

# Fracture Maxilla-An Analysis of Consecutive 199 Cases

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**Background:** To analyze the patterns, etiologies and modalities of treatments being utilized for fracture maxilla at a tertiary care center.

**Methods:** A total of 199 consecutive cases of fracture maxilla managed during period of two years were included in the study. This included 168 males and 31 females. Age of the patients ranged from 2 years to 70 years. The cases were managed as per nature and extent of trauma following standard methods of reduction and fixation.

**Results:** It was third decade of life where majority of the patients, 70 cases, presented with this fracture followed by second and fourth decade with almost equal number. In 74 cases only maxilla was involved while in 125 cases it got fractured in combination with mandible and zygoma. Most common etiology found in 120 cases was road side accidents followed by fall in 25 cases. Firearm injury was the cause in 16 cases while in 11 cases interpersonal violence was the etiology. Internal fixation was the method utilized for fixation of these fractures, throughout this series.

**Conclusion:** Most common etiology of fracture maxilla is road traffic accident. Third decade of life is the usual age range of the patient. Fracture needs reduction with internal fixation.

**Key words:** Maxillofacial trauma, Le Forte fractures, Midface fractures.

## Introduction

Maxillary fractures give rise to a more morbid situation as compared to rest of the facial fractures because practically these fractures not only involve the maxilla but also the bony structures of the entire midfacial region.<sup>1,2</sup> It is unusual for a maxillary fracture to be found in isolation after an injury.<sup>3</sup> These fractures may be isolated to midfacial region in one third of the cases, or more commonly associated with frontal bone, nasoethmoidal or mandibular fractures.<sup>4,6</sup> In 10% of the maxillary fractures, the palate is split either in a sagittal direction or, rarely, in a more complex fashion.<sup>7</sup> Although typical radiographic views of the patients with facial fractures reveal many more fracture lines and levels,<sup>8</sup> a simple classification proposed by Rene Le Forte in 1901 is still widely used to describe the three levels of maxillary fractures (Fig. 1).

This study reports on the various fracture patterns, etiologies and current treatment modalities being utilized at one of the tertiary care centers.

## Material and Methods

A total of 199 cases with fracture maxilla were selected from a total of 702 cases of facial fractures which presented at The Department of Oral and Maxillofacial Surgery, Mayo Hospital Lahore from Jan 2001 to Dec 2002. The available data was collected on a proforma which showed the age, sex of the patient, determination of the side involved, bones

involved, number and type of fractures noted in the maxilla and rest of the bones and etiology of the incident. The fracture was confirmed radiologically and on the operation findings.

## Results

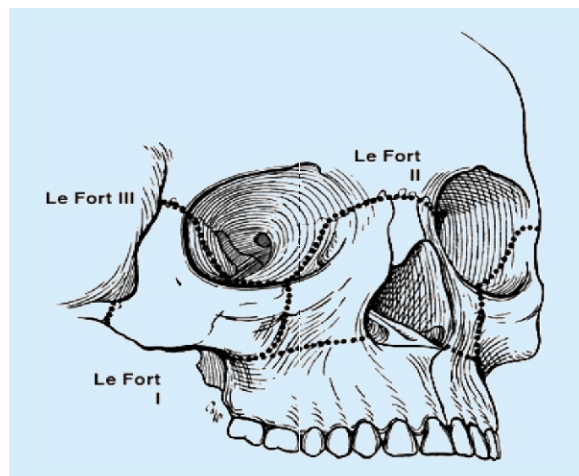
This series comprised of 199 cases and included 168 males and 31 females. Twenty eight point three five percent of the total cases of facial skeletal fracture had the element of fracture maxilla. Male to female ratio in the series was 5.4:1. Youngest patient was 2 years of age while the eldest being 70 years of age. Majority of the patients, i.e., 70 cases, were in third decade of life. This was followed by second and fourth decades with almost equal number of patients. There were 40 patients in second decade and another 42 in fourth decade of life at time of incident (Table 1).

