

The Prevalence of Maxillofacial Fracture Patterns in North West region of Rajasthan: A Retrospective Study

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ABSTRACT

Background: A retrospective study is done to evaluate the prevalence & pattern of maxillofacial injuries in North West region of Rajasthan from Jan 2005 to Dec 2014.

Material and methods: This study was undertaken at the department of Dentistry, S.P. Medical College, Bikaner, Rajasthan, India. A retrospective analysis of the patient's record, who was admitted in the department over a period of ten years, was done. Pattern of fracture in the jaw bone was studied with variables like, age, gender and treatment done.

Result: A total of 1761 patients were admitted in the department over a period of 10 years, 3209 fractures were recorded in total. Data shows mandibular body area and zygoma are the most common sites for fracture i.e. 27.71% (488), 27.54% (485) respectively. Male female ratio for maxillofacial fracture in this part of Rajasthan is found to be 6.7:1(1576 male and 235 female). Patients treated by open reduction were 6.41%, (113 from total 1761 patients). When we see the age wise distribution of maxillofacial fracture, 64.84 % patients fall in the age group of 18-49 years. In female patients, maximum were from the age group of less than 10 years i.e. 40.6%.

Conclusion: Maxillofacial fractures are significantly increasing in number with the time. Concerned authority and general population must take concrete steps to minimise these traumatising accidents.

Keywords: Maxillofacial, Trauma, Mandible, Maxilla, Zygoma, Retrospective.

INTRODUCTION

The head and facial area are the main exposed part of the human body. Therefore these are the most vulnerable areas to be traumatised due to road traffic accidents (RTA), fall, sports injury and assault. Surveys of facial injuries have shown that the aetiology varies from country to country and also within the same country depending on the geographical, socioeconomic, cultural and environmental factors^{1,2}. Literature has shown that

in every 30 seconds someone dies due to road traffic accidents worldwide. In India also RTA accounts for very high fatality rate i.e. twenty times more than the developed countries.³ Injuries to the maxillofacial region are increasing in the modern world in frequency and severity because of the increasing use of road transportation, increasing socioeconomic status of the population, alcohol consumption etc. ^{3,4}. The major causes of maxillofacial fractures all over the world are road

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traffic accident and assault⁵. The severity and pattern of the fracture depends on the magnitude of the causative force, impact duration, and part of the body struck. The surface area on which the impact strikes is also relevant⁶.

The objective of this retrospective study was to analyze the maxillofacial injuries with special attention to the site of fractures, pattern, age, gender distribution, and treatment done to the patients who reported to Sardar Patel Medical College & Associate Groups of Hospitals, Bikaner, Rajasthan between January 2005 to December 2014 and compare the results with similar studies in India and rest of the world.

MATERIALS AND METHODS

All admitted patients with maxillofacial injuries, to the Department of Dentistry, or transferred from trauma centre or emergency or other departments of Sardar Patel Medical College & Associate Groups of Hospitals, from January 2005 to December 2014, were included in the study. Patients who were treated as outdoor patients were not included in the study.

For this study, the mandible was divided into condylar, coronoid, angle, body, symphysis & parasymphysis regions. In the middle-third of the face, fractures were recorded as maxilla, zygoma, zygomatic arch, zygomaticomaxillary complex (fracture of maxilla and zygoma). Dentoalveolar fractures were recorded collectively i.e. maxilla and mandible dentoalveolar fractures both were grouped together. Data were retrieved from the case records in dental indoor patients. Patients having fracture at multiple sites were counted additively, for example, patient having bilateral condyle and symphysis fracture were counted as two fractures i.e. 1 condyle+ 1symphysis. In a patient one site is counted only once, as bilateral condyles are counted 1 only. For our study we divided the patients in five different age groups, less than 10 years, from 11 to 17 years, from 18 to 39 years, from 40 to 59 years and above 60 years. **Maximiana Cristina et al**⁷ have grouped the patients in only four groups, they have not studied the children below the age of 10 years. Treatment planning was divided in to two simple group i.e. open reduction and closed reduction.

RESULTS

A total of 1761 patients who had bony injuries were admitted in the department of dentistry Sardar Patel Medical College. 3209 fracture were recorded in all.

Fracture pattern - In total 3209 fractures, mandibular fractures were 1984 (61.82%), middle third fractures were 1225 (38.17%).

In total 1761 Patients, patients having both mandible and middle third fractures were 242 in number (13.74%) and rest of the patients had either isolated mandible or isolated maxilla fracture.

The data showed body area and zygoma were the most common site for fracture i.e. 488(27.67%) and 485(27.54%), followed by maxilla fracture 426(24.19%), parasymphysis 408(23.16%), condyle 397(22.54%), zygomaticomaxillary complex 189(10.73%), zygomatic arch 125(7.09%), ramus or coronoid process 20(1.13%) and total 115(6.53%) dent alveolar fractures were observed in both maxilla and mandible.

