

Research Article

A Study on the Pattern of Traumatic Faciomaxillary Fractures and Their Management

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ABSTRACT:

The most frequent life-threatening emergency in both industrialized and developing countries is a faciomaxillary injury, which accounts for 7.4-8.7% of emergency medical care. These injuries not only cause functional derangement but also cause face disfigurement, which can result in psychological stress.

Aim: To study the pattern of faciomaxillary fractures and their management in trauma cases.

Methodology: The study was conducted on 120 patients with traumatic Faciomaxillary fracture over a one-year period. Data regarding patient particulars, cause, site of fracture, and management were recorded, and statistical analysis was done.

Results: Out of the 120 patients, the commonest fracture was found to be nasal bone (33%), with male preponderance (82%) in the age group of young adults (63%). Most common cause found was RTA (51%). Open reduction was done for fracture mandible and middle third of face.

Discussion: Demographic distribution, cause, management and complications of faciomaxillary fractures were compared to previous studies. Nasal bone has been found to be most commonly affected. 35% of patients needed open reduction.

Conclusion: The authorities should be made aware of the need to enforce strict traffic laws due to the rising number of traffic accidents.

Keywords: Traffic, Accidents, Maxilla, Mandibular Fractures, and Nasal Bone.

INTRODUCTION

Being the most exposed area of the body, the faciomaxillary region is more susceptible to stress and consequent injury. "The prevalence of maxillofacial injuries varies from 17% to 69%," and there are a number of potential causes for this wide range, including socioeconomic circumstances, cultural and environmental factors, and the region's application of law and order¹. Faciomaxillary fractures are most frequently caused by traffic accidents (90.15%), falls, sports injuries, and interpersonal aggression (2.71%). A person's facial shape has a significant role in their identity and overall health, and poor management can cause significant long-term functional, aesthetic, and psychological harm. The severity and pattern of the Faciomaxillary fracture depends on the degree of the causal force, duration of collision and the rate of acceleration change. Because the faciomaxillary region contains vital structures in the head and neck region (such as the airway, blood vessels, nerves, and gastrointestinal tracts) and important sensory systems (such as vision, auditory, somatic sensation, gustatory, olfaction, and vestibular), trauma to this area

requires special attention. Alcohol is a significant factor in assaults that cause faciomaxillary injuries as well as traffic accidents.

Trustworthy epidemiological data on Faciomaxillary trauma is necessary for taking decision during emergency, for identification of elements that raise the possibility of harm as well as for providing targets for preventive measures. This study will be done to analyse demographical pattern of Faciomaxillary fractures along with the treatment modalities.

Aims and Objectives

- To study the pattern of faciomaxillary fractures in trauma cases.
- To study the management of faciomaxillary fractures and complications.

METHODS AND MATERIALS:

Between March 2023 and April 2024, a prospective study was carried out. Patients were selected for the trial based on the following criteria: all traumatic Faciomaxillary fractures admitted in the Department of Otorhinolaryngology and Head and Neck Surgery. All routine investigations and

Computed Tomography of Faciomaxillary region were done. Non-traumatic Faciomaxillary fractures were not included in this study.

The study included 120 patients who gave their informed consent after being fully briefed about the course of treatment. Included were details about the patient's age, gender, alcohol intake, and the type and location of the faciomaxillary injury. The causes of these fractures were categorized as falls from heights, workplace injuries, physical assault, traffic accidents, and unintentional falls. The age groups were separated into the following categories: young adults (18–40 years old), adults (41–65 years old), adolescents (11–17 years old), and the elderly (>65 years old). Mandibular and midface fractures were the classifications given to the location of the faciomaxillary fractures. Symphysis, parasymphysis, body, angle, ramus, and condyle were among the mandibular fractures. Zygomatic, maxillary, and nasal bone fractures were included in the midface fractures. Fractures at several sites were assessed independently.

