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Patterns of maxillofacial fractures treated in a tertiary care government hospital of Puducherry – A descriptive cross-sectional study

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ABSTRACT

Background: Maxillofacial trauma is most common in both developing and developed countries. Descriptive studies from various parts of the world helps us in understanding the patterns of these injuries which in turn help in formulating tailor made prevention strategies for that particular geographic region. **Aims and Objectives:** The aim of this study is to assess the patterns of maxillofacial fractures treated in IGMC & RI in Puducherry from 2011-2018. The objectives are to find out the type of maxillofacial fractures treated, to estimate the demographic data of maxillofacial fracture victims and to assess the treatment modality used (Closed reduction /open reduction and internal fixation (ORIF). **Materials and Methods:** Data of surgically treated patients of maxillofacial fractures were retrieved, tabulated and analysed using SPSS software – 24 for descriptive and inferential statistics. **Results:** The estimated results clearly indicate that males were most commonly affected by maxillofacial trauma. The common age group is 20 to 30 years. The major contributing aetiology for trauma is RTA and the common fracture that was encountered was fracture mandible and the fractures were largely managed by open reduction. **Conclusion:** The results obtained are expected to greatly contribute for the planning of prevention actions and management in health, assistance practices to victims of facial trauma, epidemiological surveillance and road traffic rules.

Key words: Maxillofacial trauma; Mandible; Maxilla; Zygoma; lefort fracture

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INTRODUCTION

Maxillofacial fractures are common worldwide due to increased incidence of Road traffic accidents (RTA).[1-4] Maxillofacial region extends from the frontal bone to the lower border of mandible. Patterns of maxillofacial fractures were published from various parts of India and worldwide.[5-7] They differ from one country to another and within the same country. Maxillofacial fractures are due to RTA, inter personal assaults, fall from height and sports injuries.[8,9] Documentation and publication of prevalence of maxillofacial fractures are of paramount importance for formulating prevention measures, equipping health care system, for the development of infrastructure and enforcement of stringent traffic rules. Pattern of maxillofacial injuries remains under reported from Tamilnadu and Pondicherry region, south India. Since no such study was conducted in Pondicherry, we did a descriptive analysis of patterns of maxillofacial trauma treated in Indira Gandhi Medical College and Research Institute for 7 years. Further, similar studies from India had not reported on the type of management of the fracture (Closed reduction /open reduction and internal fixation (ORIF). The study of this parameter will help us to appeal

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to the government to improve the tertiary care hospitals in this region for proper interdisciplinary approach.

MATERIALS AND METHODS

The descriptive study was carried out for the period of 7 years (2011-2018) at the Department of Dentistry, Indira Gandhi Medical College and Research Institute after getting ethical committee clearance (IEC no: 17/163/IEC/PP/2018). In-patient records were retrieved and data were entered in a structured Proforma.

The Inclusion Criteria were, Maxillofacial trauma patients of both the genders, Age group from 18 to 65 years, patients with isolated maxillofacial fractures, maxillofacial fracture due to RTA involving-motorised/non-motorised two wheelers (both as riders and pillion riders), Light motor vehicles/heavy motor vehicles, Pedestrians vs. any motorised vehicle, maxillofacial fracture due to self-fall and maxillofacial fracture due to interpersonal assault.

The Exclusion criteria of this study was, those who were pregnant women, unconscious patients, poly trauma, pan facial fractures, Maxillofacial fractures treated by conservative method, Soft tissue injuries without fractures and Isolated Dentoalveolar fractures.

Among the patients who were operated in the Department of Dentistry, Indira Gandhi Medical College and Research Institute, 163 patients fulfilled the above criteria and were included in the study (N=163). Collection of data was done from in-patient records in a Proforma with following details:

1. Age
2. Sex
3. Etiology-RTA, Assault, sports injury and self-fall.
4. Type of fracture- mandible (symphysis, parasymphysis, body, angle, condyle), maxilla (Lefort I, Lefort II, Lefort III) and zygoma (complex, arch).
5. Treatment modality (closed reduction, ORIF)

Data retrieved were analysed using SPSS software - 24. The compiled data were analysed using descriptive and inferential statistics.

RESULTS

One hundred and sixty-three patients (N=163) operated in the Department of Dentistry fulfilled the inclusion and exclusion criteria and they were included in the present study.

Results

Table 1 shows the frequencies and proportions of the parameters assessed. The statistics depicts that males were largely affected by maxillofacial trauma. The common age group is 21 -30 and the commonly occurring fracture is mandible 52.2% followed by fracture zygoma (37.4%) and maxilla (10.4%). On assessment of age distribution (Figure 1) it reveals that the most vulnerable age group is 21 to 30 years followed by 31 to 40 years and 41 to 50 years.

