

Original Research Article

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Incidence of mid facial fractures in armed forces personnel and their families: a retrospective five year study

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ABSTRACT

Background: Incidences of mid facial fractures in armed forces personnel and their families is rising due to increase in motorized population and high speed road traffic. The aim of this retrospective study was to determine the incidence, etiology, diagnosis, management and complication of mid facial fractures.

Methods: A 5 year retrospective study was conducted at tertiary dental care center at Pathankot, Bathinda and Kolkata. Total of 511 cases of midfacial fractures were managed at this centre. 87% of patients were managed with open reduction and internal fixation and 13% indirect reduction and conservative management. All patients were followed up for at least 1 year.

Results: 96% patients recovered uneventfully, while 4% patients had post-operative complications such as malocclusion, paraesthesia, enophthalmos, diplopia, facial asymmetry, palpability and exposure of implants.

Conclusions: The midface is composed of wafer thin sheets of cortical bones which get fractured easily. It is very important to obtain near to facial form, function and aesthetics by reconstructing the horizontal and vertical buttresses of face.

Keywords: Nasal-orbital-ethmoid complex, Road traffic accident, Midfacial fractures

INTRODUCTION

Facial fractures are commonly encountered in patients admitted for trauma care. Early diagnosis can assist in restoring the facial form, function and achieving near to normal facial aesthetics. Common causes of facial fractures in armed forces include blunt trauma as seen in automobile accidents, assaults, falls, and sports injury.¹

Primary types of facial fractures seen in trauma patients include those of the mandible, zygomatic, nasal, maxillae, and orbital bones. The epidemiology of facial fractures varies among populations with respect to type, severity, and cause. The aim of this retrospective study was to determine the incidence, etiology, diagnosis, management and complication of mid facial fractures.²

METHODS

This is a retrospective study done at tertiary dental care centers at Pathankot, Bathinda and Kolkata between January 2014 to December 2019. Total of 511 mid facial fractures patients were selected.

Inclusion criteria

In this study 5 years data was obtained from the medical records and radiographs (paranasal sinuses view, submentovertex view) and computed tomography (CT) scans (Figure 1A and B) of patients who had been managed definitively for midfacial trauma in our tertiary care centers. 72% of the patients were referred from other military hospitals and civil hospitals after primary

management for definitive management. Age, sex, etiology, facial bones involved and the treatment modalities were analyzed retrospectively.³

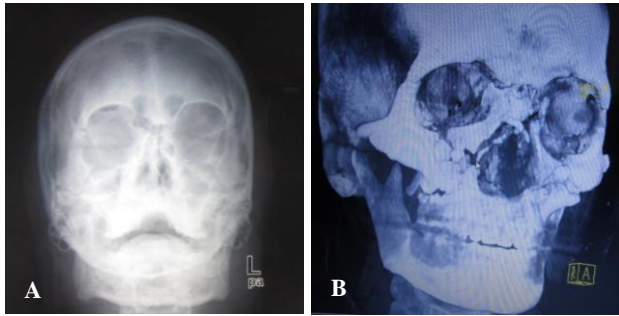


Figure 1 (A and B): Radiograph (paranasal sinuses view) showing fracture of zygomatic complex (Rt) and 3D CT scan shows nasal-orbital-ethmoid complex fracture.

Exclusion criteria

Patients with systemic conditions like hypertension, diabetes mellitus or patients with immune deficiency and autoimmune disorder were excluded.

Procedure

Patients were managed with (a) open reduction and internal fixation and (b) no active surgical intervention as deemed necessary by the requirement of particular case. All the patients were followed up for at least one year.

Data collected was analysed using Microsoft excel and presented in number and percentages.

RESULTS

Out of 511 patients with mid-facial skeleton fractures 374 were male and 137 female, with a ratio 3.7:1. The age distribution varied between 7 to 83 years, with a mean age of 28 years. The decades in which fractures were most common were, (in decreasing order of frequency), 21-30 (288 patients, 56.36%) 11-20 (79 patients, 15.46%), and 30-40 (63 patients, 12.33%).

Table 1: Aetiology of midfacial fractures in patients (n=511).

Aetiology	Number of cases	%
Traffic accident	353	69.08
Fall	68	13.31
Assault	07	1.37
Gunshot wound	13	2.54
Kick by animal	02	0.39
Work accident	18	3.52
Sports accident	49	9.59

The most common etiological factor was road traffic accidents (353 patients, 69.08%), followed by falls (68 patients, 13.31%); and sports accidents (49 patients, 9.59%) (Table 1).

The majority of fractures were zygomatic complex fractures cases (227 cases, 44.42%) least common fractures were nasal-orbital-ethmoid (NOE) complex Fractures (1.57%). Mandible-zygoma fractures were the most common type of combined injuries (48 cases, 9.39%) (Table 2).

Table 2: Distribution of cases with midfacial fractures according to facial bones and types of fracture (n=511).