The site, pattern, displacement of fracture segments, range of joint mobility (mouth opening), and occlusion of teeth were taken into consideration when planning the course of treatment. Among the treatment techniques were closed and open reduction, intermaxillary fixation, Caldwell Luc approach and conservative measures. Open reduction and internal fixation of mandible and zygoma fractures were done under general anaesthesia using titanium miniplates and miniscrews. Intermaxillary fixation was done using arch bars and elastic/stainless steel wires under local anaesthesia. Nasal bone fractures were reduced using Asch and Walsham forceps and

splinting was done. All these data were collected, compiled and analysed statistically.

Type of Study:

The study will be hospital based prospective observational study.

Sample Size:

Sample size is calculated by using the following Daniel sample size formula

$$N = \{Z^2 \times p(1-p)/d^2\}$$

Where, N= Sample size

Z= Statistics for a level of confidence (For the level of confidence of 95%, which is convention, Z Value is 1.96)

p= expected prevalence or proportion {Prevalence of faciomaxillary fracture in India is 43%(17%-69%)}^{1 2}

d = precision (d is considered 0.1 to produce good precision and smaller error of estimate)

So, the sample size is calculated as, 95 patients will be included serially for the study, after fulfilment of inclusion and exclusion criteria

Inclusion Criteria:

All patients admitted in department of ENT, SMCH with traumatic faciomaxillary fracture and who provided their consent were included in the research.

Exclusion Criteria:

- Patient not consenting for the study were not included in the study.
- Patients with faciomaxillary fracture with non-traumatic cause (eg. tuberculosis) were excluded from the study

RESULTS AND OBSERVATION:

Age Distribution:

Table 1: Patients' age distribution

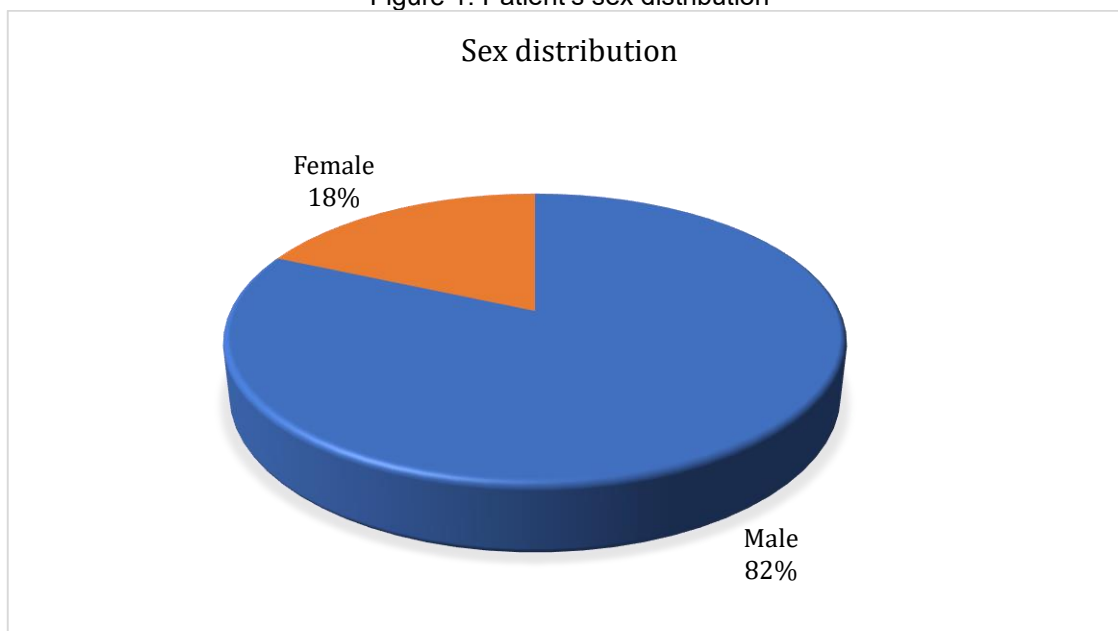
AGE (YEARS)		CASE NUMBERS
0-10	Children	04
11-17	Adolescent	14
18-40	Young adult	74
41-65	Adult	26
>65	Elderly	02

Most of the patients were in the age group of 18-40 years (61%) i.e. young adults followed by adults (22%). 12% patients were

adolescent, 3% were children. Only 2 patients were in the elderly age group.