Isolated fracture maxilla was diagnosed in 74 (37.19%) cases and in rest of the 125 (62.81%) cases it was in combinations with mandible, zygoma or both. In 63 (31.66%) cases both maxilla and mandible were found fractured. Zygomatic bone and the maxilla were fractured in 38 (19.1%) cases while in another group of 24 (12.1%) cases all these three bones were fractured (Table 2).

Road traffic accidents were the most common etiology in 120 (60.30%) cases while in 53 (26.63%) of these cases motorcyclists were involved in the accidents. Fall from height was the second most

**Table 1:** Involvement of various age groups.

No.	Age	Male	Female	Total
1.	1 - 10	15	3	18
2.	11 - 20	33	7	40
3.	21 - 30	61	9	70
4.	31 - 40	33	9	42
5.	41 - 50	17	1	18
6.	51 - 60	5	2	7
7.	61 - 70	4	-	4
Total		168	31	199

**Fig. 1:** Le Forte Fracture Lines.**Table 2:** Involvement of various bones and fracture patterns.

No.	Bone	Dento-alveolar	LeForte I	LeFore II	LeForte III	Missing record	Total
1.	Maxilla	18	2	39	15	3	74
2.	Maxilla + Mandible	21	2	31	10	-	63
3.	Maxilla + Zygoma	2	1	26	9	2	38
4.	Maxilla + Mandible + Zygoma	1	2	15	7	-	24
Total		42	7	111	41	5	199

**Table 3:** Etiology of Fractures.

No.	Etiology	Total
1.	RSA	120
2.	Fall	25
3.	FAI	16
4.	IPV	11
5.	Industrial	9
6.	Trauma	3
7.	Missing record	15
Total		199

**Key :**

RSA (Road side accident)  
 FAI (Fire arm injury)  
 IPV (Interpersonal violence)

common etiology with 25 (12.56%) cases and fire arm injury added another group of 16 (8.1%) patients. Eleven cases came with history of interpersonal

violence and 12 (6.1%) had either household or industrial trauma as an etiology (Table 3).

Le Forte II was the most common pattern of fracture lines which was observed in 111 (55.78%) cases followed by 41 (20.6%) cases of LeForte III. Seven of the cases (3.52%) had Le Forte I pattern while 42 (21.11%) cases had dentoalveolar fractures only (Table 2).

All these cases presenting with Le Forte fractures had intermaxillary fixation to maintain the occlusion except 4 cases that were treated conservatively. Circumzygomatic wiring was done in cases with LeForte I and II cases while craniomandiubular wiring was carried out in cases where the fracture lines were of the pattern of Le Forte III.

**Discussion**

Although a number of local studies are available on the maxillofacial trauma,<sup>9-13</sup> present study may be one of the few studies which concentrate on the fracture maxilla in particular. Study records one of the highest percentages of fracture maxilla reported in the local

literature, i.e., 28.35%. The incidence reported in previous two studies ranges from 4 to 14%.<sup>11,12</sup>

Male to female ratio was 5.4:1 in this series. This male dominant pattern is universal and is reflected in this series as well. It is because of the fact that men are more involved in the activities leading to maxillofacial trauma. Study shows third decade of life more commonly involved in these injuries. It is this age group which is more involved in the motor sports and outdoor activities.

Mechanism of injury in maxillary fractures usually is the direct blow to maxilla<sup>3</sup> and usually results from accidents involving unrestrained seat occupants. Road traffic accidents are the most common cause of maxillofacial trauma in third world countries<sup>11-13</sup> and this is also true for this series as more than 60% of the cases were the result of road traffic accidents. Twenty six percent of the total cases had the involvement of the motorcyclists in one way or the other. This explains the male dominant pattern and more involvement in the third decade of life.

Study also demonstrates that Le Forte II pattern is the most common fracture of maxilla found in 56% of the cases in this series and followed by Le Forte III in another group of 20% of the cases. This data shows that in majority of these cases, associated injuries to the base of skull and midface region may also be there and management of these cases may need a team approach. Another problem with these fractures is the esthetics of the face which gets disturbed and face may get elongated. Similarly, these fractures may lead to open bite. All these problems need proper reduction, fixation and stabilization of these fractures.

