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RESEARCH ARTICLE

A 2-YEAR RETROSPECTIVE STUDY OF TRAUMA PATTERNS OF MID-FACE FRACTURES

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ABSTRACT

Introduction: In present day scenario, maxillofacial trauma plays a dominant role in road traffic accidents. The purpose of this study is to enhance our understanding of the epidemiology and trauma patterns of mid-face injuries, to come up with protocols that can ensure a more efficient management of trauma patients, implement programs to increase public awareness regarding road safety rules and ultimately, aim to reduce the incidence of maxillofacial trauma in RTA.

Methods: This is a retrospective 2-year study, in which the nature of trauma patterns of mid-face fractures were analyzed taking into consideration parameters such as age, sex, nature of injury and any associated head injury.

Results: The total number of patients analyzed with mid-face fractures for 2 years was 420. Males were more prone to RTA. Number of males affected was 378 and females affected were 42. There was a predominance of trauma in 2nd to 3rd decade of life with a frequency of 178 (42.4%). Based on the nature of injury, RTA was the chief cause of mid-face fractures in 411 (97.9%) patients. Incidence of head injury was seen in 126 (30%). RTA was the most common cause of mid-face fractures. Young males were more prone to trauma from RTA. One mortality was recorded in patients with associated head injury.

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INTRODUCTION

In present day scenario, maxillofacial trauma plays a dominant role in road traffic accidents. The nature of injury can be life threatening and constitute 7.4% to 8.7% of emergency medical intervention (Wulkan *et al*., 2005; MacKenzie, 2000). The developmental anatomy and the position of the mid-face make it susceptible to direct injury even with minimal impact. Studies have shown that one-third of maxillofacial trauma patients have concomitant neurological injuries and the morbidity is aggravated with higher incidence of mortality when there is an associated head injury (Haug *et al*., 1990). The nature of injury plays a crucial role in determining the extent of damage. Victims of RTA are more prone to multiple bone fractures, hemorrhage and associated head injury in contrast to trauma from assault which commonly involves a solitary bone. Numerous studies have been conducted in different geographical locations like UAE (Al Ahmed *et al*., 2004), Nigeria (Fasola *et al*., 2003), England (Down *et al*., 1995) and South Africa (Bamjee *et al*., 1996) to study the epidemiology of trauma patterns. Literature search reveals trauma to be the leading cause of maxillofacial injuries in developing countries and assault predominates in developed countries (Lee *et al*., 2010; van den Bergh *et al*., 2012; Bakardjiev and Pechalova, 2007; Iida *et al*., 2001; Ramli *et al*., 2011; Motamedi, 2003). Though maxillofacial trauma by itself can rarely be fatal, in a polytrauma scenario, a good clinical examination and radiological diagnostic aid is crucial to rule out associated vital organ injuries that can result in mortality in the absence of timely intervention (Kraus *et al*., 2003). The purpose of this study is to enhance our understanding of the epidemiology and trauma patterns of mid-face injuries, to come up with protocols that can ensure a more efficient management of trauma patients, implement programs to increase public awareness regarding road safety rules and ultimately, aim to reduce the incidence of maxillofacial trauma in RTA.

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MATERIALS AND METHODS

This study is a retrospective analysis done in the trauma center of SRMGeneral Hospital, Kanchipuram district of India. The medical records of 420 patients diagnosed with mid-face fractures over a 2-year period were reviewed. Documentation of each case included details pertaining to age, gender of the

patient, nature of injury and any associated head injury. With the data obtained, chi-square test was done.

RESULTS

The total number of patients analyzed with mid-face fractures for a period of 2 years was 420. Males were more prone to RTA. The number of males and females involved was 378 and 42 respectively. There was a predominance of trauma in 2nd to 3rd decade of life with a frequency of 178. The next in predominance was 40-50 years age group and the number of patients was 121. 83 patients were in the age group of 31-40 years and 38 patients were above 50 years.

