

## PATTERN OF MAXILLOFACIAL INJURIES IN THE EARTHQUAKE VICTIMS

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### ABSTRACT

**Objectives:** To observe the pattern of Maxillofacial injuries in Earthquake victims and to discuss their management.

**Design:** Descriptive Study

**Place and Duration:** This study was conducted at the Maxillofacial Surgery Department, Armed Forces Institute of Dentistry (AFID), Rawalpindi over a period of six months following the 8th October, 2005 Earthquake.

**Patients and Methods:** 176 patients who sustained maxillofacial injuries during the earthquake were included in this study. The pattern of maxillofacial injuries and their management was documented.

**Results:** Out of the 176 patients, 141 (80.11%) had fractures of the maxillofacial bones. The remaining 35 (19.89%) patients sustained minor maxillofacial injuries e.g. soft tissue injuries, dentoalveolar fractures and temporomandibular joint arthritis / dislocation. Isolated mandibular fractures were seen in 64 (36.4%) patients. Fifty-seven (32.4%) patients had multiple fractures of the facial bones. Zygomatic bone was fractured in 18 (10.2%) patients whereas 02 (1.1%) patients had isolated fracture of the maxilla. Fifty-nine (41.8%) patients were treated by closed reduction and IMF, 55 (39%) patients by open reduction and transosseous wire fixation in addition to IMF and 27 (19.1%) cases by open reduction and miniplate osteosynthesis. Postoperative complications were noticed in 18 (10.2%) of the patients.

**Conclusion:** Multiple fractures of the facial bones were far more common than the routine trauma cases. The magnitude of the disaster dictated simple and timesaving conventional methods of management in majority of the cases.

**Keywords:** Pattern, maxillofacial injuries, earthquake

### INTRODUCTION

More than hundred major earthquakes occur around the world every year causing severe damage to human life and property [1]. One such devastating earthquake measuring 7.6 on the Richter scale jolted the northern parts of Pakistan on 8th October 2005. The Federal Capital Islamabad, six districts of NWFP and Azad Jammu & Kashmir including Abbottabad, Mansehra,

Balakot, Muzaffarabad, Rawlakot and Bagh were mainly affected. An area of about 30,000 square kilometers and a population of about 3.5 million were affected. More than 80,000 people lost their lives and several hundred thousands suffered injuries of various severities [2].

The injured patients were evacuated to and treated at several military and civil hospitals, mainly in Abbottabad, Islamabad and Rawalpindi. A large percentage of the patients with maxillofacial injuries were managed at AFID. The aim of this study was

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to observe the pattern of maxillofacial injuries in these patients, comparing them with routine trauma cases and to discuss their management.

## PATIENTS AND METHODS

This study was conducted at the Maxillofacial Surgery Department, Armed Forces Institute of Dentistry, Rawalpindi over a period of six months following the 8th October, 2005 earthquake. One hundred and seventy six earthquake victims with maxillofacial injuries were included in this study. After their initial management and stabilization, they were examined clinically and radiographically. Orthopantomogram (OPG), Postero-anterior view, Occipitomeatal view and Submentovertex view were the main radiographs used to diagnose the facial bone fractures. Where required, these views were supplemented with computed tomographic (CT) scans of the involved bones.

Due to the large number of patients to be managed in a short period of time, most of the fractures were treated with simple and time saving methods like closed reduction and intermaxillary fixation (IMF). However, depending upon the fracture pattern and complexity some cases were managed with open reduction and internal fixation (transosseous wiring and miniplate osteosynthesis).

All the clinical and radiographic findings, deviation in site and pattern from routine trauma cases, management steps and postoperative complications were documented on a proforma specifically designed for the earthquake victims.

Data were analyzed using SPSS ver-10.0 percentages were used to describe the data.

## RESULTS

A total of 176 earthquake victims, 102 (58%) males and 74 (42%) females, were managed. The age range was from two to eighty years.

Out of these 176 patients, 141 (80.11%) had isolated or combined fractures of one or more facial bones. While other 35 (19.89%) patients had minor maxillofacial injuries, 14 (8%) had dentoalveolar fractures, 12 (6.8%) had soft tissue injuries only, seven (4%) had temporomandibular joint (TMJ) traumatic arthritis and two (1.1%) had TMJ dislocation.

Isolated mandibular fractures were seen in 64 (36.4%) patients, isolated zygomatic bone fractures in 18 (10.2%) patients and isolated maxillary fractures in 02 (1.1%) cases. In 57 (32.4%) patients there were multiple fractures involving more than one bone. In 64 patients having mandibular fractures, there were total of 178 fractures with parasymphysis being the most common site which got fractured (29.2%), followed by angle of the mandible (22.5%) and Condyle (20.2%) (table-1). In 18 patients having zygomatic complex fractures, right side was involved more commonly (49.1%) than the left side (30.9%) (table-2). In the maxillary fractures (isolated & combined fractures) most common fracture was Le-Fort II (55.3%), followed by Le-Fort III (31.5%) and Le-Fort I (13.3%) as shown in (table-3).