Males (91.4%) suffered maxillofacial trauma in a larger proportion compared to females (8.6%) (Figure 2). RTA is the most common etiology (66.8%) followed by self-fall (19%) and then assault ((14%) (Figure 3). On estimating the frequency of isolated type of fracture (Figure 4), the most common fracture being zygomatic arch (26.9%), followed by angle of the mandible (18.4%) and the condyle of the mandible (11.6%).

The assessment of the type of management done for the maxillofacial fractures revealed that open reduction was the major treatment offered (79.1%) and the closed reduction accounts for (20.9%) (Figure 5).

Table 2 shows the age wise distribution of gender, etiology and the type of fracture. The common age group affected being 20 to 30 years and in that age group males were largely affected by RTA and with fracture zygomatic arch.

Table 3 shows the distribution of the type of fracture and etiology. The correlation between each type of isolated

Table 1: Frequencies and proportions of parameters assessed

Parameters	Group	Frequency	Percent
Age	20 and below	14	8.6
	21-30	53	32.5
	31-40	44	27.0
	41-50	35	21.5
	51-60	13	8.0
	>60	4	2.5
Gender	Male	149	91.4
	Female	14	8.6
Etiology	Assault	23	14.1
	RTA	109	66.9
	Self-fall	31	19.0
Type of Fracture	Angle Mandible	30	18.4
	Body Mandible	12	7.4
	Condyle Mandible	19	11.7
	Parasymphysis Mandible	17	10.4
	Symphysis Mandible	6	3.7
	Ramus Mandible	1	0.6
	Lefort I Maxilla	3	1.8
	Lefort II Maxilla	10	6.1
	Lefort III Maxilla	4	2.5
	Zygoma	17	10.4
	Zygomatic Arch	44	27.0
Reduction	ORIF	129	79.1
	Closed reduction	34	20.9

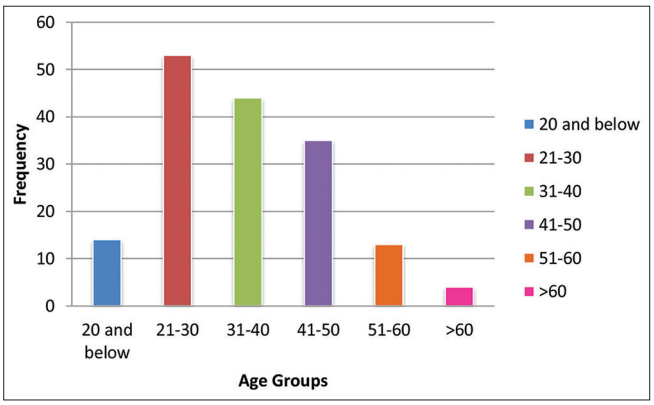

Figure 1: Frequency –age group

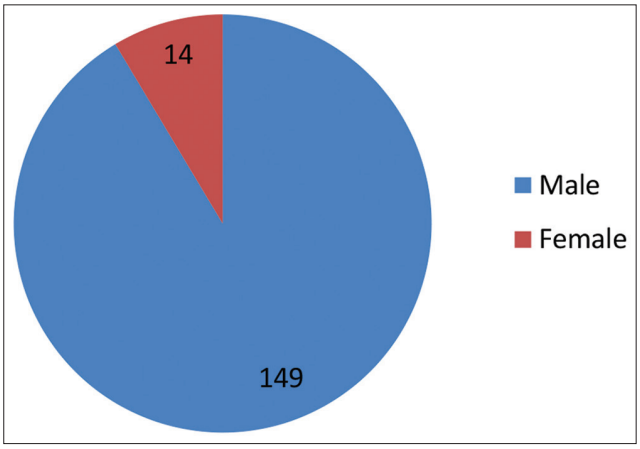

Figure 2: Gender distribution

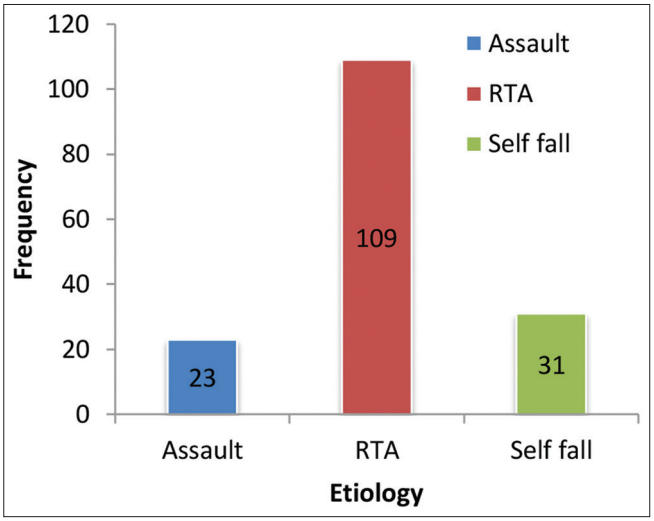

Figure 3: Frequency-Etiology

fracture with attributing etiology is demonstrated. The commonest fracture is zygomatic arch and it is due to RTA.

