

Assessment and Management of Panfacial Fractures

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ABSTRACT

Objective: To assess the clinical pattern of presentation of panfacial fractures and its management modalities at Liaquat University Hospital, Hyderabad.

Subject and Methods: This analysis comprised 131 individuals with clinical and radiographic findings of concomitant mandibular, maxillary, and zygomatic complex breaks, with or without fractures in the NOE area or frontal bone. A thorough physical checkup and suitable radiology were used to detect individuals with maxillofacial injuries. Any soft tissue or hard tissue damage to the face was assessed. The location of the fracture and the kind of fracture were documented. Closed or open reduction was used to manage the patients.

Results: The participant's mean age was 35.289.25 years. Pain was seen in 81 % of cases, facial bulging in 70.2 %, facial asymmetry in 47.1 %, ecchymosis in so much than 51.2 %, ophthalmologic damage in 14 %, malocclusion in 91.7 %, mobility in 44.6 %, and displacement of bordering teeth in 55.4 %, and mid facial flexibility in 33.9 %.

Conclusion: Fractures of mandible and Zygomatic complex were the most reported cases among panfacial trauma cases, while pain and malocclusion were the most commonly reported findings after trauma of such type.

Keywords: Panfacial fractures, Assessment, Midface fractures, Mandibular fractures, Zygomatic complex fractures, Malocclusion

INTRODUCTION

Panfacial (PF) traumas are defined as numerous fractures encompassing the top third of the face, the mid-face, and the bottom third.¹ Panfacial fractures are frequently linked with soft tissue injuries and a disruption of bony anatomic relationships². Owing to social, economical, and cultural implications, understanding of driving restrictions, and alcoholic usage, the prevalence and epidemiologic reasons of maxillofacial (MF) damage and face breaks vary greatly in diverse parts of the globe.³ The main causes worldwide are road traffic accidents, falls, assaults, sports, firearm injuries and industrial trauma^{4,5,6}. Clearly, the etiology would be expected to influence the degree and type of injury sustained. Data collected from the 1960s and early 1970s have indicated that 20%-60% of all people injured in RTA have some degree of maxillofacial injury⁷. A high incidence of maxillofacial injuries due to RTA is reported in developing nations, while incidence due to personal violence is more in developed countries⁸.

Several studies have found that mandibular fractures are the most common fracture entity.⁹ Zygomatic bone fractures represented the more prevalent type of fracture in the top two-thirds of the face. Drastic panfacial cracks are frequently correlated with multisystem damage or polytrauma, such as cervical spine injury, abdomen visceral damage, and chest (heart, lungs, and thorax) injury, airway obstacle, complex facial disfigurement, restricted facial movements, facial oedema, ophthalmologic injury, visual impairment, nerve paresis, malocclusion, setback of tongue support, and epistaxis.¹⁰ Imaging, such as a 3D CT scanning, can reveal panfacial injuries. Current advances in 3-D radiography, namely in CT and cone beam technologies, have been one of the most significant achievements in the treatment of panfacial fractures. This enables for specific injury evaluation and is necessary for appropriate evaluation, planning, reduction, and outcomes monitoring.¹¹

The goal of addressing a PF sufferer is to restore the architecture, functionality, and cosmetics of the craniofacial region whilst also effectively resolving concurrent injuries. The complicated care of individuals with multidistribution damage necessitates a systematic categorization that is thorough, quantitative, verified, and reproducible for defining PF.¹² Close reduction or open reduction with internal fixation (ORIF) are used to repair panfacial traumas, depending on the patient's age, the type and

extent of the fracture, the state of the teeth, the fracture, and the availability of finances.¹³

MATERIALS AND METHODS

From January to December 2021, a cross sectional research using non probability consecutive sample was undertaken at the Oral and Maxillofacial Surgery Division of Liaquat University of Medical & Health Sciences, Jamshoro/Hyderabad, Pakistan. The research covered individuals of any genders (Male or Female) with clinically and radiographic confirmation of Concurrent injuries of the mandible, maxilla, and zygomatic complex with or without fractures in the NOE area or frontal bone who were presented to the hospital inside 7 days. Excluding parameters were defined for patients who refused to enroll in the research and had an accompanying skull or cervical spine trauma, upper/lower limb traumas, or an isolating maxillofacial fracture.

