

*Original article****FACIO MAXILLARY FRACTURES ATTENDED IN A TERTIARY CARE HOSPITAL.***

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***ABSTRACT***

**Background:** - *Facio-maxillary injuries account for 93.3% of total injuries. Facial injuries occur in a significant proportion of trauma patients requiring prompt diagnosis of fracture and soft tissue injuries with possible emergency intervention. Facio-maxillary fractures may present with associated neural and spine injuries. In fact there may be associated limb injuries also.*

**Aim of the Study:** - *To find out about the common causes, different types of fractures, male female ratio, different complications and patients who needed surgical intervention.*

**Materials and Methods:** - *This is a prospective cross sectional study comprising of 60 patients who were having different facio-maxillary fractures and visited to L.G. Hospital from June 2017 to May 2018.*

**Observation and Results:** - *Facio-maxillary fractures and their incidence varies with different places. Male to female ratio was 14:1 in our study. Facio-maxillary fractures are associated mostly with Road Traffic Accidents (RTA 80%), followed by fall (12%), assault (5%) and sports injuries (3%). Commonest facial bone to get fractured is nasal bone (53.3%), followed by mandible (43.3%), maxilla (40%), orbit (23.3%), zygoma (10%) and frontal (6.6%). Condylar fracture is most common amongst mandible fractures, 8 cases (30.8%). Most common isolated bone to get fractured is nasal bone (16.7%) followed by mandible (10%), maxilla (6.7%), orbit (6.7%), fontal (3.3%), zygoma (3.3%). Clinical examination of the patient is very important in terms of facial asymmetry and oedema, mouth opening and teeth occlusion. 3D CT face helps in diagnosis of facio-maxillary fractures. In uncomplicated cases of facio maxillary fractures of maxilla and mandible with proper mouth opening and teeth occlusion, conservative management was done and in patients with decreased mouth opening and improper teeth occlusion surgical management was done. In cases of nasal bone fractures, if there was external deviation of nose or nasal blockage, patient was managed surgically and if there was absence of external deviation or nasal blockage, patient was managed conservatively. Out of 60 patients, 24 (40%) patients were operated while 36 (60%) patients were managed conservatively. Most of the mandible fractures (76.9%) were operated (20 Out of 26) while other bone fractures (Nasal- 68.7%, Maxilla- 91.7%, Zygoma- 33.3%, Orbital and frontal- 100%) were managed conservatively. Most common complication following injury was hypoesthesia (4 out of 60 patients). Local site infection, angle of mouth deviation and haematoma were seen in only one patient each.*

**Conclusion:** - *Based on this study we can conclude that facio maxillary injuries*

*account for major percentage of injuries following RTA (80%). Most of the facial bone fractures were treated conservatively (60%). 3D CT face is the gold standard investigation to rule out different facio maxillary fractures. This data is important for evaluation of existing preventing measures and useful in development of new methods of injury prevention and treatment.*

## **KEYWORDS**

*FACIAL TRAUMA, FRACTURES, MANDIBLE, MAXILLA.*

## **INTRODUCTION**

Facio-maxillary injuries account for 93.3% of total injuries [1]. There are different types of facio-maxillary fractures according to the involved bones like nasal bone fracture, maxillary fracture, mandibular fracture, frontal bone fracture, zygoma fracture and orbital fracture. Some of them are isolated fractures while some are combined fractures. In mandible different parts which get fractured are- condyle, body, symphysis, angle, parasymphysis, coronoid process, alveolar process and ramus. Le Fort described three levels of midface fracture (FIG-7) [2]. Le Fort type I- fracture runs above the floor of the nasal cavity, through nasal septum, maxillary sinuses and inferior parts of medial and lateral pterygoid plates. Le Fort type II- fracture runs from the floor of the maxillary sinuses superiorly to the infra-orbital margin and through the zygomatico-maxillary suture, within orbit it passes across the lacrimal bone to the nasion. In Le Fort type III, there is disconnection of the facial skeleton from the cranial base. Facial injuries occur in a significant proportion of trauma patients requiring prompt diagnosis of fractures and soft tissue injuries with possible emergency interventions [3]. There are many studies in the literature that have analysed the demographic factors associated with facial trauma according to various criteria [3, 4, 5]. The epidemiology of fractures varies with regard to injury type, severity and cause, depending on the population study [6]. The differences in populations with regard to the causes of fractures may be the result of differences in culture and varieties of risk factors. Continuous long-term collection of data regarding the epidemiology of facial fractures is important because it provides information necessary for the development and evaluation of preventive measures that might help reduce the incidence of facial injuries [6]. The aim of this study was to find out about the common causes, different types of fractures, male female ratio, different complications and patients who needed surgical intervention.