DISCUSSION

Management of maxillofacial injuries is an everyday challenge for the oral and maxillofacial surgeon and

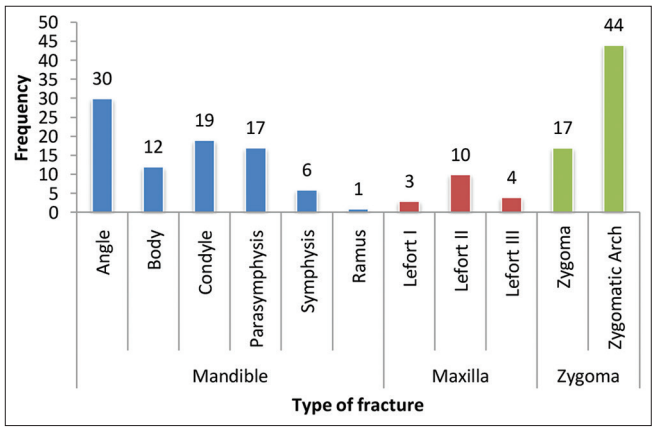

Figure 4: Frequency- type of fracture

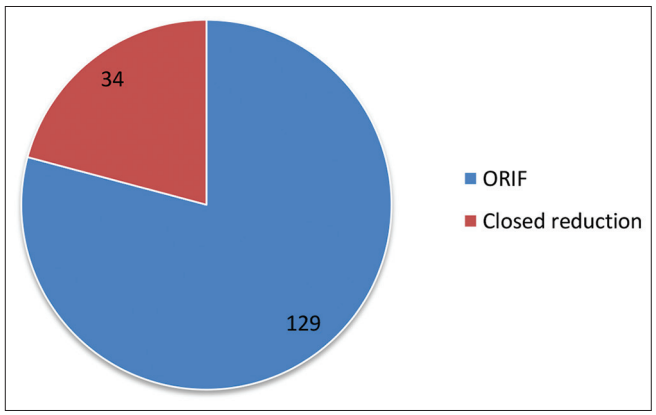

Figure 5: Type of surgical management

it demands excellent clinical skills and the treatment facilities. Open reduction and internal fixation (ORIF) are the treatment modality for the management of these patients. Males are prone to greater risk because of their involvement to risk factors such as driving vehicles, sports and social life (which involves usage of alcohol and drugs). It was also observed that most victims were in the age group of 20–30 years. Maxillofacial trauma is common in this age group due to commuting to work place with careless driving on the roads. The car population as a proportion of total motor vehicles is only 13% in India compared to developed countries (56%-80%). On the contrary, the proportion of motorised two wheelers is much higher (70%) in India. This high proportion of two wheelers has a large effect on traffic and crash accidents. A prevalence study by Prasad et al[10] from North Chennai estimated RTA as a major etiology for maxillofacial trauma. Pedestrians, bicyclists, and MTW (motorised two wheelers) riders are more vulnerable to injury and constitute 60% to 80% of all traffic injuries in India.[11] The number of deaths or injuries caused by two wheelers is about 15 to 20 times greater than for closed vehicles.[12] In our study, the major cause of maxillofacial injury was RTA (66.8%) and it is in concurrence with previous studies from India. These injuries are usually due to skid or fall from a vehicle,

Table 2: Age wise distribution of gender, etiology and the type of fracture

Age	Number of injuries	Sex		Etiology			Type of fracture										
		Male	Female	Assault	RTA	Self fall	Mandible						Maxilla			Zygoma	
							Angle	Body	Condyle	Parasymphysis	Ramus	Symphysis	Lefort I	Lefort II	Lefort III	Zygoma	Zygomatic arch
≤20	14	14	0	6	5	3	6	1	3	0	0	0	1	1	0	1	1
21-30	53	49	4	5	36	12	9	4	6	10	0	0	0	2	3	5	14
31-40	44	40	4	4	34	6	8	4	4	4	0	1	2	2	0	3	16
41-50	35	31	4	7	21	7	5	2	5	1	0	3	0	3	1	7	8
51-60	13	12	1	1	9	3	2	1	1	1	1	0	0	2	0	1	4
>60	4	3	1	0	4	0	0	0	0	1	0	2	0	0	0	0	1
Total	163	149	14	23	109	31	30	12	19	17	1	6	3	10	4	17	44
		91.4	8.6	14.1	66.9	19.0	18.4	7.4	11.7	10.4	0.6	3.7	1.8	6.1	2.5	10.4	27.0

