

# An Assessment of Changing Incidence of Maxillofacial Fractures: A Retrospective Study

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## ABSTRACT

**Purpose :** Maxillofacial injuries constitute an integral part of polytrauma, the incidence, cause and management of which may vary from region to region. The aim of the study is to assess the etiology, type, management of maxillofacial fractures along with a special emphasis on the changing trend in the incidence of mid-face fractures.

**Patients and method :** A retrospective review done at our institution evaluated 1047 patients treated for maxillofacial fractures in last 10 years. Descriptive analysis of data was done through SPSS-16.

**Results :** of all the facial fractures managed at our institution, during a period of 2005-12, mandibular fractures accounted for 52%, followed by mid-face fractures which was 38% and both fractures were 10%. Contrary to the previous findings, incidence

of mid-face fractures increased significantly over the last 2 years (2013-14), accounting for 51% of the cases, followed by mandibular fractures which was 42% and both fractures were 7%. Road traffic accidents attributed for 92% of the cases. Surgical intervention was required in 66% of mid-face fractures and 81% of the mandibular fractures. Postoperative complications were present in 3% of the cases.

**Conclusion :** According to this study, the most significant observation is the drastic change in the pattern of facial fractures with the incidence of mid-face fractures increasing over a period of 2 years. This observation is in contrast to several studies which state mandibular fractures as the most common fractures of maxillofacial region. Based on the findings herein, a forth coming change in the pattern of maxillofacial fractures is suggested and it varies from region to region.

**Keyword:** Retrospective study, Polytrauma, Mid-face fractures, Incidence.

## INTRODUCTION

Fracture of the mandible is common in patients who sustain facial trauma as the mandible is one of the common targets in

### Introduction

In today's era, with the increase in the urbanization, Road Traffic Accidents (RTAs) have become a common emergency situation in hospitals. Maxillofacial injuries constitute an integral part of polytrauma, which requires special attention for its repair and reconstruction as these facial injuries also cause psychological trauma to the individual victim. Other than RTAs, maxillofacial trauma may also be caused by assaults, sports and fall from height.

A plethora of epidemiological studies have been published in literature regarding the incidence, etiology and management of maxillofacial fractures, however these studies are greatly dependent on local socioeconomic and demographic factors.

The present study intends to delve into the incidence, etiology and management of maxillofacial fractures at our institution with a special emphasis on the changing trend in the incidence of midface fractures.

### Patients and methods:

This study involves the patients who sustained maxillofacial fractures and were treated at the department of Oral and Maxillofacial Surgery, HKES's S.Nijalingappa Dental College, Gulbarga. It spans 10 year period from January 1, 2005 till December 31st, 2014. A number of parameters including age, sex, cause of injury, pattern and treatment modalities along with the post operative complications were recorded and evaluated. All maxillofacial injuries were assessed and treated by the same group

of oral and maxillofacial surgeons. Of note, in these patients other concomitant bodily injuries were treated by pertinent consulting specialists. The descriptive analysis of this data obtained was done through SPSS-16.

### Results:

This study involved 1047 patients who sustained maxillofacial fractures and was as noted before, were treated in our institution from 2005-2014 (Table 1).

Table 1 : Distribution of case year wise

Year	Number of cases	Percentage of cases
2005	98	9.36%
2006	107	10.21%
2007	92	8.78%
2008	114	10.88%
2009	118	11.27%
2010	86	8.21%
2011	94	8.97%
2012	102	9.74%
2013	117	11.11%
2014	119	11.36%

There was a male preponderance with male to female ratio being 7:1 (Table 2).

Gender	Number of cases	Percentage of cases
Male	911	87.02%
Female	136	12.98%
Total	1047	100%

Predictably the most susceptible age group in the study ranged from 21-30 years (Table 3).

