



Comprehensive Evaluation of Facial and Shoulder Injuries in Road Traffic Accidents as Related to Fracture Incidences: An Original Research Study

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ABSTRACT:

Background and Aim: Road Traffic Accidents are one of the major and most common causes of fracture of facial and shoulder bones. However; the incident rates are mostly depending upon various internal and external factors. Immediate treatment is desirable in these fracture cases so as to maximize the life expectancy. The ultimate aim of this study was to evaluate the facial and shoulder injuries in road traffic accidents as related to fracture incidences.

Materials and Methods: This study was conducted on 100 patients with age 25-50+ years those reported after incidents of road traffic accidents. Out of 100 patients, 59 patients were male and 41 were female. In facial injuries after road traffic accidents, authors studied in detail about the Maxillary fractures, Mandible fractures, Zygomatic fractures, Nasal-orbital fractures, Fronto-ethmoidal fractures, any Combination fractures. In shoulder injuries, Scapula Coracoid fractures, Scapula Acromion fractures, Scapula Spine fractures, Scapula Blade fractures, Scapula Glenoid fractures, Humerus Surgical Neck fractures, Humerus Supracondylar fractures, Humerus Shaft fractures, Combination of any were studied. P values less than 0.05 was considered as significant.

Statistical Analysis and Results: Statistical analysis was completed by using SPSS statistical package In Facial Fractures, Maximum incidence was reported for fractures of combination types followed by maxillary fractures. Over all P value was reported to be significant for maxillary fracture (0.002). Minimum fracture incidence was noted in Fronto-ethmoidal fracture. In Shoulder Fractures, Maximum incidence was reported for fractures of combination types followed by Humerus Surgical Neck fractures. Over all P value was reported to be significant for all studied fracture (0.001). Minimum fracture incidence was noted in Fronto-ethmoidal fracture.

Conclusion: Within the limitations of the study, authors concluded that in facial fractures, combination fractures involving multiple bones were most common after maxillary bone fractures. Similarly in shoulder fractures, combination fractures involving multiple bones were most common after Humerus Surgical Neck bone fractures.

Introduction

Literature is overwhelmed with the studies conducted on the fractures related to maxillofacial region and shoulder region. Bone fractures are one of the major public health problems which have high mortality and

morbidity rate.¹⁻² Bone fractures leads to high impact on mental, social and physical health of individual. In shoulder, scapula is commonly involved bone at different levels and regions during road traffic accidents.³⁻⁴ Maxillofacial trauma predominantly



involves the maxilla and other adjacent bones. The maxillary fracture imparts great role in the facial esthetics. It is therefore highly critical to rehabilitate these bones accurately. Mandibular body and ramus fracture is also seen in most of the accident cases.⁵⁻⁶ They may or may not be associated with condylar or subcondylar fracture. This kind of fracture always ends up with permanent significant deviation of the mouth on either side. It is therefore important to firstly categorize mandibular fracture into favorable or unfavorable fracture.⁷ Road traffic accidents mostly results into combination of fracture which involves multiple bones fracture and associated soft tissue trauma or lacerations. It is therefore highly crucial to firstly focus on these areas.⁸⁻⁹ The aim of this paper was to evaluate the facial and shoulder injuries in road traffic accidents as related to fracture incidences.

Materials and Methods

This study was conducted on 100 patients with age 25-50+ years reporting to institute's outpatient department. The patients were primarily reported after incidents of road traffic accidents. Patients 50+ yrs of age were also considered in the study as and when reported in the study tenure. Author has checked and selected total 100 road traffic accidents patients from the regular patient footfall of department. This study was predominantly focusing on the fractures of facial and shoulder region. Out of 100 patients, 59 patients were male and 41 were female. The contact no and address details of the patients were also noted for future usage. All participating patients were informed in detail about the study. Written consent was also obtained from all participating patients. In facial injuries after road traffic accidents, authors studied in detail about the following facial fractures: Maxilla, Mandible, Zygomatic, Nasal-orbital, Fronto-ethmoidal, Any Combination. In shoulder injuries after road traffic accidents, authors studied in detail about the following shoulder fractures: Scapula Coracoid, Scapula Acromion, Scapula Spine, Scapula Blade, Scapula Glenoid, Humerus Surgical Neck, Humerus Supracondylar, Humerus Shaft, and Combination of Any. Authors had decided to conduct and complete the study on incidence basis. Literature has well evidenced that incidence based studies are exceptionally useful in obtaining detailed information

about individual and group information and outlooks. In addition, incidence based studies also provide a wider range of information with superior transparency. Authors had also explained the relative importance of this study to all participating patients. The privacy and other interrelated rights of the patients along with their freedom of expression were kept absolutely confidential. The recorded data was subjected to suitable statistical tests to obtain p values, mean and other statistical parameters. P values less than 0.05 was considered as significant.