## **METHOD**

This is a prospective cross sectional study comprising of 60 patients who were having different facio-maxillary fractures and visited to L.G. Hospital from June 2017 to May 2018. Patients were evaluated thoroughly by history taking, proper examination and routine investigations. In general examination - Consciousness, orientation to time, place and person, neck movements and general mobility of the patients were checked. In local examination - Facial oedema, facial asymmetry, skin lacerations, deep cuts, decreased mouth opening, improper teeth occlusion, teeth loss, nasal bleeding, black eye, epiphora, eyeball movements and redness of eyes were checked. We carried out investigations such as 2D & 3D CT Facial bones, CT Brain and CT cervical spine (if needed) and all routine blood investigations.

### **Inclusion criteria:-**

All cases with facio-maxillary fractures of all age groups were included in our study.

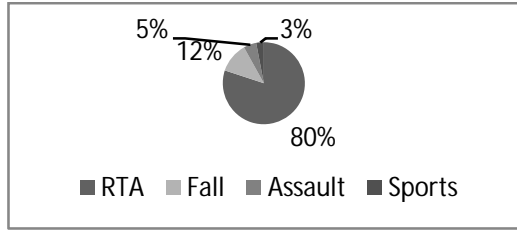
### **Exclusion criteria:-**

Cases with severe head and spine injuries in which urgent Neurosurgical or Orthopaedic intervention was required, were excluded from our study.

**OBSERVATION AND RESULT**

In decreasing order, causes for facio-maxillary injury were RTA (80%), fall down (12%), assault (5%) and sports injury (3%). We have compared these causes with Jordan and Korean Study. The results of our study are consistent with these two studies.(FIG. 1, TABLE 1) [3,7]

**FIG.1 CAUSES OF FACIO-MAXILLARY INJURY.**



**TABLE.1 COMPARISION OF DIFFERENT CAUSES OF FACIO-MAXILLARY INJURIES IN OUR STUDY WITH STUDY OF JORDAN AND KOREA.**

CAUSE	OUR STUDY-2017 NUMBER OF PATIENTS n=60 (%)	INDIAN JOURNAL OF PLASTIC SURGERY, 2010 by KUN HWANG, KOREA(n=2094)	STUDY OF JORDAN 1992-1997,BATAINEH AB(n=563)
RTA	48(80%)	52%	55.2%
FALL	7(12%)	16.6%	19.7%
SPO RTS INJURY	2(3%)	9.7%	8.2%
ASSAULT	3(5%)	15.5%	16.9%

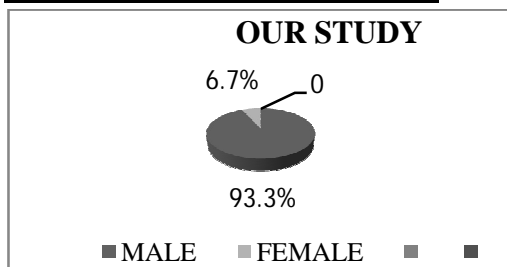
The most common facial bone to be fractured is nasal bone(53.3%) followed by mandible (43.3%), maxilla (40%), orbit (23.3%), zygoma (10%) and frontal (6.6%). These findings are in concurrence with the study of Korea and Jordan. (TABLE 2)[1,3]. In our study, we found 4 patients with Le Forte Type I and 2 patients with Le Forte Type II Fractures.

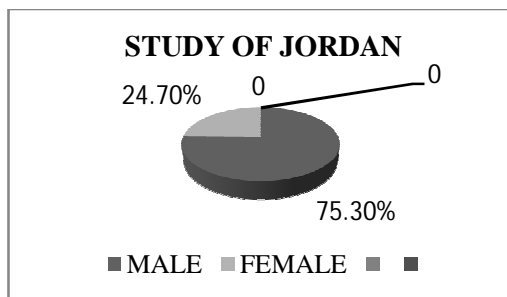
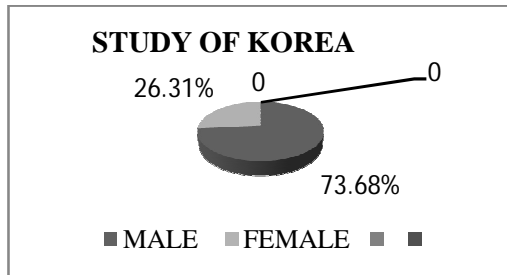
**TABLE.2 COMPARISON OF INCIDENCE OF FACIAL BONE FRACTURES .**