Table 3

Distribution of case age wise

Age group (years)	Number of cases	Percentage of cases
0-10	21	2.05%
11-20	252	24.06%
21-30	294	28.08%
31-40	231	22.06%
41-50	144	13.75%
51-60	61	5.82%
>60	44	4.20%

In the period between 2013-14, there was a drastic change in the incidence of patterns of maxillofacial fractures, with increased incidence in midface fractures compared to the mandibular fractures.(Table 4).

Table 4

Distribution of cases according to incidence and pattern

Year	No. of cases	Mid-Face fractures		Mandible fractures		Fractures involving both midface and mandible	
		No. of cases	Percentage of cases	No. of cases	Percentage of cases	No. of cases	Percentage of cases
2005-14	1047						
2005	98	36	36.73%	53	54.08%	09	9.18%
2006	107	34	31.77%	62	57.94%	11	10.28%
2007	92	32	34.78%	53	57.60%	07	7.60%
2008	114	42	36.84%	64	56.14%	08	7.01%
2009	118	49	41.52%	55	46.66%	14	11.86%
2010	86	36	41.86%	43	50.00%	07	8.13%
2011	94	42	44.68%	40	42.55%	12	12.76%
2012	102	37	36.27%	52	50.98%	13	12.74%
<b>Total</b>	<b>811</b>	<b>308</b>	<b>38.05%</b>	<b>422</b>	<b>51.99%</b>	<b>81</b>	<b>9.94%</b>
2013	117	59	50.42%	48	41.02%	10	8.54%
2014	119	62	52.10%	51	42.85%	06	5.04%
<b>Total</b>	<b>236</b>	<b>121</b>	<b>51.26%</b>	<b>99</b>	<b>41.93%</b>	<b>16</b>	<b>6.79%</b>

The road traffic accidents accounted for the maximum number of maxillofacial fracture cases, where motorcycle accident was followed by automobiles, bicycle and pedestrian hit. The second most common etiology was assault followed by sports injury and fall from height (Table 5).

Table 5

Etiology of fractures of facial skeleton

Sl No.	Etiology	No. of cases	Percentage of cases
<b>1</b>	<b>Road traffic accident</b>	<b>963</b>	<b>91.97%</b>
(i)	Motorcycle	689	65.80%
(ii)	Automobiles	194	18.52%
(iii)	Bicycle	36	3.43%
(iv)	Pedestrian hit	44	4.20%
<b>2</b>	<b>Assaults</b>	<b>51</b>	<b>4.87%</b>
<b>3</b>	<b>Sports injury</b>	<b>13</b>	<b>1.24%</b>
<b>4</b>	<b>Fall from height</b>	<b>09</b>	<b>0.85%</b>
<b>5</b>	<b>Others</b>	<b>11</b>	<b>1.05%</b>

Lacerations and abrasions were the most frequently encountered concomitant injuries rating at about approximately 79.5% of the total cases. Other concomitant injuries included fractures elsewhere and brain injury, accounting for 24.3% and 11% of the cases respectively.

In our study, most of the cases underwent open reduction and internal fixation as compared to closed reduction (Table 6).

Table 6

Distribution showing treatment modalities

Fracture site	Year	No. of cases	Surgical treatment		Non surgical or conservative treatment	
			No. of cases	Percentage of cases	No. of cases	Percentage of cases
	2005-14	1047				
Mid-face fractures	2005-12	308	197	63.96%	111	36.03%
	2013-14	121	83	68.59%	38	31.40%
	<b>Total</b>	<b>429</b>	<b>280</b>	<b>66.27%</b>	<b>149</b>	<b>33.71%</b>
Mandible fractures	2005-12	422	346	81.99%	76	18.00%
	2013-14	99	79	79.79%	20	20.20%
	<b>Total</b>	<b>521</b>	<b>425</b>	<b>80.99%</b>	<b>96</b>	<b>19.10%</b>
Fractures involving both midface and mandible	2005-12	81	78	96.29%	03	3.70%
	2013-14	16	16	100%	00	0.00%
	<b>Total</b>	<b>97</b>	<b>94</b>	<b>98.14%</b>	<b>03</b>	<b>1.86%</b>

This reflects the current trend towards open reduction and internal fixation. Post operative complications requiring further interventions were present in 3% of the cases.