Tables 1,2 and 3 illustrate the age and nature of injury distribution along with chi-square analysis. Based on the nature of injury, this study showed that RTA was the chief cause of mid-face fractures in 411 patients (97.9%). Fractures due to self-fall were seen in 5 patients (1.2%), assault was the cause in 3 patients (0.7%) and one case was due to sports injury (0.2%). Table 4 illustrates cross tabulation of values involving age-group and nature of injury with chi-square analysis. Table 5 illustrates the values obtained from gender and nature of injury with chi-square test analysis. Associated head injury was present in 126 patients and there was one mortality recorded where the patient was a victim of polytrauma.

Frequencies

Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20 - 30 Years	178	42.4	42.4	42.4
	31 - 40 Years	83	19.8	19.8	62.1
	41 - 50 Years	121	28.8	28.8	91.0
	> 50 Years	38	9.0	9.0	100.0
	Total	420	100.0	100.0	

Crosstabs

Age Group * Nature of injury Crosstabulation

			Nature of injury				Total
			Road traffic accident	Self fall	Assault	Sports injury	
Age Group	20 - 30 Years	Count	175	2	0	1	178
		% within Age Group	98.3%	1.1%	0.0%	0.6%	100.0%
	31 - 40 Years	Count	81	2	0	0	83
		% within Age Group	97.6%	2.4%	0.0%	0.0%	100.0%
	41 - 50 Years	Count	119	1	1	0	121
		% within Age Group	98.3%	0.8%	0.8%	0.0%	100.0%
	> 50 Years	Count	36	0	2	0	38
		% within Age Group	94.7%	0.0%	5.3%	0.0%	100.0%
Total		Count	411	5	3	1	420
		% within Age Group	97.9%	1.2%	0.7%	0.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.929[a]	9	.068
Likelihood Ratio	11.902	9	.219
Linear-by-Linear Association	1.050	1	.306
N of Valid Cases	420		

a. 12 cells (75.0%) have expected count less than 5. The minimum expected count is .09.

Crosstabs

Age Group * Nature of injury Crosstabulation

			Nature of injury				Total
			Road traffic accident	Self fall	Assault	Sports injury	
Age Group	20 - 30 Years	Count	175	2	0	1	178
		% of Total	41.7%	0.5%	0.0%	0.2%	42.4%
	31 - 40 Years	Count	81	2	0	0	83
		% of Total	19.3%	0.5%	0.0%	0.0%	19.8%
	41 - 50 Years	Count	119	1	1	0	121
		% of Total	28.3%	0.2%	0.2%	0.0%	28.8%
	> 50 Years	Count	36	0	2	0	38
		% of Total	8.6%	0.0%	0.5%	0.0%	9.0%
Total		Count	411	5	3	1	420
		% of Total	97.9%	1.2%	0.7%	0.2%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.929[a]	9	.068
Likelihood Ratio	11.902	9	.219
Linear-by-Linear Association	1.050	1	.306
N of Valid Cases	420		

a. 12 cells (75.0%) have expected count less than 5. The minimum expected count is .09.

Crosstabs

Gender * Nature of injury * Age Group Crosstabulation

Age Group				Nature of injury				Total
				Road traffic accident	Self fall	Assault	Sports injury	
20 - 30 Years	Gender	Male	Count	175	0		0	175
			% of Total	98.3%	0.0%		0.0%	98.3%
		Female	Count	0	2		1	3
			% of Total	0.0%	1.1%		0.6%	1.7%
	Total		Count	175	2		1	178
			% of Total	98.3%	1.1%		0.6%	100.0%
31 - 40 Years	Gender	Male	Count	81	0			81
			% of Total	97.6%	0.0%			97.6%
		Female	Count	0	2			2
			% of Total	0.0%	2.4%			2.4%
	Total		Count	81	2			83
			% of Total	97.6%	2.4%			100.0%
41 - 50 Years	Gender	Male	Count	109	0	0		109
			% of Total	90.1%	0.0%	0.0%		90.1%
		Female	Count	10	1	1		12
			% of Total	8.3%	0.8%	0.8%		9.9%
	Total		Count	119	1	1		121
			% of Total	98.3%	0.8%	0.8%		100.0%
> 50 Years	Gender	Male	Count	13		0		13
			% of Total	34.2%		0.0%		34.2%
		Female	Count	23		2		25
			% of Total	60.5%		5.3%		65.8%
	Total		Count	36		2		38
			% of Total	94.7%		5.3%		100.0%
Total	Gender	Male	Count	378	0	0	0	378
			% of Total	90.0%	0.0%	0.0%	0.0%	90.0%
		Female	Count	33	5	3	1	42
			% of Total	7.9%	1.2%	0.7%	0.2%	10.0%
	Total		Count	411	5	3	1	420
			% of Total	97.9%	1.2%	0.7%	0.2%	100.0%