FRACTURED BONE	% OF ISOLATED # NO OF PATIENTS (%)	% OF COMBINED # NO OF PATIENTS (%)	TOTAL % OF ASSOCIATED WITH OTHER # NO OF PATIENTS (%)	STUDY OF KOREA (ISOLATED #)	STUDY OF JORDAN (TOTAL #)
	IN OUR STUDY				
NASAL	10( 16.7%)	22(36.6%)	32 (53.3%)	37.7%	
MANDIBLE	6 (10 %)	20(33.3%)	26(43.3% )	30%	74.4%
MAXILLA	4(6.7 %)	20(30%)	24(36.7% )	1.3%	13.5%
ZYGOMA	2 (3.3% )	4(6.7%)	6 (10% )	5.7%	10.7%
ORBIT	4 (6.7 %)	10(16.6%)	14 (23.3 %)	7.6%	
FRONTAL	2 (3.3%)	2(3.3)	4(6.6%)	0.3%	

Facio-maxillary injuries were more common in males than females, which is in agreement with other studies(FIG 2) [1,3].

**FIG.2MALE FEMALE RATIO**



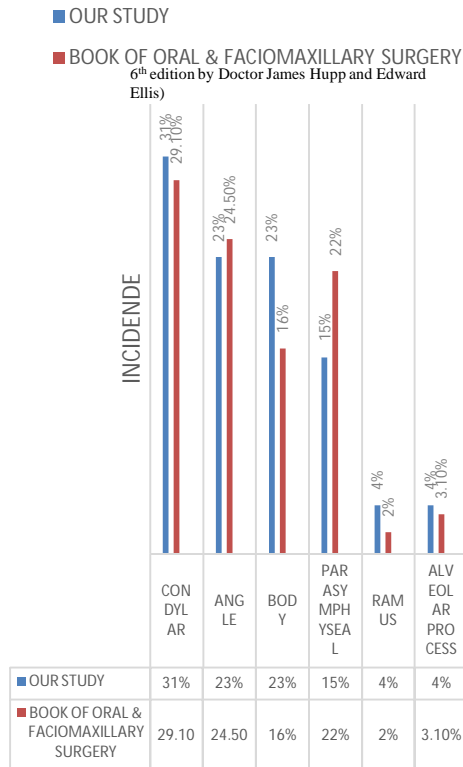


Condylar fracture is the commonest amongst different types of mandibular fractures followed by angle of mandible, symphysis, body, ramus and alveolar process.

We have compared incidence of different parts of mandible fractures with a Book on “Contemporary oral and facio-maxillary surgery” (6th edition by Doctor James hupp and Edwaed Ellis). It showed that most common part to get fractured is condyle of the mandible (FIG 3) [8].

**FIG.3 COMPARISON OF INCIDENCE OF FRACTURE OF DIFFERENT PARTS OF MANDIBLE FRACTURES IN OUR STUDY WITH A BOOK ON “CONTEMPORARY**

**ORAL AND FACIO-MAXILLARY SURGERY”(6th edition by Doctor James hupp and**



PART OF MANDIBLE

**EdwaedEllis)”. \_\_\_\_\_**

Most of the patients with mandible fractures (76.9%) were operated (20 Out of 26) by either open or closed reduction while majority of other fractures (Nasal- 68.7%, Maxilla- 91.7%, Zygoma- 33.3%, Orbital and frontal- 100%) were managed conservatively (TABLE 3) [9].

**TABLE 3 COMPARISON OF MANAGEMENT OF FRACTURES OF DIFFERENT FACIAL BONES**

BONE FRACTURE (n)	MANAGEMENT DONE IN OUR STUDY	
	CONSERVATIVE(%)	OPERATIVE(%)
NASAL(32)	22(68.7%)	10(31.3%)
MANDIBLE(26)	6(23.1%)	20(76.9%)
MAXILLA(24)	22(91.7%)	2(8.3%)
ZYGOMA(6)	2(33.3%)	4(66.7%)
ORBIT(14)	14(100%)	-
FRONTAL(4)	4(100%)	-

Most common complication is hypoesthesia (13.3%) followed by infection, angle of mouth deviation and haematomas. (TABLE 4).