(Table 1 and 2)

Gender; In 1761 patients, 1576 patients were male and 235 were female. Male female ratio for maxillofacial fracture in this part of Rajasthan is found to be 6.7:1. **(Table 3)**

Age; In 1576 male patient, 89 (5.6% of male patients) were below the age of 10 years, 134 (8.5%) in the age group of 11-17 years, 1075 (68%) from 18-39 age group, 235 (14.9%) from 40-59 age group and 43(2.7%) were geriatric patients (above 60 years). **(Table 4)**

In 235 female patients 96 (40.6%) were below the age of 10 years, 32 (13.5%) in the age group of 11-17 years, 67 (28.3%) from 18-39 age group, 28 (11.9%) from 40-59 age group and 13(5.5%) were geriatric patients (above 60 years) **(Table 5).**

Treatment plan; all maxillofacial trauma patients were treated either by open reduction or closed reduction. 6.41% (113) of the total 1761 patient were treated by open reduction, and rest of the

Table 1: Mandibular fracture pattern, site wise distribution.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Site of Fractures											
Symphysis	28	29	21	27	18	26	27	31	39	24	270
Parasymphysis	19	11	28	34	52	53	52	52	60	47	408
Angle	30	49	35	49	31	45	28	45	44	45	401
Body	38	44	67	58	43	28	38	55	70	47	488
Condyle	28	32	36	33	28	44	36	46	66	48	397
Ramus/ Coronoid	4	1	-	1	2	-	2	1	6	3	20
Combined	28	32	40	44	40	49	27	46	65	47	418

Table 2: Maxillary fracture pattern, site wise distribution.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Site of Fractures											
Maxilla	21	27	23	29	27	59	42	60	79	59	426
Zygoma	26	29	43	27	43	63	49	45	83	77	485
Arch	6	7	6	9	24	30	13	13	9	8	125
ZMC	6	9	8	5	11	38	20	16	48	28	189
Combined dentoalveolar	9	10	10	12	8	18	11	11	14	12	115
Combined maxilla And mandible	9	10	16	29	7	38	17	32	45	39	242

Table 3: Yearly distribution of male female patients.

S.No	YEAR	MALE	FEMALE	TOTAL
1	2005	97	16	113
2	2006	81	22	103
3	2007	104	20	124
4	2008	114	24	138
5	2009	143	22	165
6	2010	188	19	207
7	2011	178	29	207
8	2012	217	24	241
9	2013	214	28	242
10	2014	192	29	221
11	TOTAL	1576	233	1761

Table 4: Yearly age wise distribution of male patient.

YEAR	<10	11 TO 17	18 TO 39	40 TO 59	>60	TOTAL
2005	3	5	69	20	0	97
2006	3	14	77	12	7	113
2007	8	6	67	19	4	104
2008	7	10	83	12	2	114
2009	9	19	102	11	2	143
2010	13	18	141	21	6	199
2011	16	14	110	29	5	174
2012	13	14	156	29	6	218
2013	6	21	140	40	7	214
2014	11	13	130	42	4	200
TOTAL	89	134	1075	235	43	1576

Table 5: Yearly age wise distribution of female patient.

YEAR	<10 year	11 TO 17 year	18 TO 39 year	40 TO 59 year	>60 year	TOTAL
2005	7	4	2	1	2	16
2006	6	5	9	1	2	23
2007	10	2	5	2	1	20
2008	13	3	6	2	0	24
2009	12	4	4	3	1	24
2010	5	0	12	2	0	19
2011	10	2	10	5	2	29
2012	10	4	6	4	0	24
2013	8	2	11	5	2	28
2014	15	6	2	3	3	29
total	128	99	95	41	249	235

Table 6: Year wise distribution of open reduction cases.

YEAR	TOTAL PATIENTS	OPEN REDUCTION	PERCENTAGE
2005	113	24	21
2006	103	20	19
2007	124	21	20
2008	1389	12	9
2009	165	10	6
2010	207	13	6.2
2011	207	0	0
2012	241	6	2.48
2013	242	4	1.65
2014	221	3	1.35
TOTAL	1761	113	6.41%

Table 7: Male female ratio.

TOTAL	MALE	FEMALE	RATIO
1761	1576	235	6.49:1

patient were treated conservatively by closed reduction. 24%, 20%, 21% patients were treated by open reduction in year 2005 to 2007 respectively. 12%, 10%, 13% patients were treated by open reduction in next three years i.e. 2008, 2009 and 2010. In last four years i.e. from year 2011-14, closed reduction remained a preferred mode of treatment. (**Table 6**)

DISCUSSION

Injuries to the maxillofacial region are increasing in the modern world in frequency and severity because of the increasing use of road transportation, increasing socioeconomic status of the population, alcohol consumption etc.^{3,4}. The objective of this retrospective study was to analyze the maxillofacial injuries with special attention to the site of fractures, pattern, age, gender distribution, and treatment rendered to the patients at our centre, and to compare the results to other parts of country and internationally.

