolaryngology at a tertiary health care centre. 100 patients between the age group of 20-60 years of both the sexes were included in the study. Patients were evaluated thoroughly with prime focus on the radiological intervention i.e., Computed tomography and X-ray. Open or closed reduction was carried out depending on the type and site of fracture. Facial fractures were found more commonly in third decade of life. Most of them had a period of hospital stay of an average of 9 days. Open reduction and internal fixation was done in cases of zygoma fractures and closed reduction was done in nasal fractures. Road traffic accidents were reported as commonest cause for facial fractures followed by assault and fall respectively. Males were the common victims. Nasal bones were the foremost fractures followed by zygomatic fractures. Closed reduction was done in nasal bone fractures. Open reduction and internal fixation was done in all cases of zygoma fractures

**Keywords:** Facial fractures, Radiological intervention, Road traffic accidents, Closed reduction, Open reduction

### INTRODUCTION

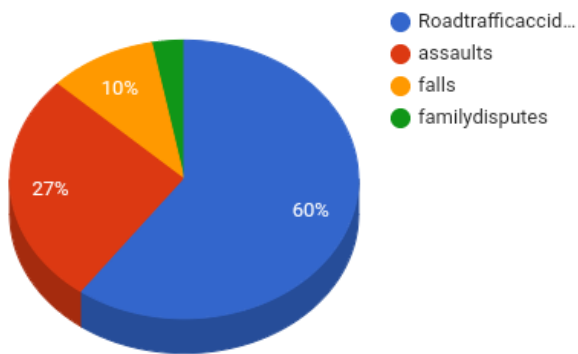
Injuries to the face are common and account for 10% of all accidents and emergency department attendances.<sup>1-5</sup> Aesthetically, first impressions of a person in terms of their intellect, ability, trustworthiness and even sexual orientation are influenced by facial appearance.<sup>5</sup> Functionally the facial skeleton provides support to the muscles of facial expression and these in turn act as the sphincter that protects the eyes and make the mouth competent.<sup>5</sup> The facial skeleton holds and supports the eyes in the optimum position for binocular vision and the orbital margins provide additional protection for the orbit.<sup>7</sup> Maxillofacial injuries are often associated with significant morbidity, loss of function and quality of life.<sup>2</sup> Therefore, lesions of the maxillofacial complex are significant public health problems, not only for the cost but also because of

functional and aesthetic problems that patient can suffer. The clinical characteristics can vary according to social issues, geopolitical variations and technological advances. This regional epidemiological study can help develop more efficient ways to provide health care services and to assess and improve quality, in addition to creating strategies for prevention, for financing and to access to treatment in the public sector. This study aims at analyzing various factors related to facial fractures such as age, gender, most common causes, most frequently involved bones, and routinely performed surgical intervention.

### CASE SERIES

The study consisted of 100 case records of patients with maxillofacial injuries treated in the department of

otorhinolaryngology of our tertiary health care centre, from June 2018 to June 2020.



**Figure 1: Etiological distribution of facial fractures.**

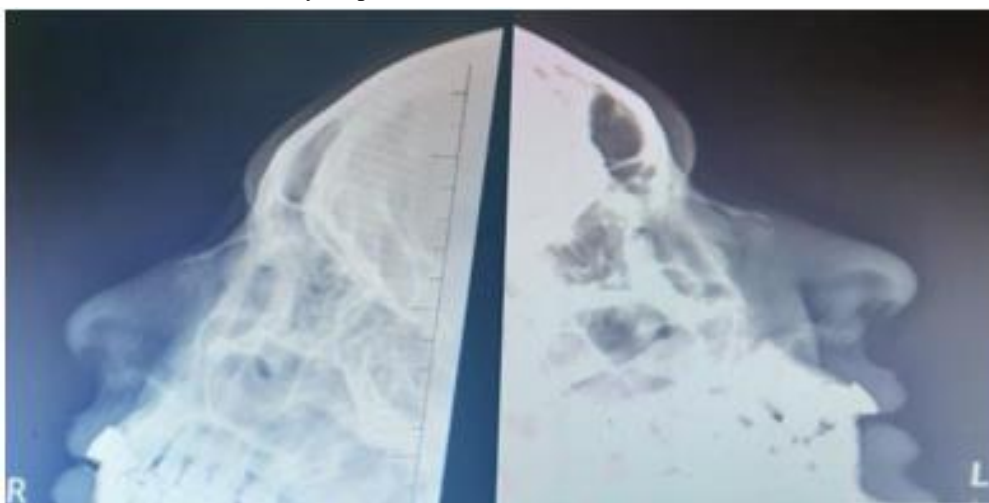
**Table 1: Distribution of facial fractures in males and females.**