Maxillary fractures can be treated by extra skeletal or internal skeletal fixation.<sup>3</sup> External fixation may be done by means of plaster head caps, halo frames, or

by pins and rods. Many forms of external skeletal fixation have attachment rods screwed to a plate on a splint cemented to the teeth. However, direct osteosynthesis with the use of wires or miniplates has minimized the use of external fixation. Another remarkable benefit of the internal fixation is accurate reduction and fixation of fractures. Most of the studies being done now consider open reduction and fixation as treatment of choice for these fractures.<sup>12,14</sup>

The treatment modality utilized in this series was internal fixation. However, only in seven cases miniplates were utilized and in rest of the cases osteosynthesis was carried out with wire. This might be due to the fact majority of these patients are unable to afford the cost of miniplates and screws and hence osteosynthesis with wire remains the only choice left. Intermaxillary fixation remains the essential step in maintaining occlusion and the immobility of the reduced segments. Circumzygomatic and cranio-mandiubular suspensions are employed in cases of displacement or gross separation to supplement the intermaxillary immobilization. These suspensions pull the separated upper jaw against the base of the skull and hence restore the normal esthetics of the face as well.

## Conclusion

Maxillofacial trauma usually involves the youth. Complexity of the region demands a team approach while managing these patients. Internal fixation remains the treatment of choice in treating these cases.

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## References

1. Gruss JS, Van-Wyck L., Phillips JH. et al. The importance of the zygomatic arch in complex midfacial fracture repair and correction of post traumatic orbit-zygomatic deformities. *Plast. Reconstr. Surg.* 1990; 85: 878-890.
2. Gruss JS, MacKinnon SE. Complex maxillary fractures: the role of buttress stabilization and immediate bone grafting. *Plast. Reconstr. Surg.* 1985; 75: 303.
3. Cannell H. Maxillary fractures. In: outcome after head, neck and spinal trauma- medico legal guide. 1997. Butterworth and Heinmann. p 267-70.
4. Manson PN, Su CT, Hoopes JE. Structural pillars of the facial skeleton. *Plast. Reconstr. Surg.* 1980; 66: 54.
5. Manson P, Clark N, Robertson B, Crawley WA. Comprehensive management of pan facial fractures. *J. Craniofac. Trauma.* 1995; 1: 4356.
6. Manson P N. Some thoughts on the classification and treatment of LeForte fractures. *Ann. Plast. Surg.* 1986; 17: 356.
7. Manson P, Glassman D, Vander Kolk C, Petty P. Rigid stabilization of sagittal fractures of the maxilla and palate. *Plast Reconstr. Surg.* 1990; 85: 711716.

8. Hehmann RJ, Sargent LA. Maxillary fractures. *Trauma*. 1992;9:67-75.
9. Cheema SA. Zygomatic bone Fracture. *JCPSP*. 2004; 14: 337-9.
10. Iram Abbas, Kamran Ali, Yaqoob Baig Mirza. Spectrum of Mandibular Fractures at a Tertiary Care Dental Hospital in Lahore. *J Ayub Med Coll Abbottabad*. 2003; 15 (2): 12-4.
11. Masood AZ, Tauqeer I, Sohail M, and Aleem A. the pattern of maxillofacial injuries received at Abbasi Shaheed Hospital, KMDC, Karachi. *Ann Abbasi Shaheed Hosp Karachi Med Dent Col*. 2002;7: 291-3.
12. Zia UH, Lahri IA, Hussain F, Kumari M. An analysis of maxillofacial trauma patients treated during May 2002- April 2003 at dental section, BMC, Quetta. *Pak Oral & Dental J*. 2003; 23 (1): 87-90.
13. Ambreen A, Rauf S. Causes of Maxillo Facial Injuries - A three years study. *J Surg Pakistan*. 2001; 6 (4): 25-7.
14. Shahid H, Ahmad M, Ibrahim K, Anwar M, Mughese A, Sameera A, Farhan T, Naheed A, Tariq I, Saleem A Malik. Maxillofacial Trauma: Current practice in management at Pakistan Institute of Medical Sciences J Ayub Med Coll Abbottabad. 2003; 15 (2): 8-11.