Statistical Analysis and Results

All the recorded data were arranged in logical manner and subjected to suitable statistical analysis using SPSS statistical package for the Social Sciences version 22 for Windows. Out of the total sample size of 100 patients who participated in the study, 24 belonged to the age group of 25-34 years, 26 subjects were of 35-44 years of age, 27 were 45-50 years of age and 23 patients were more than 50 years of age. P value was reported to be significant for all studied age groups. Maximum 27 patients were reported in the age group of 35-44 Yrs. In general it had 59 male and 41 female subjects (Table 1-2). Table 3 and graph 1 denotes about the Patients distribution according to Facial Fractures Frequency. Maximum incidence was reported for fractures of combination types followed by maxillary fractures. Over all P value was reported to be significant for maxillary fracture (0.002). Minimum fracture incidence was noted in Fronto-ethmoidal fracture. Table 4 and graph 2 showed about the patients distribution according to Shoulder Fractures Frequency. Maximum incidence was reported for fractures of combination types followed by Humerus Surgical Neck fractures. Over all P value was reported to be significant for all studied fracture (0.001). Minimum fracture incidence was noted in Fronto-ethmoidal fracture. Table 5 demonstrates about the Fundamental statistical description with level of significance evaluation using Pearson Chi-Square Test for shoulder fractures. P value was significant for Scapula Acromion fractures, Scapula Spine fractures, Scapula Glenoid fractures. Table 6 illustrates about the Fundamental statistical description with level of significance evaluation using Pearson Chi-Square Test for Facial Fractures. P value was significant for Maxillary fractures.

**Table 1:** Patients distribution according to gender: Statistical Evaluation using Student's t-test

Sex	Number [n]	Mean	SD	P value
Male	59	2.65	1.230	0.980
Female	41	2.87	1.630	

Table 2: Patients distribution according to age groups: Evaluation of level of significance using ANOVA test

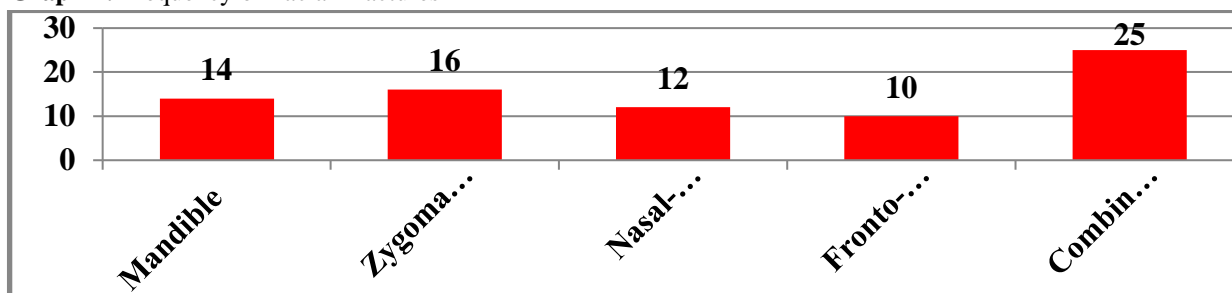
Patients distribution according to age groups						
Group	Age Range	n	Mean	SD	P value	*Sig [*p<0.05]
I	25-34 Yrs	24	2.54	1.460	0.001*	
II	35-44 Yrs	26	2.79	1.240		
III	45-50 Yrs	27	2.37	2.144		
IV	>50 Yrs	23	2.53	2.465		

Table 3: Patients distribution according to Facial Fractures Frequency

Patients distribution according to Facial Fractures						
Sr No.	Type	n	Mean	SD	P value	*Sig [*p<0.05]
1	Maxilla	23	1.54	2.850	0.002*	
2	Mandible	14	2.03	1.540		
3	Zygomatic	16	2.17	2.174		
4	Nasal-orbital	12	2.23	1.165		
5	Fronto-ethmoidal	10	2.34	2.124		
6	Any Combination	25	2.21	2.954		

Table 4: Patients distribution according to Shoulder Fractures Frequency

Patients distribution according to Shoulder Fractures						
Sr No.	Type	n	Mean	SD	P value	*Sig [*p<0.05]
1	Scapula Coracoid	11	2.54	1.450	0.001*	
2	Scapula Acromion	9	2.23	1.540		
3	Scapula Spine	10	2.67	2.324		
4	Scapula Blade	6	2.23	2.435		
5	Scapula Glenoid	8	2.24	1.420		
6	Humerus Surgical Neck	14	2.53	1.140		
7	Humerus Supracondylar	11	2.17	2.474		
8	Humerus Shaft	9	2.83	2.565		
9	Combination of Any	22	2.74	1.120		