Types of fracture	Males	Females
Nasal bone fractures	35	10
Zygomatic body fractures	19	7
Zygomatic body+arch fractures	13	3
Nasoethmoid complex fractures	5	2
Maxilla lefort fractures	4	2

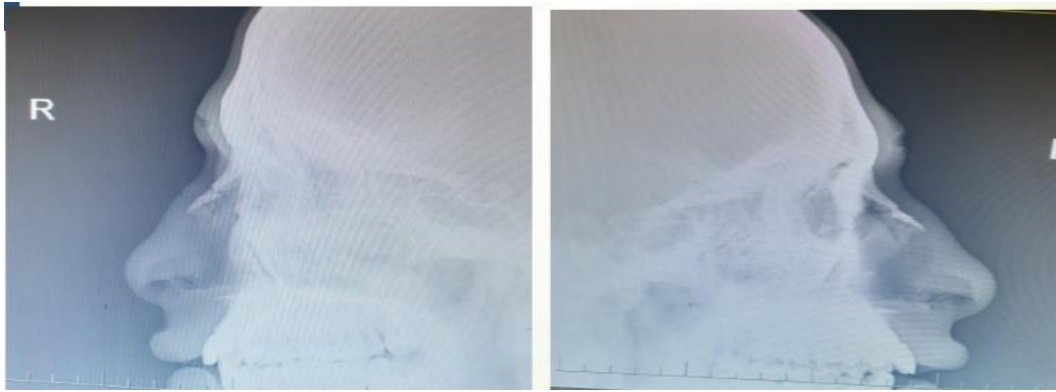
On admission the patients gave their consent to use the data obtained during examination and treatment. Detailed analysis was carried out on the case records of 100 patients with maxillofacial injuries due to various causes. Other than history, examination findings on admission, patients age and gender, information was also obtained regarding pattern of injury and detailed description of accident. Patients included in this research were between 20-60 years of age irrespective of gender without significant comorbidities. Around 60% of cases reported with history of road traffic accident as a cause of injury, where as other cases assault (20%), falls (18%) and family dispute (2%)

(Figure 1). The injuries that the patients suffered were grouped based on the facial bone involved- nasal bones, zygoma, zygomatic body, arch plus body and Le forte fractures (Table 1).