Sex Distribution:

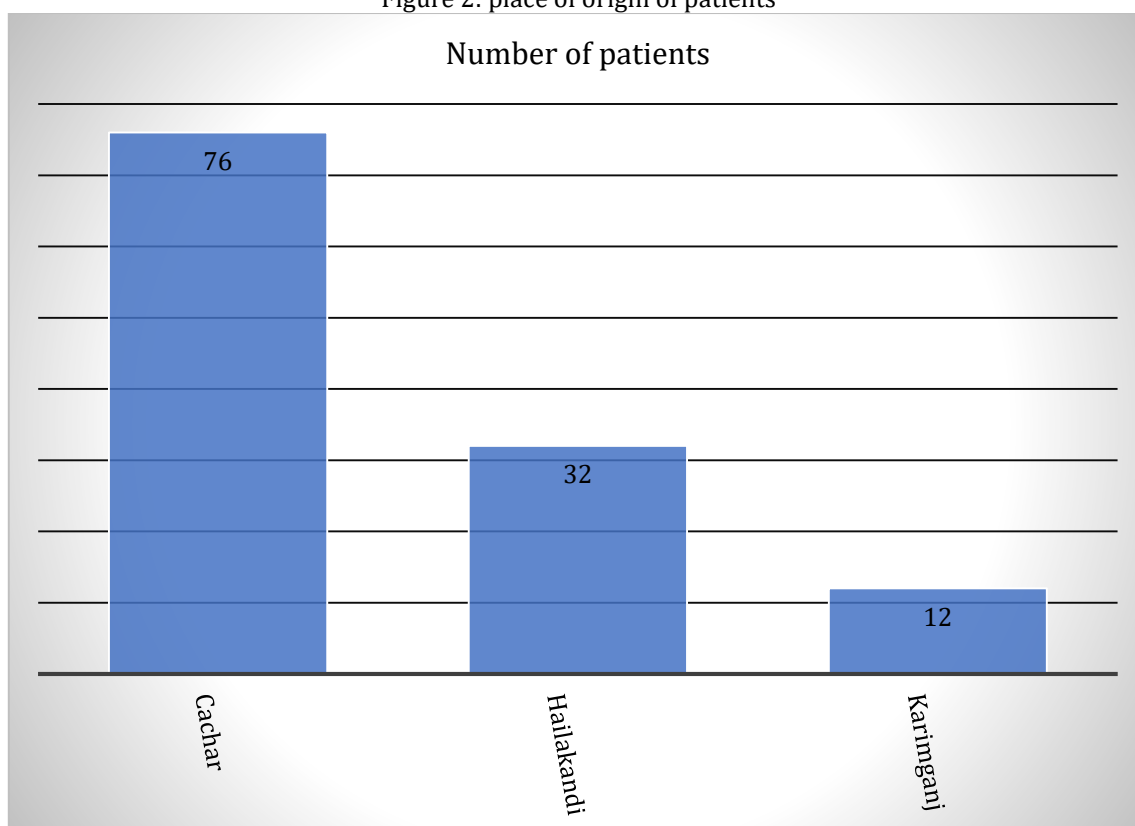
Figure 1: Patient's sex distribution



82% patients were male. Only 18% patients were female in our study.

Place of Origin Distribution:

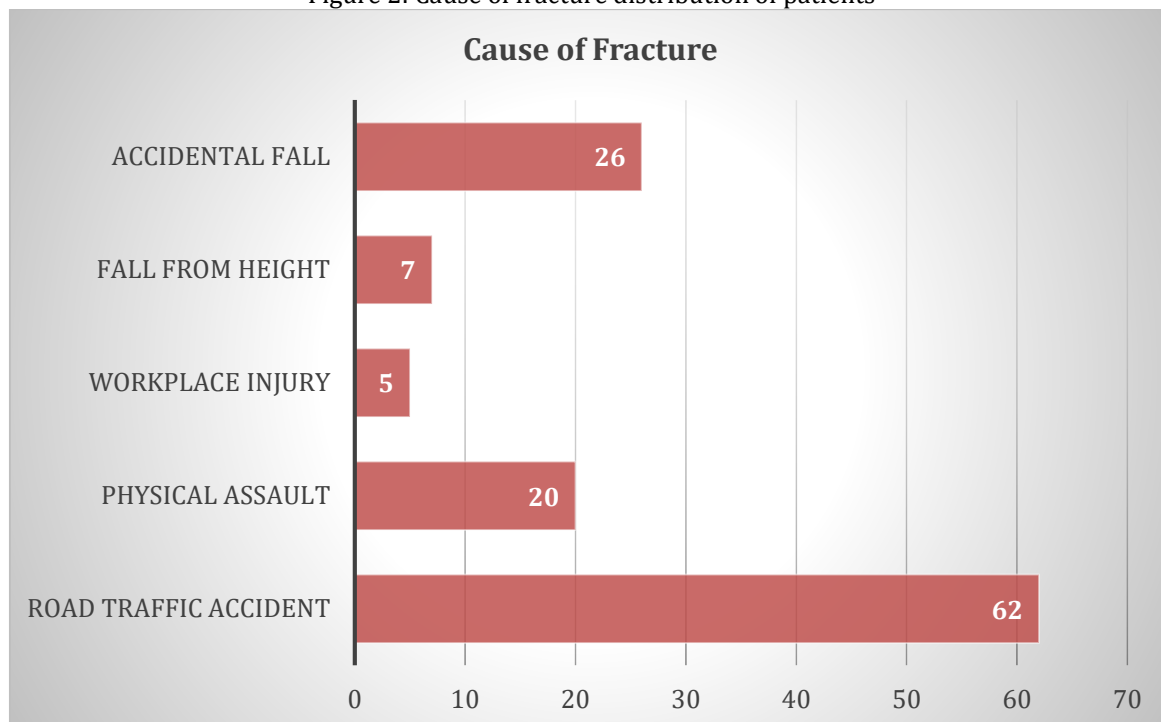
Figure 2: place of origin of patients



Majority (76) patients hailed from Cachar district followed by Hailakandi and Karimganj district of Assam.