## Discussion:

The last two decades has seen a drastic change in the lifestyle of man, bringing along with it an increase in the incidence of RTAs due to high speed vehicle collisions. Hence, maxillofacial injuries is commonly seen in such cases as face is the most exposed and vulnerable area of the body.

This study is designed to evaluate the incidence of maxillofacial injuries due to various etiologies and to assess any changing trend in the pattern of fractures through the years. During the period of 2013-2014, the incidence of midface fractures has increased as compared to the period between 2005-2012 when mandibular fractures predominated.

According to the British authors, the continued increase in the middle 3rd fractures is due to the rise in the number of zygomatic fractures [24]. The German authors explained the rise in the number of midfacial fractures by the increasing amount of "Road Traffic Accident" [24]. The publications from Aberdeen (GB) [1], Florence (Italy) [2] and Lund (Sweden) [3] mention even higher percentages for middle 3rd fracture citing 60%, 60.7% and 66% respectively when compared to our study in which the incidence was 51.26%.

Midface fractures were the commonest facial fractures in later years of our study which was in contrast to the finding of previous studies where mandibular fractures were the most common fractures in the maxillofacial skeleton (Ahmed et al 2004 [4]; Ansari 2004 [5]; Down et al 1995 [6]; Erol et al 2004 [7]; Haug et al 1990 [8]; Torgersen and Tornes 1992 [9]). This can be attributed to the less availability of CT scans in the early years of our study, due to which a few fractures would have gone undiagnosed.

Following midface fractures, mandibular fractures were the next most common seen in our study. This finding was not in concordance with previous study reported in the literature. (Mourouzis and Koumoura 2005 [10]; Thomas and Hill 2000 [11]) where mandibular fractures were the commonest facial fractures followed by the midface fractures.

This study revealed that the peak incidence of fractures occurred in the 21-30 years age group. These findings are similar to those from other studies which indicate that young individuals suffer more from trauma (Adekeye 1980a,b, [12,13]; Ahmed et al 2004 [5]; Moshy et al 1996 [14]; Oji 1995 [15]; Liet et al 2010 [16]).

As would be expected, there was a male predominance with 87.02% of the cases being men and 12.98% being women for a ratio of 7:1. This can be explained because the majority of such casualties result from RTAs, falls, assaults, where men are more often involved (Adekeye 2004a,b [12,13]; Ahmed et al 2004 [4]; Ansari 2004 [5]; Haug et al 1990 [8]; Hachi et al 2002 [17]; Iatron et al 2010 [18]; Lu et al 2010 [16]).

In our study 81.80% of patients were treated with the open method and 18.20% with the closed method. This is in contrast with previous studies (Ahmed et al 2004 [4]; Ansari 2004 [5]; Erol et al 2004 [7]) in which closed reduction was more frequently used.

Maxillofacial injuries of all severity levels can be reduced by 50%

with use of restraints. Preventive measures such as obligatory wearing of a crash helmet and seat belts and strict enforcement of laws against "Drinking and Driving". If these measures are taken then there will be significant reduction in the number of Road Traffic accidents. (Holmes et al 2004 [20]; Vanbeek and Merckx 1999 [21]).

## Conclusion:

In this retrospective study of 1047 cases at our institution between 2005-2014, the most significant observation is the drastic change in the pattern of facial fractures with the increase in the incidence of midface fractures over a period of the last 2 years. This observation is in contrast to several studies which have found mandibular fractures as to be the most common fractures of maxillofacial region. The most common cause being RTAs followed by assaults. Most fractures occurred in the age of 21-30 years. Open reduction and internal fixation was the most commonly employed method for the treatment of such fractures at our institution. Based on the findings herein a forthcoming change in the pattern of maxillofacial fractures is suggested and it may vary from region to region. The data in the study has made it feasible to attain the main tenets of the research; yet the retrospective nature of the study limits its accuracy and applicability, hence a further prospective study is recommended.

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