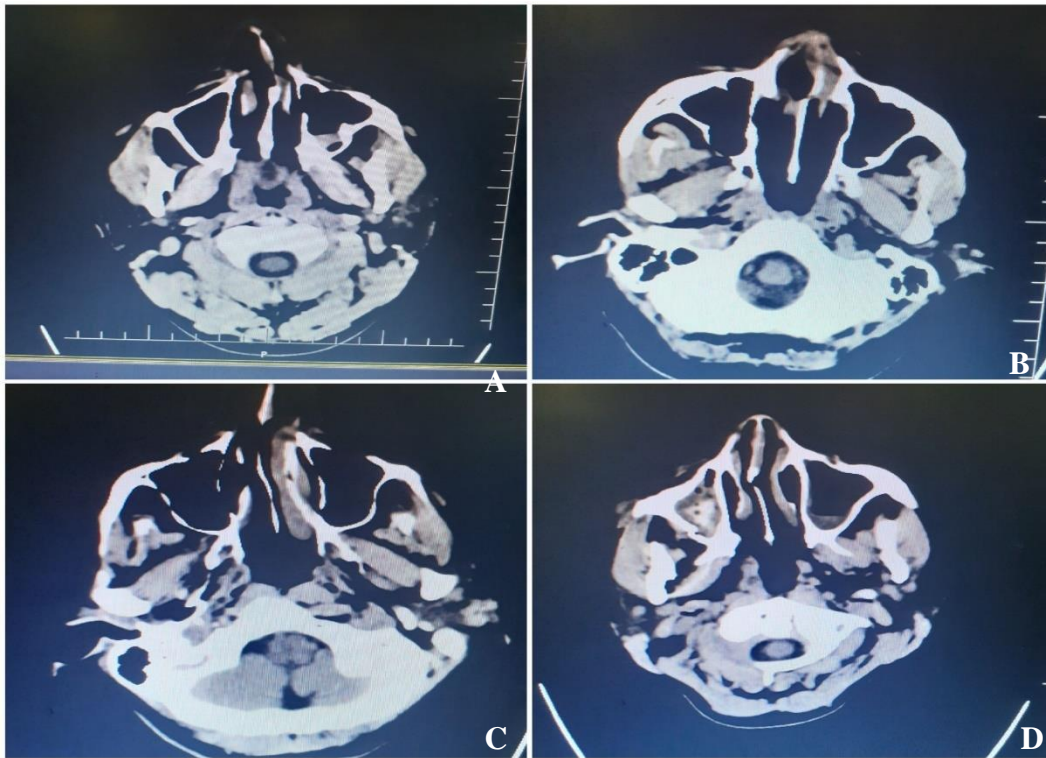
Cases of mandibular fractures and brain injuries were excluded. The fractures are mainly grouped based on the bone maximally involved or affected by the injury. Based on the facial bone involved- patients were categorised and studied. The study included basic information regarding the patient like age, gender, nature of trauma causing facial fracture, in addition to the bones involved. Management of patient is also taken into consideration. Out of the hundred patients included in the study, almost three-fourth of the patients presented with nasal bleeding, which was the main complaint is around 50% of the cases and in the rest of the cases it was associated with other complaints. Nasal obstruction (70%), nasal deformities (40%), facial deformities (40%), visual disturbances (25%) like diplopia, subconjunctival hemorrhage, periorbital ecchymosis and restricted eye movements, infraorbital numbness (10%), altered sensation over the cheek (4%), altered bite (35%) were other presenting complaints. Other than these complaints, patients also had associated limb injuries, soft tissue injuries. Injuries to other regions of the body that required attention. Patients were evaluated thoroughly with the routine blood investigations and imaging studies as required. Computed tomography of the face was routinely done in most of the cases (Figure 4), unless the patient was not affordable or presented with trivial complaints in which cases X-ray of the nasal bones were done (Figure 2 and 3). Patients were managed accordingly on the basis of history, examination, and radiological investigation findings. In cases of isolated displaced nasal bone fracture (32%), closed reduction was done. In cases of zygomatic complex fracture, open reduction and internal fixation was done using 1.3 to 1.5 mm miniplates (Figure 5). Nasoethmoid complex fracture was treated either by closed or open reduction. Maxillary Lefort fractures were again managed by open reduction and internal fixation.