Cause of Fracture Distribution

Figure 2: Cause of fracture distribution of patients

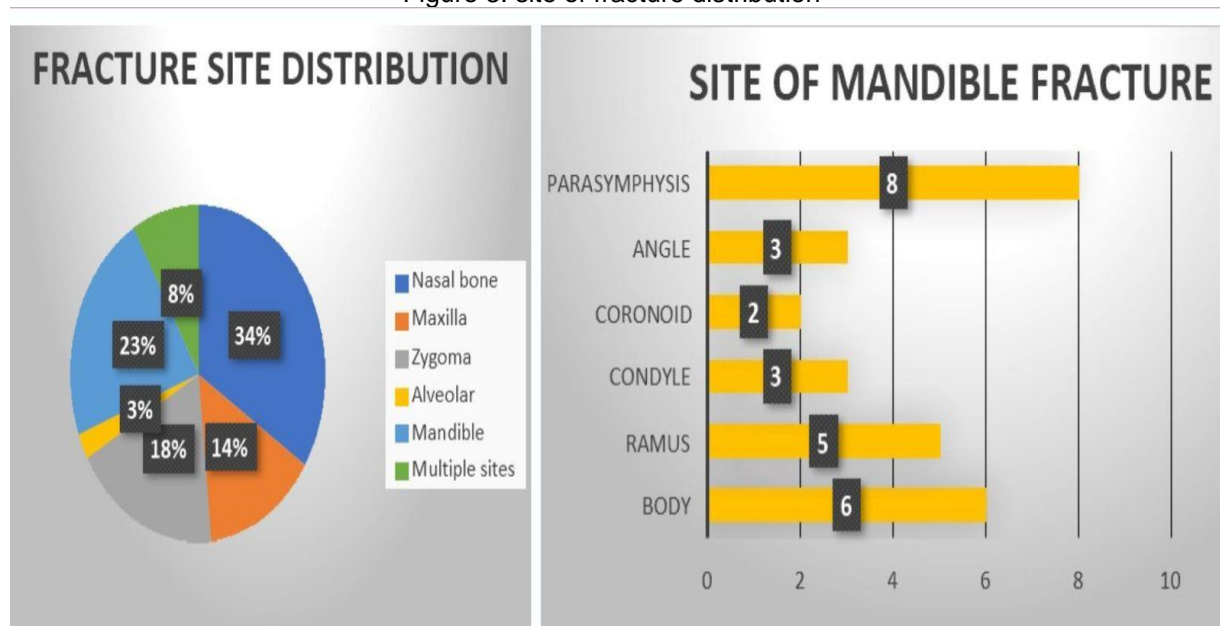


The most prevalent cause of faciomaxillary fracture in our study was road traffic accident constituting more than 50% of cases. Second most common cause was accidental fall followed by physical assault. Other causes

encountered were fall from height (5.8%) and workplace injury (4.1%).

Site of Fracture Distribution

Figure 3: site of fracture distribution



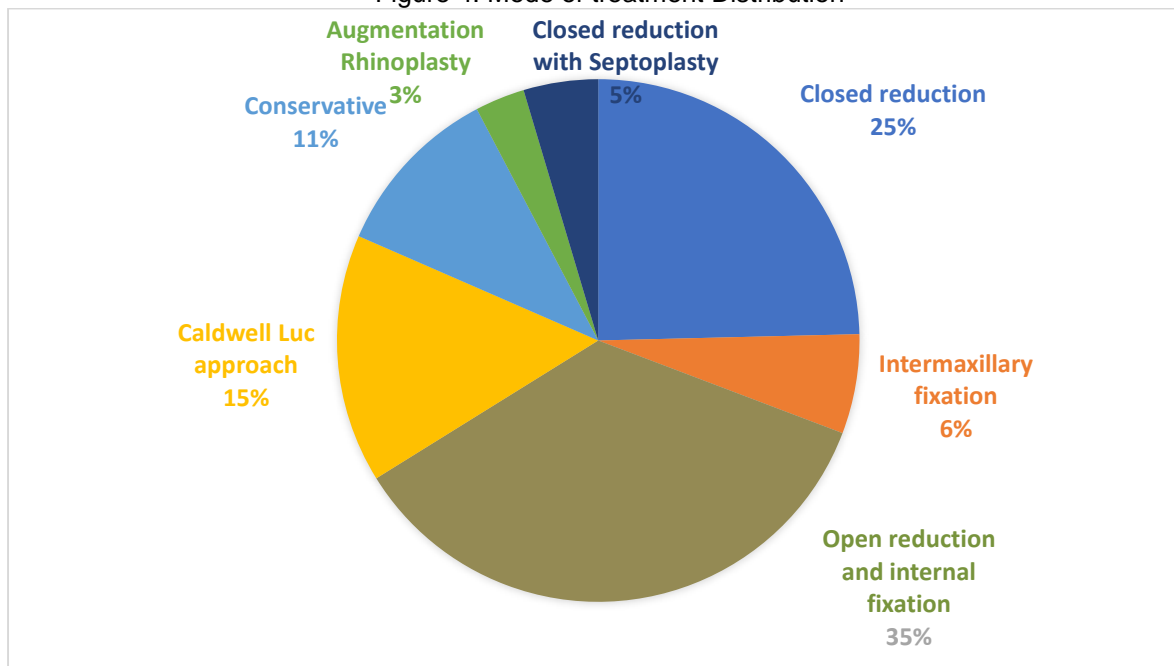
Nasal bone fracture was found to be the most common site (34%). Second most common site was mandible (23%) followed by zygoma

fracture (18%). 14% patients presented with maxillary fracture and 3% with dento alveolar

fracture. Parasymphysis was the most common site of mandible fracture.