Chi-Square Tests

Age Group		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
20 - 30 Years	Pearson Chi-Square	178.000[b]	2	.000		
	Likelihood Ratio	30.448	2	.000		
	Linear-by-Linear Association	133.536	1	.000		
	N of Valid Cases	178				
31 - 40 Years	Pearson Chi-Square	83.000[c]	1	.000		
	Continuity Correction[d]	45.922	1	.000		
	Likelihood Ratio	18.854	1	.000		
	Fisher's Exact Test				.000	.000
	Linear-by-Linear Association	82.000	1	.000		
	N of Valid Cases	83				
41 - 50 Years	Pearson Chi-Square	18.472[e]	2	.000		
	Likelihood Ratio	9.564	2	.008		
	Linear-by-Linear Association	16.460	1	.000		
	N of Valid Cases	121				
> 50 Years	Pearson Chi-Square	1.098[f]	1	.295		
	Continuity Correction[d]	.080	1	.778		
	Likelihood Ratio	1.732	1	.188		
	Fisher's Exact Test				.538	.427
	Linear-by-Linear Association	1.069	1	.301		
	N of Valid Cases	38				
Total	Pearson Chi-Square	82.774[a]	3	.000		
	Likelihood Ratio	43.336	3	.000		
	Linear-by-Linear Association	68.922	1	.000		
	N of Valid Cases	420				

a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is .10.
b. 5 cells (83.3%) have expected count less than 5. The minimum expected count is .02.
c. 3 cells (75.0%) have expected count less than 5. The minimum expected count is .05.
d. Computed only for a 2x2 table
e. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .10.
f. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .68.

DISCUSSION

The distribution of trauma patterns varies widely with geographical location. Factors such as socioeconomic conditions, maintenance of law and order play an important role in determining the cause and nature of injury. An extensive research with systematic documentation is essential to arrive at a definitive conclusion regarding epidemiology of maxillofacial trauma in any given place. An exhaustive review has been done by Gassner (2013) with a 10 year review of 9543 cases whose study shows that a total of 3578 patients had 7061 facial bone fractures. There are numerous other studies on the epidemiology of facial bone fractures but none conclusive in spite of large scale trials. This may be attributed to the wide range of differences in selection criteria. In our study, RTA was found to be the major cause of mid-face fractures. Similar studies done by Subashraj (2007) and Gandhi *et al*. (2011) also conclude RTA to be the leading cause of mid-face fractures. The incidence of mid-face fractures is very high in maxillofacial injuries. The developmental anatomy of mid-facemakes it susceptible to injury even with minimal impact. The position of mid-face in close proximity to the neurocranium increases the chances of head injury. Recognition of concomitant injuries is crucial for an accurate diagnosis and further management. The role of mid-face in shielding the brain is controversial. There are numerous studies debating the protective role played by mid-face versus the role of mid-face fractures actually increasing the chances of associated head injuries. Studies by Tanaka *et al*. (1994) and numerous other authors (Oginni *et al*., 2006; Bouguila *et al*., 2008; Rahman *et al*., 2007; Ferreira *et al*., 2004; Imahara *et al*., 2008; Erol *et al*., 2004; Abbas *et al*., 2009; Kontio *et al*., 2005; Alcalá-Galiano *et al*., 2008) correlate the increased chances of brain injury with mid-face fractures. In our study 126 patients out of 420 had an associated head injury (30%). Studies by Hogg *et al*. (2000) and Obuekwe (2004) reported the incidence of head injury to be 87% and 55% respectively. The results vary in the studies because of the differences in case selection in diagnosing head injury.