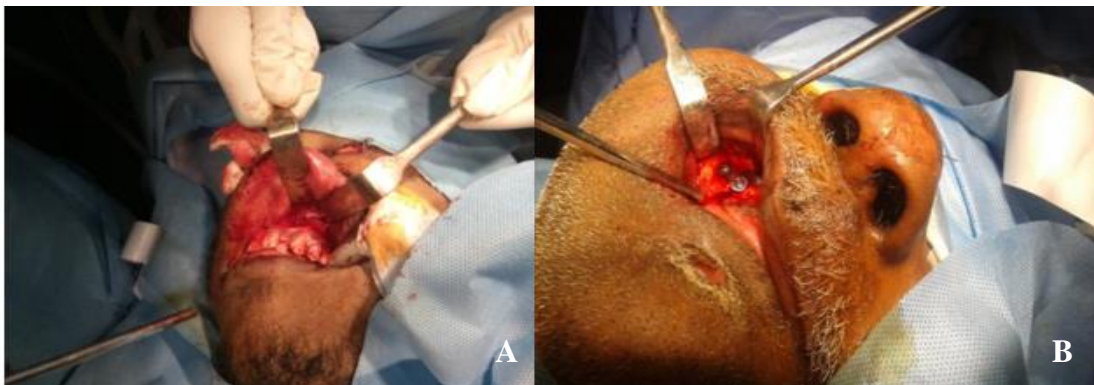
**Figure 2: Bilateral nasal bone fracture.**



**Figure 3: Displaced bilateral nasal bone fracture.**



**Figure 4: Computed tomography of various patients included in the study (A) Fracture medial wall of left orbit, comminuted fracture of left zygomatic arch, fracture anterior and posterolateral wall of left maxillary sinus with hem sinus; (B) Fracture of nasal bone on the right side; (C) Fracture left zygomatic arch, fracture lateral wall of left orbit; (D) Posterolateral and anterior wall of right maxillary sinus, fracture of zygomatic arch.**



**Figure 5: Intra operative pictures of open reduction and internal fixation.**

Types of maxillofacial injuries and their frequency of occurrence: nasal bone fracture- 45; zygomatic body fracture- 26; zygomatic body+arch- 16; nasoethmoid complex fracture- 7; and maxilla lefort fractures- 6.

**Table 2: Number of days of hospitalization.**

Days of hospitalization (weeks)	Cases (n=100)
1	77
1-2	20
2-3	3

## DISCUSSION

According to our study, we found that the mean age of patients was within the range of 30±2 years. Most of the patients were in 2<sup>nd</sup> to 6<sup>th</sup> decade of life. Road traffic accidents were most common cause followed by assaults and falls. Most commonly involved bone was nasal bone followed by zygomatic complex fractures. Mean period of hospitalization was found to be 7 days. 59% of the study group had soft tissue facial injuries and 35% had concurrent corporeal injury. Open reduction and internal fixation were done in all cases of zygoma fracture and closed reduction was done in case of nasal bone fracture, combination of procedures was done in case of nasal bone fracture occurring with other facial fractures.

Although there are many devices improving the safety of the motor vehicle users, the maxillofacial injuries resulting from traffic accidents occur quite frequently. It accounts for 60% of facial injuries that take place.<sup>2</sup> It must be emphasized that the data from maxillofacial departments do not reflect quite precisely the incidence of maxillofacial injuries. It comes from the fact that some patients with maxillofacial injuries concomitant with severe injuries of the other body regions are admitted to neurosurgical, casualty, orthopedic, maxillofacial and other wards.<sup>2</sup> Therefore, the numbers could be even higher. However not all facial injuries require surgical intervention, some cases can be managed conservatively, like soft tissue injuries and undisplaced fracture of nasal bones. Nonetheless our study focuses on cases requiring surgical intervention.

While road traffic accidents have steadily fallen in developed countries, they continue to rise with horrifying speed in the low- and middle-income countries (LMIC) of Africa and Asia.<sup>1</sup> The WHO has estimated that nearly 25% of all injury fatalities worldwide are a result of road traffic crashes (RTCs), with 90% of the fatalities occurring in LMIC.<sup>1</sup> The reductions in road traffic crashes in developed countries are largely attributed to a wide range of road safety measures such as seat belt use, traffic calming measures, and traffic law enforcement.<sup>1</sup> Therefore, there is an urgent need to get down to what the developed nations have done to reduce/prevent road traffic crashes.<sup>1</sup> In our study it has been noted that the most frequently involved age group are those in third decade of life. Similar results have also been noted in another study retrospective analysis of facial fractures reported as the more frequent