Facial bones and types of fracture	Number of cases	%
Isolated arch fractures	41	8.02
NOE complex	08	1.57
Maxilla plus dentoalveolar	151	29.55
Zygomatic complex	227	44.42
Orbital blow out	19	3.72
Mandible+zygoma	48	9.39
Mandible+maxilla+zygoma	17	3.33

Treatment

Four hundred and forty four (87%) patients were treated by open reduction and internal fixation with mini, low profile, micro titanium plates as dictated by the location and type of bone involved (Figure 2 A-D). Remaining thirteen percent (13%) were managed conservatively (Table 3).

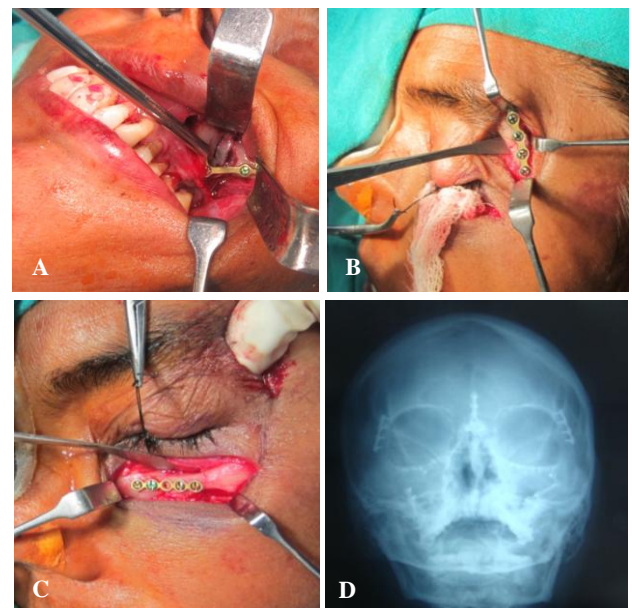


Figure 2 (A-D): Open reduction and internal fixation with titanium plates.

Table 3: Distribution of cases treated by different treatment modalities (n=511).

Treatment modalities	Number of cases
Internal fixation	444
Circum-osseous skeletal fixation	09
Indirect reduction	18
Titanium mesh	24
No active intervention	67

The treatment protocol followed in children was to avoid open reduction and rigid fixation, short-term immobilisation, wherever possible circumzygomatic and circum-mandibular suspensions in acrylic splint support.

In one year follow-up of the patients were done and it was found that paraesthesia and malocclusion were the main post-operative complications (Table 4).

Table 4: Distribution of complications.

Complications	Number of cases
Malocclusion	11
Paraesthesia	16
Diplopia	7
Residual deformity	5
Infections	3
Enophthalmos	4
Exposure and palpability of implants	3

Other complications were facial asymmetry (5 cases), diplopia (7 cases), enophthalmos (4 cases) and infections (3 cases).

DISCUSSION

Midfacial fractures pose a challenge to maxillofacial surgeon in evaluation and treatment as it is made up of numerous bones and they rarely fracture in isolation. The relative fragility of mid facial bones acts as a cushion for trauma directed towards cranium. The skeletal support system has been described as having vertical and horizontal buttress of strong bones surrounding weaker areas of nose, eye, mouth and sinus. The vertical buttresses are paired naso-maxillary, zygomatico-maxillary and pterygo-maxillary. The horizontal buttresses are frontal bone, Infra orbital rim, zygomatic arch, maxillary alveolus and palate. For re-establishing the facial form in three dimension space the re-establishment of the horizontal and vertical buttresses is very pertinent.⁴

The epidemiological surveys on the causes and incidence of maxillofacial injuries vary with geographic region, socioeconomic status, culture, region and era.⁵ Midfacial fractures commonly involved the age group between 20 to 30 years. Surveys of maxillofacial fractures reported similar results concerning the age group.^{5,6} The possible

explanation for this was that individuals between the ages of 11 and 30 years frequently take part in dangerous exercises and sports, drive motor vehicles carelessly, and are more likely to be involved in interpersonal-violence.

In our study zygomatic complex fractures formed 44.42% of all midfacial fractures (Table 1).⁷ The male female ratio was 3.7:1. Other studies have also reported the similar finding.^{8,9}

Traffic accidents were the most prevalent cause of facial fractures in this study, being the cause of injury to 353 of the patients, as established by other survey.⁸⁻¹⁰ Slightly increased involvement on left side of face was evident in our sample. Most of the patients (444 of 511) in this study were treated by open reduction and internal as deemed necessary by the location and the type of fracture.

According to the results of the present study, complications were found in 4% of patients, lower than data presented by other authors, ranging from 11.8 to 12.8%. The characteristics of the fracture locations and degree of bone fragmentation also contribute to development of postoperative complications. For example surgical repair of lesions involving the NOE are difficult to treat, result in cosmetic and functional complications are seen more frequently. This study revealed that NOE fractures demonstrated the highest rate of complications of all facial fractures, which is comparable to complications rates among different studies.¹⁰⁻¹²

CONCLUSION

The mid-face is composed of wafer thin sheets of cortical bones which get fractured easily. It is very important to obtain near to facial form, function and esthetics by reconstructing the horizontal and vertical buttresses of face. According to these data it seems realistic to assume that road traffic legislation enforcement and continuous public education toward the use of restraining devices should be encouraged.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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