Fracture pattern – The incidences and pattern of maxillofacial fractures vary with the geographic region, socioeconomic status, cultural and religion². Most of the studies showed that zygoma fracture was significantly lower than a mandibular fracture because of the fact that the mid facial bones are extremely elastic. Mandible fracture is the most frequently observed fracture⁸⁻¹⁰. This preponderance could be due to the reason that it is the only movable bone in the facial skeleton and have many weak areas making it vulnerable to fracture. In contrast middle third fracture is found to be the most frequently occurring fracture by others¹¹. But in our study no significant difference was found in occurrence of mandibular body fracture (27.71%) and zygoma fracture (27.54%).

This could be due to the prominent location of the zygoma in the face. **Ferreira P et al** study also supported the most common fracture site as zygoma¹².

Gender distribution; the man: woman ratio was calculated to be 6.7:1 in our study. This pattern unique and is not comparable with other studies worldwide and to the studies conducted in other parts of the country. Study done at Wardha, Maharashtra¹³ reported male female ratio of 4.9:1. Similar studies from Mysore, Karnataka³ reported this ratio to be 4.7:1. Ratio of 4.5:1 was found in the states of Uttar Pradesh and Uttaranchal¹⁴. In Delhi¹⁵ it comes out to be 4.4:1.

If we consider studies from other countries like Brazil⁷ male female ratio is 4.3:1, which is somewhat comparable to other parts of our countries. Studies from other part of India and other countries as in Canada, the United Arab Emirates, Singapore

and Turkey give almost similar results. Lower ratios were found in Nigeria and Greece. Pakistan reported a ratio of 32:1 which stands out different from others.

The higher frequency of maxillofacial injuries among men compared to women in the present study may be attributed to the fact that the females, most often, are confined to house hold work specially in this part of Rajasthan they are more dependent on the male members of the family for going out. Most of female don't drive and if few younger female, drive vehicles, they drive less frequently, and more carefully than males; Also, the fact that women occasionally participate in business and are less exposed to fights, industrial works, and sports and one more cause which can be included here that rarely females consume alcohol (except few communities, which in turn are more traditional and conservative and not usually allowed to roam independently).

Age; maximum number of patients who observed maxillofacial injuries were in the age between 18 and 39 years. This age group is usually involved in dangerous activities and drive without much care. In both male and female presented the similar incidence in this age group according to **Maximiana Cristina**⁷ and others from Brazil. In contrast we found in our study that for male patients this age group is undoubtedly more prone to get facial trauma, but for female patients age group under 10 years is more vulnerable. 40% female who get injured were from this age group. Perhaps social values can be the cause, as female child is an unwelcomed member of the family, they are not given proper attention and care which is vital for this age and after their first decade of life female themselves become more careful as they grow up, their outdoor movements got somewhat restricted, which could be the cause of less number of fractures in next age group.

Age range was 1.6 year to 82 year. Youngest patient recorded was one and half year old, etiological factor was fall from the bed.

Treatment plan; all maxillofacial trauma patients were treated either by open reduction or closed reduction. 24%, 20%, 21% patients were treated by open reduction in year 2005 to 2007 respectively. Total patients of maxillofacial injuries in this year

were 113, 103, and 124 respectively. 12%, 10%, 13% patients were treated by open reduction in next three years i.e. 2008, 2009 and 2010. Maxillofacial patients admitted and treated were 138,165,207. In last four years from 2011 to 2014 yearly admitted patients were 207,241,242 and 221 respectively. Closed reduction remained a preferred mode of treatment as there are some limitations at a government setup, moreover, increasing number of patients, increasing patient: dentist ratio and lesser available resources can be blamed for this scenario.

Causes of the fracture can be grouped broadly into four major categories: road traffic accident, falls, violence (including assault and fights) and miscellaneous (sports injuries, pathological, animal attack, iatrogenic fracture etc^{3, 7,13-14}. Etiological factors were not taken into consideration in the present study as no complete records were available. Data which were available shows that RTA appears to be the major cause of maxillofacial trauma. Undoubtedly road traffic accidents are increasing day by day because of multiple factors. The reasons of increasing RTA³ are;

1. Sharing of the roads by slow and fast moving vehicles, by pedestrians and even by animal.
2. Disregard for traffic rules; minors are driving twowheeler, no helmets or if wearing, they are not up to the standards.
3. Defective roads; poor street lighting; and speed breakers by the public for their own convenience.
4. Increasing traffic as a result of expanding economy and rapid increase in the density of urban population.
5. Alcohol consumption

CONCLUSION

Maxillofacial fractures are significantly increasing in number and also in severity with the time. Mandibular body and Zygoma are the most common sites of fracture in maxillofacial trauma. Male female ratio in this part of Rajasthan is 6.7:1. Among males 18-39 year group was most dominant and in female less than 10 year group is more

vulnerable to maxillofacial injuries. Concern authority and general population must take concrete steps to minimise these traumatising accidents.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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