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Research article

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### Epidemiology and Management of Panfacial Fractures and the Associated Injuries in Andhra Pradesh

Sumita Shankar<sup>1\*</sup>, Manaswitha Boyanagari<sup>2</sup>, Vamsi Krishna Boyanagari<sup>2</sup>, Mehul Shankar<sup>3</sup>, Ravi Shankar Ayyanar<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of Plastic Surgery, Guntur Medical College, Guntur District, Andhra Pradesh, India.

<sup>2</sup>Post graduate student, Department of Public Health, Manipal University, Manipal, Karnataka.

<sup>3</sup>Medical Student, Christian Medical College, Vellore, TamilNadu, India.

<sup>4</sup>Chief Executive Officer, Dr. NTR Vaidya Seva Trust, Govt of Andhra Pradesh, India.

\*Corresponding author: Sumita Shankar

Email: [sum713@yahoo.com](mailto:sum713@yahoo.com)

#### ABSTRACT

##### Background

Facial Trauma is considered as one of the leading causes of death among people who are aged under 40 years. Patients with facial fractures may be associated with a variety of injuries of other regions of the body that worsen the prognosis resulting in functional disability or even death. The aim of this present study is to identify the characteristics of pan facial fractures and the occurrence, types, and severity of associated injuries outside the facial region.

##### Materials and Methods

A retrospective study was carried out between January 2015 to September 2016 on patients admitted with facial injuries in plastic surgery departments of the network hospitals empanelled under Dr. NTR Vaidya Seva Trust. The medical records of patients were studied to gather data regarding the patient's age and sex, aetiology, type of associated injuries, Type of fracture and treatment received were collected and analysed.

##### Result

A total of n=145 case records were analysed in this study. The most common associated injury was Cranial trauma (7.6 %). The incidence peak of the trauma was observed among patients aged 26 to 45 years (51.7%). Higher incidence was observed in male population (93.1%). Majority of the patients utilized private facilities for treatment (84.8%). Road traffic accidents were by far the leading aetiology (82.8%). The maxilla was most commonly involved in combined facial fractures.

##### Conclusion

Road traffic accidents (RTA) are the leading cause for facial fractures and associated injuries. Preventive measures, such as the obligatory wearing of a crash helmet and seat belts should be strictly followed, besides strict enforcement of the law regarding "drinking and driving". Useful strategies for patient care and prevention of further complications should be planned considering the associated injuries.

## INTRODUCTION

Facial Trauma is considered as one of the leading causes of death among people who are aged under 40 years.[1] Facial trauma often occurs as a result of little protection and considerable exposure of the facial region.[2] Pan facial fractures involves simultaneous fractures of the upper, middle, and lower thirds of the face.[3, 4] It is evident from the clinical aspect of facial trauma that the prominent positioning of anatomical structures of nasal and zygomatic orbital regions results in greater exposure and common fractures. [5] Soft tissue trauma and destruction of the bony framework, may result in malocclusion or facial deformities. Patients with facial fractures may experience a variety of injuries of other regions of the body that worsen the prognosis resulting in functional disability or even death.[6] Adult males are the most common victims of road traffic accidents (RTA) facing maxillofacial trauma and other associated injuries. [7] Hence treatment of pan facial fractures should involve the opinion of other specialities as these patients subsequently may have multisystem injury as well. Knowledge of the type, and the severity of the associated injuries is essential for rapid assessment and treatment initiation. The aim of this present study is to identify the characteristics of pan facial fractures and the occurrence, types, and severity of associated injuries outside the facial region. Further, identify the current treatment modalities for facial fractures.

## MATERIALS AND METHODS

A retrospective study was carried out between January 2015 to September 2016 on patients admitted with facial injuries in plastic surgery departments of the network hospitals empanelled under Dr. NTR Vaidya Seva Trust. The medical records of patients who received free cashless treatment under the Dr. NTR Vaidya Seva Scheme were studied. Data

regarding the patient's age and sex, aetiology, type of associated injuries, Type of fracture and treatment received were collected and analysed. The aetiology of injury was categorized into four categories: [1] RTA involving automobiles, motorcycles and bicycles, including drivers, pillion riders, passengers, and pedestrians; [2] Fall(s) from heights or while playing or due to systemic illness like epilepsy; [3] Assaults or interpersonal violence; and [4] work accidents and other injuries. All the fractures falling under Lefort classification (I, II, III) were combined under the term Lefort. Associated Injury (AI) was defined as any extra facial injury i.e. intracranial, vascular, thoracic or abdominal organs injuries, and fractures excluding brain commotion and wounds.

## RESULTS

A total of n=145 case records were analysed in this study. Facial Trauma patients age ranged from 13 to 70 years (mean, 32.9 years). The incidence peak of the trauma was observed among patients aged 26 to 45 years (51.7%). Higher incidence was observed in male population (93.1%). Majority of the patients utilized private facilities for treatment (84.8%). Road traffic accidents were by far the leading aetiology (82.8%). Other aetiologies comprised falls at home (17 patients), work accident [2], and interpersonal violence [1] **Table 1.** The most common associated injury was Cranial trauma (7.6 %), followed by fractures of Upper Limbs (4.1%), and Lower Limbs (6.2%). The maxilla was most commonly involved in combined facial fractures followed by the mandible, Orbit (6.2%) and zygomatic complex (5.5%) **Table 2.** The commonly followed pharmacological management included administration of antibiotics, antiemetics, nonsteroidal anti-inflammatory drug (NSAID), proton pump inhibitors and Betadine mouth gargles. **Table 3.**