From our study, analysis of the gender reveals males to be more prone to trauma. Studies by RajibKhadka (2014) and other studies (Sojot *et al*., 2001; Malara *et al*., 2006; Adebayo *et al*., 2003) also conclude a male predominance in trauma. Studies done in Iran (Kadkhodaie, 2006) show women to be more prone to fractures. This can be attributed to the differences in cultural background wherein women are more involved in outdoor activities, thereby increasing their vulnerability to trauma. The susceptible age of trauma from our study has been found to be the second to third decade of life. The life style of the younger age group, reckless driving and use of high speed transportation are all contributing factors. Studies done at other countries also reveal the maximum incidence of fractures to be in the second and third decade of life (Ugboko *et al*., 1998; Ozay *et al*., 2009; Maximiana *et al*., 2009; Adriane *et al*., 2009; Dimitroulis and Eyre, 1991).

Conclusion

Our study concludes RTAto be the major cause of mid-face fractures occasionally associated with head injury. The role of maxillofacial surgeons is crucial in a polytrauma setup in the management of life-threatening hemorrage induced by facial fractures. The findings in our study are similar to numerous other studies in developing countries. Males are more susceptible to trauma with maximum incidence in the second and third decade of lives.It is the need of the hour to utilize the data available and take vigilant steps to address the issue of RTA. The protocols of the government used for enforcing strict rules for road safety and the role of health care workers to constantly educate the public will play a crucial role in developing countries to reduce the instances of road accidents.

Abbreviations: RTA – Road Traffic Accidents.

REFERENCES

Abbas I., M. Fayyaz, I. Shah, M.A. Khan, S.H. Qazi, N. Munir, *et al.* 2009. Demographic distribution of maxillofacial fractures in Ayub Teaching Hospital: 7-year review *J Ayub Med Coll Abbottabad*., Volume 21, pp. 110–112.

Adebayo ET, Ajike OS, AdekeyeEO. 2003. Analysis of the pattern of maxillofacial fractures in Kaduna, Nigeria. *Br J Oral MaxillofacSurg*., 41:396-400.

Adriane K, Francis L, Kate K. 2009. Oral Maxillofacial Fractures seen at a Ugandan Tertiary Hospital: A Six-month prospective study. Clinics (Sao Paulo), 64:843-8.

Al Ahmed HE, Jaber MA, Abu Fanaz SH, Karas M. 2004. The pattern of maxillofacial fractures in Sharjah, United Arab Emirates: A review of 230 cases. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod*., 98:166-70.

Alcalá-Galiano A., I.J. Arribas-García, M.A. Martín-Pérez, A. Romance, F.F. Montalvo-Moreno, J.M. Millán-Juncos 2008. Pediatric facial fractures: children are not just small adults *Radiographics*, Volume 28, pp. 441–461.

Bakardjiev A. and Pechalova P. 2007. Maxillofacial fractures in Southern Bulgaria - a retrospective study of 1706 cases. *J Craniomaxillofac Surg*., 35(3):147–150.

Bamjee Y, Lownie JF, Cleaton – Jones PE, Lownie MA. 1996. Maxillofacial injuries in a group of South Africans under 18 years of age. *Br J Oral MaxillofacSurg*., 34:298-302.

Bouguila J., I. Zairi, R.H. Khonsari, Y.M. Jablaoui, A. 2008. Adouani Epidemiology of maxillofacial traumatology in *Tunis Rev StomatolChirMaxillofac*, Volume 6, pp. 353–357.

Dimitroulis G, Eyre J. 1991. A 7-year review maxillofacial trauma in a central London hospital. *Br Dent J*., 170:300-2.

Down KE, Boot DA, Gorman DF. 1995. Maxillofacial and associated injuries in severely traumatized patients: Implications of a regional survey. *Int J Oral Maxillofac Surg*., 24:409-12.

Erol B., R. Tanrikulu, B. Görgün 2004. Maxillofacial fractures. Analysis of demographic distribution and treatment in 2901 patients (25-year experience) *J CraniomaxillofacSurg*, Volume 32, pp. 308–313.

Fasola AO, Nyack EA, Obiechina AE, Arotiba JT. 2003. Trends in the characteristics of maxillofacial fractures in Nigeria. *J Oral MaxillofacSurg*., 61:1140-3.