Participants who met the eligibility requirements were admitted to the Liaquat University of Medical & Health Sciences Hyderabad's Oral & Maxillofacial Surgery Unit. The patient/attendant gave signed written permission to the investigator. A thorough physical evaluation and suitable radiology were used to detect patients with maxillofacial injuries. Every soft tissue or hard tissue damage to the face was assessed. Standard images were collected, including OPG, PA view, PNS, and SMV. The location of the fracture and the kind of fracture were recorded. Close reduction, i.e Intermaxillary Fixation (IMF) with erich arch bars, or open reduction and internal fixation (ORIF) with micro plates and transosseous wire are used to address the condition. Miniplates used were 1.3 mm for midface fractures such as NOE and rim fractures, 2 mm for F-Z, zygomatic arch, buttresses, and mandible, and 2.7 mm for soft tissue defects.

For the assessment, all information was input into SPSS program 21.0 (statistical software for social sciences). For quantitative factors like age and fracture period, mean and standard deviation were computed. Gender, clinical manifestation of panfacial Cracks (pain, facial edoema, face asymmetries, ecchymosis, ocular damage, malocclusion), state of tooth (i.e. mobility and migration of neighboring teeth), and mid facial mobility and site of Fractures were all assessed.

RESULTS

This research comprised 131 individuals with clinical and radiographic confirmation of concomitant mandibular, maxillary,

and zygomatic complex breaks, with or without broken bones in the NOE area or frontal region. As spotted in Figure 1, there were 94 (71.7%) males and 37 (28.1%) females. The sufferers' mean age was 35.55±9.15 years, and the median fracture length was 2.95±0.74 days. (table 1). In terms of anatomical site of crack, lefort was seen in 22 (17.7%), mandible in 83 (63.3%), dentoalveolar cracks in 11 (8.3%), and zygomatic bone complex in 15 (11.45%) instances, as illustrated in table 2. Table 3 shows the prevalence of clinical patterns of panfacial fracture occurrence. Pain was reported in 78.6 % of cases, face edoema in 70.2 %, facial imbalance in 42.7 %, Ecchymosis in 51.9 % of cases, ophthalmologic damage in 13.7 % of cases, Malocclusion in 90.83 % of instances, mobility in 44.27 % of cases, and displacement of adjoining teeth in 52.6 % of cases, and mid facial mobility in 34.35 % of cases. As demonstrated in table 4, the plurality of individuals (64.12 %) was handled with open reduction and internal stabilization.

Figure 1: n=131

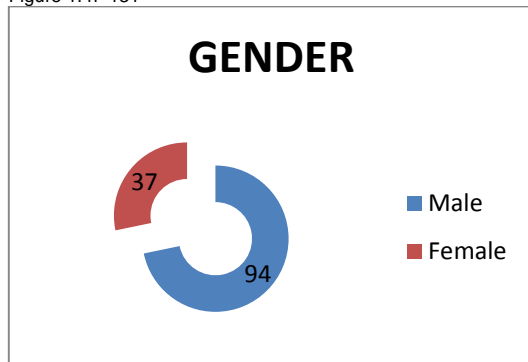


Table 1:

| Statistics | Age (Years) | Duration of fracture (Days) |
|----------------------------------|-------------|-----------------------------|
| Mean | 33.24 | 2.92 |
| Std. Deviation | 9.22 | 0.74 |
| 95% Confidence Interval for Mean | Lower Bound | 33.51 |
| | Upper Bound | 35.55 |

Table 2: n=131

| Anatomical Location | Frequency | Percentage |
|------------------------|-----------|------------|
| Lefort | 22 | 16.7% |
| Mandible | 83 | 63.3% |
| Dentoalveolar fracture | 11 | 8.3% |
| Zygomatic bone complex | 15 | 11.45% |