**Table 1 Descriptive statistics of the studied population**

		Frequency (n)	Percent (%)
<b>Age groups</b>	≤ 25	50	34.5
	26 to 45	75	51.7
	≥ 46	20	13.8
	<b>Total</b>	<b>145</b>	<b>100.0</b>
<b>Facility</b>	PVT	123	84.8

	GOVT	22	15.2
	<b>Total</b>	<b>145</b>	<b>100.0</b>
<b>Gender</b>	Male	135	93.1
	Female	10	6.9
	<b>Total</b>	<b>145</b>	<b>100.0</b>
<b>Aetiology</b>	Automobile Accident	120	82.8
	Fall	17	11.7
	Others	3	2.1
	Not informed	3	2.1
	Interpersonal violence	1	0.7
	Work Accident	1	0.7
	<b>Total</b>	<b>145</b>	<b>100.0</b>

**Table 2 Description of the Affected site/ facial bone involved and the Associated Injuries**

		Frequency (n)	Percent %
<b>Affected site/ facial bone</b>	Nasal	1	.7
	Temporal	1	0.7
	Mandible and Nasal	2	1.4
	Frontal	3	2.1
	Zygomatic Arch and Mandible	8	5.5
	Zygomatic Complex	8	5.5
	Orbit	9	6.2
	Mandible	12	8.3
	Lefort and Mandible	36	24.8
	Lefort	65	44.8
	<b>Total</b>	<b>145</b>	<b>100.0</b>
<b>Associated injury</b>	Abdomen	2	1.4
	Upper limb	6	80.7
	Lower limb	9	7.6
	Cranioencephalic Trauma	11	6.2
	Absent	117	4.1
	<b>Total</b>	<b>145</b>	<b>100.0</b>

**Table 3: Pharmacological management of Pan Facial Trauma patients**

Generic name of the Drug	Dosage
Inj. Ceftriaxone	1gm IV 12 hourly
Inj. Amikacin	15 mg/kg/day divided IV/IM q 8-12 hour
Inj. Metronidazole	100 cc IV 8 hourly
Inj. Diclofenac	50 mg IM 12 hourly
Inj. Pantoprazole	20 mg IV 12 hourly
Inj. Dexamethasone	4 mg Iv 12 hourly
Trypsin: Chymotrypsin	(100000AU) TID
Inj. Ondansetron	IV 2 mg OD
Betadine (oral gargles)	

## DISCUSSION

A total of 145 medical records of patients with facial trauma, admitted in the plastic surgery departments of various hospitals across Andhra Pradesh were analysed in this study to identify the characteristics of pan facial fractures and the associated injuries. Our study showed that most of victims were male (93.1%) which is in consistence with several studies that confirmed the prevalence of the male gender in facial trauma [5, 8]. Road traffic accidents (RTA) are the leading cause for the maxillofacial fractures in our study as reported by similar studies. [1, 5] But, it was observed that the aetiology of maxillofacial fractures varied across India. The results from our South Indian state showed that RTAs are the leading cause of facial fractures, where as a study conducted in north Indian city of Delhi showed that Interpersonal violence is the common cause of maxillofacial fractures followed by RTA. [9] This can be attributed to the fact that men remain outdoors for a longer period, greater number of automobile drivers, the practice of physical contact sports, in addition to a more intense social life inferring in higher consumption of alcohol and other drugs thus making them susceptible to trauma in general and maxillofacial trauma in particular. As females drive less frequently they are less likely to be involved in vehicular accidents. Also, women are less vulnerable to sport-related injuries and to falls and

violence related to alcohol consumption.[10] Higher frequency of facial trauma and associated body injuries was observed in our patients of age group 26 to 45 years. Similarly, a study by Scherbaum Eidt, João Matheus et al and Kapoor P, Kalra N. showed that age groups between 20 and 40 years old are the most common relating to facial trauma.[5, 10] In our study the most prevalent affected site was the maxilla representing 50% of the cases followed by mandible in contrast to majority of studies that reported frequent mandible fractures. [5, 11, 12] The injury associated to facial trauma mostly found in this study was Cranioencephalic trauma (CET) (7.6 %). A similar study observed that in facial traumas in the midface of naso-orbital-ethmoid, Le Fort, and orbit types, the most associated injury was CET. [5] Lesions in other parts of the body must not be forgotten. Being on the front line during emergency, the plastic surgeon performing the primary evaluation must be aware of the fact that about 25% of patients with facial fractures have lesions in other parts of the body.[5] Thus the epidemiological investigation of facial traumas along with associated body injuries helps in the outlining of risk circumstances, as well as the characteristics of individuals who are more susceptible to facial trauma across Andhra Pradesh. For treatment 84.8 % of the patients under this study visited/ referred to private healthcare facilities may be because of the availability of specialists and advanced equipment. Pharmacological management

of these patients was done by the administration of Antibiotics, Antiemetics, Nonsteroidal Anti-Inflammatory Drug (NSAID), proton pump inhibitors and Betadine mouth gargles. Majority of the cases in our study were treated by Open Reduction and Internal Fixation (ORIF) under general anaesthesia because of the advantages of direct anatomical reduction, early return to function and minimal complications. Maxillomandibular fixation (MMF) and Intermaxillary fixation (IMF) were subsequently followed to maintain proper occlusion until internal fixation of the fracture was achieved. It has been

proven that following preventive measures, such as the obligatory wearing of a crash helmet and seat belts, better enforcement of the law regarding "drinking and driving", and educating people about the dangers of all-terrain injuries the number of road traffic accidents can be reduced significantly.[5, 13] Useful strategies for patient care and prevention of further complications should be planned considering the associated injuries. A well-coordinated multidisciplinary approach is important to achieve optimum stabilization and ongoing treatment of patients with facial fractures.

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