**TABLE 4 COMPLICATIONS.**

NAME OF THE COMPLICATION	NUMBER OF	IN OUR	IN KOREAN

	<b>PATIENTS IN OUR STUDY</b>	<b>STUDY (%)</b>	<b>STUDY (%)</b>
HYPOAESTHESIA	8	13.3%	68.4% ( p < 0.0001)
DIPLOPIA	-	0%	25.6%
INFECTION	2	3.3%	2.3% (p 0.7176)
MOUTH ANGLE DEVIATION	2	3.3%	2.3% (p 0.7176)
HAEMATOMA	2	3.3%	0.8% (p 0.1353)
TM JOINT ANKYLOSIS	-	0%	0.8%

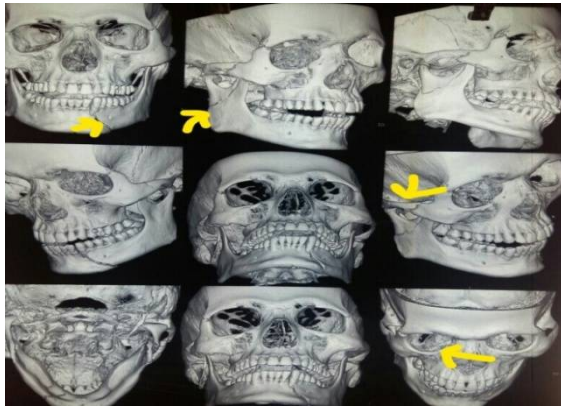
## **DISCUSSION**

Large numbers of studies have been reported on the aetiology of facial trauma [10, 11]. Location such as geographic region, socio-economic status can influence both type and frequency of injuries reported for a given population [6]. The increasing prevalence of facial bone injuries emphasises the necessity for epidemiological surveys to determine optimal prevention strategies and patient management [3]. Long-term collection and analysis of epidemiologic data regarding facial fractures in severely injured patients is an important step in the evaluation of conventional preventive measures. [8]. It is also necessary to determine trends to help, guide the development of new methods of injury prevention [8]. The commonest cause of fracture in our study is RTA (80%), this is consistent with other studies of Korea and Jordan [1,3]. Prevention can be made by proper traffic rules implication and safety wears. In addition, drinking and driving prevention campaigns require strengthening because most of the injuries related to RTA were alcohol related. The results of this survey are consistent with prior reports in Korea [12]. In studies of Korea and Jordan, sports injuries were more common than India because people over there are more engaged with sports activities. In studies of Korea and Jordan, incidence of assault is common [1, 3]. To prevent the injuries due to assault, violence protection programs concentrating on both assault and self-inflicted injury may help decrease the frequency of facial trauma resulting from intentional injuries in the population. In our study, males were affected more (93.3%) as compared to other countries as in India mostly males are bread earners. The commonest bone to get fractured was nasal bone. Isolated nasal bone fractures were accounted in 16.7% of cases and associated fractures in 53.3% of cases. Our findings are in concordance with previous study in Korea that commonest fracture was nasal bone (37.7%) [1]. This is because the nose is an easy target in personal violence. The nose is projecting, relatively unprotected and with very little soft tissue cover. In our study, most of the cases of isolated nasal bone fractures (68.7%) were managed conservatively. Most of the other bone fractures were treated conservatively (Zygoma- 33.3%, Maxilla- 91.7%, Orbital and frontal- 100%) except mandible. Most common part of the mandible fracture was condyle. Most of the mandibular fractures were operated (76.9%). For prevention of Maxilla and Mandibular fractures, rules regarding wearing of Helmets should be followed. Most common complication in our study was

hypoesthesia which was 13.3% which correlates with the study of Korea (68.4%, most common) [1]. Few of the pictures of the Computed Tomography scan related to our study showing different types of mandibular fractures, nasal bone fracture, maxillary fracture and zygoma fracture are shown in Fig 3, 4, 5, 6. Fig.7 shows classification of mid face fractures.