Graph 1: Frequency of Facial Fractures



Graph 2: Frequency of Shoulder Fractures

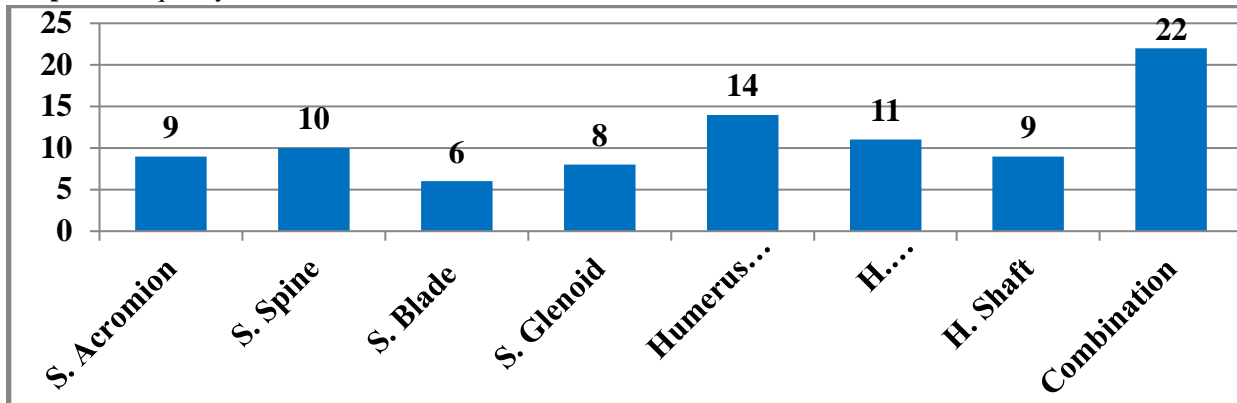


Table 5: Fundamental statistical description with level of significance evaluation using Pearson Chi-Square Test for shoulder fractures

Variable No.	Mean	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
1	2.54	1.450	0.160	1.96	2.433	1.0	0.086
2	2.23	1.540	0.000	1.96	2.242	2.0	0.030*
3	2.67	2.324	0.078	1.96	2.498	1.0	0.030*
4	2.23	2.435	0.035	1.96	1.556	1.0	0.080
5	2.24	1.420	0.025	1.96	2.550	3.0	0.001*
6	2.53	1.140	0.029	1.96	2.463	1.0	0.435
7	2.17	2.474	0.016	1.96	1.231	1.0	0.341
8	2.83	2.565	0.033	2.33	1.219	1.0	0.324
9	2.74	1.120	0.025	1.26	1.526	1.0	0.090

***p<0.05 significant**

Table 6: Fundamental statistical description with level of significance evaluation using Pearson Chi-Square Test for Facial Fractures

Variable No.	Mean	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
1	1.54	2.850	0.746	1.12	1.536	2.0	0.01*
2	2.03	1.540	0.903	1.94	1.803	2.0	0.20
3	2.17	2.174	0.532	1.47	1.436	1.0	0.48
4	2.23	1.165	0.653	1.84	1.043	1.0	0.10
5	2.34	2.124	0.012	1.03	1.793	1.0	0.90
6	2.21	2.954	0.303	1.54	1.244	2.0	0.30

***p<0.05 significant**



Discussion

Boffano and associates worked on the European maxillofacial trauma (EURMAT) project which was a multicentre and prospective study. Their results and inferences also indicated towards the potential role of rta in maxillofacial trauma including shoulder fractures. Their recommendations were highly critical in minimizing the fracture in cadence rate.¹⁰ Naveen Shankar and colleagues also explored about the pattern of the maxillofacial fractures in a multicentre retrospective study.¹¹ Their inferences were in accordance with our conclusions and recommendations. Bonavolontà performed a epidemiological analysis of maxillofacial fractures in Italy. They experienced a single tertiary center with 1720 patients. Their results were highly significant and comparable with our results.¹² McGoldrick studied about the maxillofacial injuries in patients with major trauma. They confirmed about the fracture significant in the rta cases.¹³ Arangio and coworkers also studied in detail about the maxillofacial fractures in the province of Latina, Lazio, Italy. They reviewed 400 injuries and 83 cases in rta and stated that road accidents are the major cause of fracture of shoulder bones.¹⁴ Al Ahmed HE and colleagues studied the pattern of maxillofacial fractures in Sharjah, United Arab Emirates and reviewed 230 cases. So, their study results were in accordance with our results.¹⁵ Thomas and other researchers have explored the etiology and changing patterns of maxillofacial trauma. They also noticed rta as a major cause of maxillofacial and shoulder fractures.¹⁶ Roccia and other researchers have performed an analysis of 711 victims of interpersonal violence to the face, Turin, Italy. They noticed that scapula fracture was highly common in the rta cases. This was in accordance with our results and inferences.¹⁷ Many other researchers in the literature have postulate the somewhat similar statements and guidelines.¹⁸⁻²⁰

Conclusion

Within the limitations of the study, authors concluded that Road Traffic Accidents has great impact on the maxillofacial and shoulder bones. The fractures related to maxillofacial and shoulder bones are of high risk. Moreover, there are high incidence rate of these fractures as seen in this study. In facial fractures, combination fractures involving multiple bones were

most common after maxillary bone fractures. Similarly in shoulder fractures, combination fractures involving multiple bones were most common after Humerus Surgical Neck bone fractures. Authors also expect some similar long term studies to establish authentic guidelines in these perspectives.

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