The soft tissue wounds were debrided and stitched under local anesthesia. Patients with traumatic arthritis were treated conservatively by advising soft diet and prescribing anti-inflammatory analgesics. In one of the patients with dislocated TMJs, closed reduction was successful whereas in the second patient open reduction under general anesthesia was required because all conservative measures to reduce the dislocated TMJ had failed.

Out of 141 cases of facial bone fractures, 59 (41.8%) were managed by closed reduction and intermaxillary fixation (IMF), 55 (39%) cases were managed by open reduction, transosseous wire fixation and IMF. In 27 (19.1%) patients the fractures were treated by open reduction and miniplate osteosynthesis. In three patients, with multiple facial bone fractures, which had associated orbital floor

fractures were treated with the help of oculoplastic surgeon.

Postoperative complications were noticed in 18 (10.2%) patients that included minor occlusal discrepancies in seven patients, which were managed with arch bars and elastics with or without occlusal spot grinding. Postoperative infections were noticed in five (2.8%) cases and were managed by removal of the osteosynthesis devices and culture-specific antibiotics. In five (2.8%) patients there were unaesthetic scar marks and these patients were referred to plastic surgeon for management. There was persistent diplopia in one patient who was referred to ophthalmologist for further management.

## DISCUSSION

Earthquakes and other natural disasters have affected human civilization since time immemorial. Since the earliest documentation of earthquake casualties, some 15 million

**Table-1: Pattern of mandibular fractures.**

Types of fractures	No of Fractures
Dentoalveolar	15 (8.4%)
Symphysis	06 (3.4%)
Parasymphysis	52 (29.2%)
Body of mandible	25 (14%)
Angle of Mandible	40 (22.5%)
Ramus of Mandible	03 (1.7%)
Condyle	36 (20.2%)
Coronoid	01 (0.6%)
<b>Total</b>	<b>178</b>

**Table-2: Pattern of zygomatic complex fractures.**

Types of fractures	No of Fractures
Zygomatic Complex (Right)	27 (49.1%)
Zygomatic Complex (Left)	17 (30.9%)
Bilateral Zygoma	04 (7.3%)
Zygomatic Arch	07 (12.7%)
<b>Total</b>	<b>55</b>

**Table-3: Pattern of Maxillary fractures.**

Types of fractures	No of Fractures
Le-Fort I	05 (13.2%)
Le-Fort II	21 (55.3%)
Le-Fort III	12 (31.6%)
<b>Total</b>	<b>38</b>

**Table-4: Comparison of maxillofacial injuries (earthquake victims Vs routine trauma)**

Types of fractures	Earthquake victims (176 patients)	Routine trauma (AFID) (300 Patients) <sup>6</sup>	Routine trauma (Rowe & Killy) (1500 patients) <sup>10</sup>
Fracture Mandible	64 (36.4 %)	159 (53 %)	871 (58 %)
Fracture Zygomatic bone	18 (10.2 %)	51 (17 %)	298 (19.8 %)
Fracture Maxilla	02 (1.1 %)	12 (04 %)	172 (11.5 %)
Combination Fractures	57 (32.4 %)	42 (14 %)	128 (8.5 %)
Soft tissues Injuries only	12 (6.8 %)	15 (05 %)	--
Dentoalveolar Fractures	14 (8 %)	21 (07 %)	--
TMJ Injuries	09 (5.1 %)	--	--
Isolated Nasal Fractures	--	--	31 (2.2 %)

people have lost their lives in these catastrophic events [1]. According to published studies, in earthquakes the average toll per year is around 8000 deaths and 26000 injuries [3-5]. In the 8th October earthquake disaster alone the figures were more than 80,000 deaths and more than 100,000 major injuries [2].

In our study the significant findings were that isolated fractures of facial bones were less in percentage and multiple / combination fractures were more common as compared to routine trauma cases (table-4) [6,7]. Mandible was the most commonly fractured bone

followed by zygomatic and maxillary bones. The same is true for routine trauma reported in other studies.

While the current trend in maxillofacial fractures management is open reduction and rigid internal fixation [8], we, because of the large number of patients to be treated in a short period of time, used conventional, simple and time saving methods. Where such simple techniques were inadequate, however open reduction and internal fixation was carried out.

Postoperative complications were noticed in 18 (10.2%) patients (malocclusion in 7, infection and unesthetic scars in 5 five each and persistent diplopia in one patient.) This is comparable to complication rates reported in studies of routine trauma [9]. Though the conventional methods (IMF) do not provide immediate functional recovery, as is the case with rigid internal fixation, yet in such disasters priority should be given to simple and quickly dispensed methods so that maximum numbers of patients are benefited in a relatively short period of time.

Another significant finding, though not part of our study, was that most of our patients also had significant psychological trauma not only because of their own injuries but also because most of them had lost their nears and dears and much of their property.

## CONCLUSION

While isolated fractures were seen in many patients, a large proportion had multiple fractures involving more than one bones. Though open reduction and rigid internal fixation offer certain advantages over the conventional techniques, when the number of patients is large and time is short, simple and quick techniques do give acceptable results and such techniques like IMF, splints, arch bars etc should always be kept in mind and not discarded as old and obsolete.

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