Table 3: N=131

| Clinical Findings Of Panfacial Fractures | Frequency | Percentage | P Value |
|--|-----------|------------|---------|
| Pain | 103 | 78.6% | 0.782 |
| Facial Swelling | 92 | 70.2% | 0.404 |
| Facial asymmetry | 56 | 42.7% | 0.227 |
| Ecchymosis: | 68 | 51.9% | 0.865 |
| Ophthalmic injury | 18 | 13.7% | 0.897 |
| Malocclusion | 119 | 90.83% | 0.889 |
| Status of tooth | | | |
| Mobility | 58 | 44.27% | 0.944 |
| Displacement of adjacent teeth | 69 | 52.6% | |
| Mid facial mobility | 45 | 34.35% | 0.137 |

Table 4: Management Modalities Of Panfacial Fractures: N=131

| MANAGEMENT MODALITY | Frequency | Percentage |
|---------------------|-----------|------------|
| OPEN REDUCTION | 84 | 64.12% |
| Miniplates | 61 | 72.61% |
| Transosseous Wiring | 23 | 27.38% |
| CLOSE REDUCTION | 47 | 35.87% |

DISCUSSION

Panfacial fractures (PFs) are common after high-energy traumas and pose significant complications for operators and sufferers alike. Fractures involving atleast three of the four components of the facial skeleton, namely the frontal region, upper and lower half of the midfacial region, and mandibular portion, are referred to as these fractures.^{14,15}

The median age of the participants in this analysis was 35.55±9.15 years, that is consistent with several other studies because the majority of the participants in this research were early age adults in their third decade.^{16,17} Conversely, other research, such as Bisek et al¹⁸, who reported an average age of 49.25 years, disagree with this conclusion. Panfacial fractures are most prevalent in people in their third decade. The higher frequency of panfacial fracturing in younger adults in the current research might be related to the fact that persons in this age group are highly involved in sporting, physical hobbies, industries, and high-speed vehicles.

There were 94 (71.7%) males and 37 (28.1%) females in this research. Men are most likely to suffer from facial fractures; Lin et al¹⁹ and Erdmann D¹⁵ both concur that males are particularly likely to suffer from facial cracks. Males are more likely to be harmed since they are generally exposed to traumatic threat elements such as driving and sporting accidents. To lessen the occurrence of these fatalities, measures must be taken to improve traffic security.

The most prevalent kind of soft tissue damage was a tear, while the most prevalent kind of bone damage was a mandibular fracture. It's possible that the mandible's primacy derives from the fact that it's the more visible and sole moveable face bone. Though some sources said that maxillary fractures were the most prevalent type of injury, others did not.^{20,21,22} This variance in damage style might be attributable to differences in the method of injury and the anatomical location of the broken bone.

PFs are commonly linked to a variety of life-threatening consequences and fatalities, the majority of whom are caused by substantial external forces. The more common clinical observations described in our investigation were facial edoema, facial asymmetries, ecchymosis, ocular damage, mobility and migration of adjacent teeth, and mid facial movement. Jang SB¹⁴ and Lin et al¹⁹ have also reflected on these outcomes.

A progressive healing approach is used to treat panfacial damage. The operator must first reestablish the occlusal connection before proceeding with the sequencing repairs. As a result, after correct occlusion is established, the midface buttresses' solidity and positional connection may be attained. The majority of the individuals in this research were managed with open reduction and internal fixation, which is the first line of therapy for panfacial fractures. ORIF has also been identified as the preferred therapy in a number of additional investigations.^{23,24,25}

CONCLUSION

Fractures of mandible and zygomatic complex were the most reported cases among panfacial trauma cases, while pain and malocclusion were the most commonly reported findings after trauma of such type. Thorough anatomical knowledge and expertise of the maxillofacial surgeon is must for managing a case of pan facial trauma using either of the approaches. Oral and maxillofacial surgeons are frequently engaged in the management of this trauma, and many of the patients may necessitate subsequent dental procedures after the fractures have been reduced. As a result, a general dentistry practitioner's grasp of face trauma and its consequences is critical.

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