Mode of Treatment Distribution:

Figure 4: Mode of treatment Distribution



35% patients needed open reduction with internal fixation. Closed reduction of nasal bone fracture was done in 25% patients, 5% patients needed septoplasty along with it. Maxillary fractures were reduced with Caldwell-Luc

approach in 15% of cases. 11% patients were treated with conservative measures.

Post-Operative Complication

Table 2: distribution of patients according to post-operative complication

Post-operative complication	Patient number
Infection	10
Malocclusion	6
Nerve injury	4

10 patients (8%) presented with wound infection in post operative follow up. 6 patients (5%) presented with malocclusion and 4 patients (3%) had nerve injury.

DISCUSSION:

We studied 120 patients with faciomaxillary fractures, of whom 82% were males and 18% females. In earlier studies done by Pandey et al⁶, where there was a male predisposition (89.6%)³, by Joshi et.al⁴ male preponderance is 70% and that by Gupta et al⁵, where they found 4.07:1 male to female ratio, with men being most impacted (80.3%). Place of origin of 63.3% cases were Cachar.

The age group most commonly affected was 18-40 (61%). In the study by Sawhney and Ahuja⁶, 77% of patients were in the 16-45 age group. Ashwini et al⁷ also found similar clustering of cases in the 20-30 age range.

Road traffic accidents were determined to be the most frequent cause of injuries. (62%) which correlated with studies done by Bernardo et.al⁸ (45%) and Sawhney et.al (50%)⁹. The second most frequent reason was accidental fall. (21%).

Nasal bones were the most often fractured faciomaxillary structures in our investigation. (34%). However, Gali et.al⁶ found fracture mandible to be the most common site (41.4%), which was also supported by studies done by Bernardo et.al⁸ and Sawhney et.al.⁹ In our study the increased proportion of fracture of nasal bones can be explained due to the fact that it is the most projected part of face that bears the blow of injury first and fragile nature of the nasal skeleton. The second most common fracture we encountered in our study was mandible fracture constituting 23%.

parasymphysis of mandible was the most affected site among mandible fractures (29%). Conservative management was done in a fairly good number (11%) of patients with undisplaced fractures and 35% needed an open reduction and internal fixation of the fracture fragments with titanium miniplates and miniscrews. The choice to operate and the type of surgery was guided by the type of fracture that is displaced or undisplaced, disability or deformity caused by it e.g. restricted mouth opening, blocked airway, crooked nose etc., age of the patient. This agrees with studies done by Gali et.al¹⁰ and Mijiti et.al¹⁰ where 58.6% and 62.4% patients needed Open Reduction and Internal Fixation (ORIF)

respectively. Patients with dento-alveolar fracture interdental wiring (7%) were performed. Children requiring Open Reduction with Internal Fixation (ORIF) were mostly mandible fracture and their implants were removed after 6 months. In 7% of patients of nasal bone fracture with external nasal deformity, Augmentation Rhinoplasty was done for cosmesis.

During follow up in almost 83% cases no complication was noted. In 16% cases complication was noted, out of which most common was infection comprising of 8% of total cases. After management most patients (85.83%) were discharged in improved status



Figure 6: A case of fracture in parasymphysis in road traffic accident; intraoperative picture showing open reduction with internal fixation with 2 titanium miniplate and 4 miniscrews.



Figure 7: A case of fracture left zygomatic arch; intraoperative picture showing open reduction with internal fixation with 1 titanium miniplate and 2 screws.



Figure 8: A case of fracture mandible at multiple site following road traffic accident; intraoperative picture of open reduction with internal fixation with titanium miniscrews and miniplates and maxillo-mandibular fixation.

CONCLUSION:

This study demonstrates that road traffic accidents were the most frequent cause of faciomaxillary injuries in the southern region of Assam, and that these findings are comparable to national and regional figures. The second most frequent reason was physical assault. Significant number of patients having RTAs were young adults between 18-40 years. The most common structure to be injured was nasal bone. Clustering among young-adults reflects vulnerability of this productive age group. These results should raise public awareness and alert authorities, especially the government and the Road Traffic Authorities, about the need of upholding current traffic laws.

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