collision with another vehicle, loss of control due to an unexpected accident with pedestrians or animals. RTAs can be prevented by behavioural change to the various preventive measures such as the use of seat belts, wearing of helmets and strict adherence to the traffic rules. The higher frequency of maxillofacial injuries among males compared to females is a uniform finding from previous studies.[13] In our study Males (91.4%) suffered maxillofacial trauma in a larger proportion compared to females (8.6%). Puducherry city, capital of the union territory is a former French colony and a major tourist attraction. The city attracts lots of tourists and workers from adjoining rural areas. The main modes of transportation are two wheelers and hence the recorded maxillofacial trauma was high in males. Males in majority are the bread winners in the developing country like India.

Previous studies have registered that the zygomatic fractures are the most common subtype among mid facial fractures in both children and adults.[14] The maxilla (22%), orbit (16%), and Nasal (16%) bones were the most frequently fractured facial bones.[15] Singaram et al[16] and Septa et al[17] observed that mid facial fracture was common than mandible and zygomatic bone. In our study we observed that mandible is the most common fracture followed by zygoma (including the arch) and then followed by maxillary fractures.

Use of restraints such as helmets and seat belts are of paramount importance in preventing maxillofacial trauma. Bekal et al[18] recorded that the incidence of Maxillofacial trauma increased due to non-utilisation of restraining devices in and around Bengaluru, India.

Helmets are not gender specific. In India a common misconception is that full facial helmets are meant for males. This renders most of the females vulnerable to facial fractures. Although use of restraints such as helmets and seat belts are mandatory in any part of India, the compliance is less. Bekal et al[18] and Pandey et al[19] recorded maxillofacial fractures in RTA because of not wearing helmets or not wearing seat belts. According to WHO, RTA accounts for 9th position of DALY (disability-adjusted life year) loss but in2020 it can reach to third position.[20,21]

The results of our study clearly demonstrate that males were affected more than females in the age group of 21 to 30 years and it is in concurrence with previous studies worldwide. The common type of fracture observed was mandible and it is different from the previous studies reported from south India. Further, in isolated fracture types, zygomatic arch fracture appeared to be most common. This finding is reported to be first of its kind

Table 3: Distribution of type of fracture etiology

Type of fracture	Etiology						Total		Chi Square	P Value
	Assault		RTA		Self fall					
	N	%	N	%	N	%	N	%		
Angle Mandible	11	47.8	15	13.8	4	12.9	30	18.4	40.215	0.005
Body Mandible	2	8.7	5	4.6	5	16.1	12	7.4		
Condyle Mandible	1	4.3	16	14.7	2	6.5	19	11.7		
Parasymphysis Mandible	1	4.3	15	13.8	1	3.2	17	10.4		
Ramus Mandible	1	4.3	0	0.0	0	0.0	1	0.6		
Symphysis Mandible	0	0.0	5	4.6	1	3.2	6	3.7		
Lefort I Maxilla	0	0.0	2	1.8	1	3.2	3	1.8		
Lefort II Maxilla	1	4.3	8	7.3	1	3.2	10	6.1		
Lefort III Maxilla	0	0.0	4	3.7	0	0.0	4	2.5		
Zygoma	3	13.0	12	11.0	2	6.5	17	10.4		
Zygomatic Arch	3	13.0	27	24.8	14	45.2	44	27.0		

on analysis of previous studies. Treatment protocol has changed during the past 20 years, and like many like other regions of the world, conservative methods have been replaced by open reduction and rigid fixation. The present study is in concurrence with the above statement as ORIF accounts for 79 percent in our study.

CONCLUSION

Maxillofacial trauma deserves special attention because of the direct injury created on the face which may lead to permanent damage to vision, hearing, mastication and aesthetics. More emphasis should be placed to understand the patterns of maxillofacial trauma in that particular geographical region to strengthen the level of primary prevention of RTA, violence and other causes of trauma.

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Author's contribution:
DK - Conception and design of the work and reviewed the literature and final approval of the version to be published; **VP -** Design of the study and Critical revision of the article; **NB -** Data collection, manuscript preparation; **ND -** Manuscript preparation and critical revision of the article, data analysis and interpretation.

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