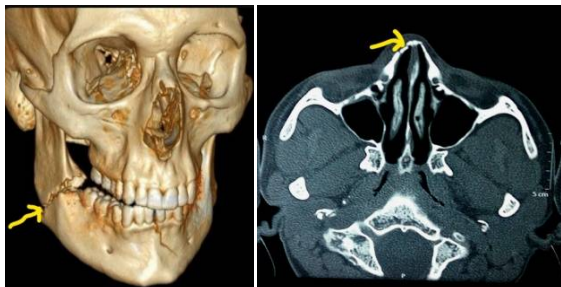


**FIG.3 FRACTURES OF FACIAL SKELETON**



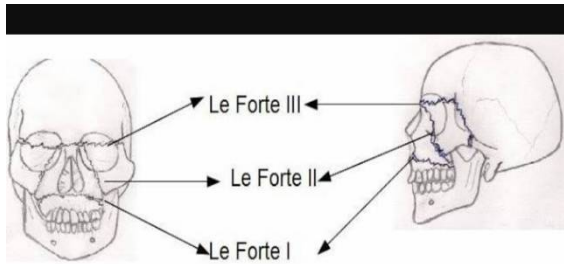
**FIG.4 DIFFERENT TYPES OF MANDIBULAR FRACTURE .**

**FIG.5 MANDIBULAR FRACTURE**      **FIG.6 NASALBONE FRACTURE**





## **FIG.7 MID FACE FRACTURES**



### **CONCLUSION**

Based on this study we can conclude that facio-maxillary injuries account for major percentage of injuries following RTA. Patients with severe head and spine injuries were treated for that injury first.

Clinical examination of the patient is very important. 3D CT face is the gold standard investigation in cases of different facio maxillary fractures. In uncomplicated cases of nasal bone fractures without external deviation or nasal blockage, conservative management was done. In uncomplicated cases of facio maxillary injuries involving maxilla and mandible with proper mouth opening and teeth occlusion, conservative management was done. In patients of nasal bone fractures with external deviation and nasal blockage, surgical management was done. In patients with maxilla and mandibular fractures with decreased mouth opening and improper teeth occlusion, surgical management was done. Complications, following the surgical interventions, were very less compared to the outcome of the surgery. This data is important for evaluation of existing preventive measures and is useful in development of new methods of injury prevention and treatment.

### **REFERENCES**

1. Singaram MG SV, Udhayakumar RK. Prevalence, pattern, etiology, and maxillo-facial trauma in a developing country: A retrospective study . J Korean assoc Oral Maxillofac. Surg.2016 Aug; 42(4): 174-81.
2. Holmes S and Gleeson M. Fractures of the facial skeleton. Scott-brown's Otorhinolaryngology and Head and Neck surgery(2008), 7<sup>th</sup> edition; 3(128): 1625.
3. Bataineh AB. Etiology and incidence of maxillofacial fractures in north of Jordan. Oral Surgery Oral Pathology Oral Radiology Endod. 1998; 86: 31-5.
4. Iida S. and Matsuya T. (2002). Pediatric maxillofacial fractures: their aetiological characters and fracture patterns. Journal of Cranio-Maxillofacial Surgery, 30(4), pp. 237-241.
5. Van Hoof RF, Merckx CA, Stekelenburg EC. The different patterns of fractures of facial skeleton in four European countries. International Journal of Oral Surgery. 1977; 6:3-11
6. Hogg N., Stewart T., Armstrong J. and Girotti M. (2000). Epidemiology of Maxillofacial Injuries at Trauma Hospitals in Ontario, Canada, Between 1992 and 1997. The Journal of Trauma: Injury, Infection, and Critical Care, 49(3), pp. 425-432
7. Al Khawalde M. (2011). Maxillofacial fractures in Jordan; a 5 year retrospective review. Oral Surgery, 4(4), pp. 161-165.
8. Kun Hwang, Sun Hye You. Analysis of facial bone fractures: An 11 year study of 2094 patients. Indian Journal Of Plastic Surgery, 2010 jan-jun; 43(1): 42-48.
9. Mark W. Ochs and Myron R. Tucker, Management of facial fractures, James R. Hupp, Edward Ellis III, Myron R. Tucker. "Contemporary Oral and Maxillofacial surgery book" (2014), 6<sup>th</sup> edition, part VI, 498.

10. Erol B., Tanrikulu R. and Görgün B. (2004). Maxillofacial Fractures. Analysis of demographic distribution and treatment in 2901 patients (25-year experience). *Journal of Cranio-Maxillofacial Surgery*, 32(5), pp.308-313.
11. Gassner R., Tuli T., Hächl O., Rudisch A. and Ulmer H. (2003). Cranio-maxillofacial trauma: a 10 year review of 9543 cases with 21067 injuries. *Journal of Cranio-Maxillofacial Surgery*, 31(1), pp.51-61.
12. Lee JH, Mun GH, Bang SI. A clinical and statistical analysis of the facial bone fractures: 7 years survey. *J Korean Soc Plast Reconstruction Surg*. 1998;25:1046-52.