involvement of 21-30 years may be due their increased involvement in traveling to workplace and outdoor activities. Our study noted that facial fractures were common in males than females with M: F=3:1. Similar male predominance was seen in other studies which were done in India, which could have occurred due to the fact that males are still the main working community and are hence more exposed to work-related stress and workplace injuries.<sup>1</sup> The other causes of increased incidence of injuries in this age group and gender may be due to their risk-taking behavior along with lack of knowledge or, in the most of cases, violation of traffic rules.<sup>1</sup> Nasal bone fracture was the most common facial fracture noted followed by zygomatic complex fracture in our study. Similar outcome was also obtained in another study on facial bone fractures, i.e.; ‘Analysis of facial bone fractures: An 11-years study of 2094 patients’ which stated that, in the present study, the most commonly fractured isolated bones were the nasal bone (37.7%) and the mandible (30%) this is because the nose is an easy target in personal violence. The most common aetiology of injury in our study is trauma. The nose is projecting, relatively unprotected and with very little soft tissue cover. The most common complex fracture was a tripod fracture (6.2%).<sup>3</sup> 59% of the study group had soft tissue facial injuries and 35% had concurrent corporeal injury. However, in our study we did not include cases with mandible fractures as it is managed mainly by maxillofacial surgeons.

According to this study management of the cases was done as follows ‘In most of the fractured facial bones, except the nasal bones (N=1,034), an open reduction was performed in 64%, closed reduction in 14%, no surgical intervention in 12% and a closed reduction with open reduction in 11%. The fractured nasal bones accounted for most of the closed reductions (93%) and other facial bones (64%) for open reductions.<sup>3</sup> This data has been found to be quite similar to our data were cases with nasal bone fracture occurring in combination with other facial fractures closed reduction was combined with open reduction and internal fixation was performed (32%). Number of days of hospitalization varied according to the type of fracture, local edema and general condition of the patient. Surgery was performed on 3rd to 5th day in most of the cases, once the swelling subsided. Therefore, the number of days of stay in hospital was found to be 6 to 8 days (average of 7 days).’ Facial bone reduction was carried out on average 5.2 days after the injury, when the swelling decreased, and the average hospital stay was 8.4, quoted from study done over 11 years on 2094 patients.<sup>3</sup>

## CONCLUSION

The increasing prevalence of facial bone injuries emphasizes the necessity for epidemiological surveys to determine optimal prevention strategies and patient management. Such data can inform care-givers the causes and incidences of facial bone. The insight into the epidemiology of facial bone fractures and associated

injuries is useful not only for developing prevention strategies but also for decisions with regard to patient care, development of optimal treatment regimens and appropriate resource allocation.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

## REFERENCES

1. Kaura S, Kaur P, Bahl R, Bansal S, Sangha P. Retrospective Study of Facial Fractures. Ann Maxillofac Surg. 2018;8(1):78-82.
2. Jose A, Nagori SA, Agarwal B, Bhutia O, Roychoudhury A. Management of maxillofacial trauma in emergency: An update of challenges and controversies. J Emerg Trauma Shock. 2016;9(2):73-80.
3. Hwang K, You SH. Analysis of facial bone fractures: An 11-year study of 2,094 patients. Indian J Plast Surg. 2010;43(1):42-8.
4. Malara P, Malara B, Drugacz J. Characteristics of maxillofacial injuries resulting from road traffic accidents--a 5 year review of the case records from Department of Maxillofacial Surgery in Katowice, Poland. Head Face Med. 2006;2:27.
5. Kim D, Holmes S. In: Watkinson J, Clarke R, eds. Scott Brown's otorhinolaryngology head and neck surgery. 8th ed. Boca Raton: CRC Press; 2018: 1189.

**Cite this article as:** Tanthry D, Nehla A, Santhraya M, Pannen DP. Epidemiological analysis of facial fractures. Int J Otorhinolaryngol Head Neck Surg 2021;7:1176-80.