Ferreira P., M. Marques, C. Pinho, J. Rodrigues, J. Reis, J. 2004. AmaranteMidfacial fractures in children and

adolescents: a review of 492 cases *Br J Oral MaxillofacSurg*., Volume 42, pp. 501–505.

Gandhi S, *et al*. 2011. Pattern of maxillofacial fractures at a tertiary hospital in northern India: a 4-year retrospective study of 718 patients. *Dent Traumatol*., 27(4):257–262.

Gassner R, *et al*. 2003. Cranio-maxillofacial trauma: a 10 year review of 9,543 cases with 21,067 injuries. *J Craniomaxillofac Surg*., 31(1):51–61.

Haug RH, Prather J, Indresano AT. 1990. An epidemiologic survey of facial fractures and concomitant injuries. *J Oral MaxillofacSurg.,* 48:926-932.

Hogg NJ, Stewart TC, Armstrong JE, GirottiMJ. 2000. Epidemiology of maxillofacial injuries at trauma hospitals in Ontario, Canada, between 1992 and 1997. *J Trauma*., 49:425–32.

Iida S, *et al*. 2001. Retrospective analysis of 1502 patients with facial fractures. *Int J Oral MaxillofacSurg*., 30(4):286–290.

Imahara S.D., R.A. Hopper, J. Wang, F.P. Rivara, M.B. Klein 2008. Patterns and outcomes of pediatric facial fractures in the United States: a survey of the National Trauma Data Bank J Am CollSurg, Volume 207, pp. 710–716.

Kadkhodaie M.H. 2006. Three-year review of facial fractures at a teaching hospital in northern Iran *Brit J Oral MaxillofacSurg*., Volume 44, pp. 229–231.

Kontio R., R. Suuronen, H. Ponkkonen, C. Lindqvist, P. Laine 2005. Have the causes of maxillofacial fractures changed over the last 16 years in Finland? An epidemiological study of 725 fractures *Dent Traumatol*., Volume 21, pp. 14–19.

Kraus JF, Rice TM, Peek-Asa C, McArthur DL. 2003. Facial trauma and the risk of intracranial injury in motorcycle riders. *Ann Emerg Med*., 41: 18-26.

Lee JH, Cho BK, Park WJ. 2010. A 4-year retrospective study of facial fractures on Jeju, Korea. *J CraniomaxillofacSurg*., 38(3):192-196.

MacKenzie, EJ. 2000. Epidemiology of injury: Current trends and future challenges. *Epidemiol Rev*., 22:112-9.

Malara P, Mala B, Drugacz J. 2006. Characteristics of maxillofacial injuries resulting from road traffic accidents-a 5 years review of the case records from Department of maxillofacial surgery in Katowice, Poland. *Head Face Med*., 2:27-32.

Maximiana C, Sergio Monterio L, Jose Nazareno G. 2009. Analysis of 185 maxillofacial fractures in the state of Santa Carina, Brazil. *Braz Oral Res*., 23:268-74.

Motamedi MH. 2003. An assessment of maxillofacial fractures: A 5-year study of 237 patients. *J Oral Maxillofac Surg*., 61(1):61-64.

Obuekwe ON, Etetafia M. 2004. Associated injuries in patients with maxillofacial trauma. Analysis of 312 consecutive cases due to road traffic accident. *J Med Biomed Res*., 3:30–6.

Oginni F.O., V.I. Ugboko, O. Ogundipe, B.O. 2006.3 Adegbehingbe Motorcycle-related maxillofacial injuries among Nigerian intracity road users *J Oral MaxillofacSurg*, Volume 64, pp. 56–62.

Ozay O, Gursel T, Mahmut UK, Kemal U, Ismail K, Lutfu B. 2009. A retrospective study on the epidemiology and treatment of maxillofacial fractures. *UlusTravmaAcil CerrahiDerg*., 15:262-6.

Rahman R.A., R. Ramli, N.A. Rahman, H.M. Hussaini, S.M. AI Idrus, A.L.A. 2007. Hamid Maxillofacial trauma of pediatric patients in Malaysia: a retrospective study from 1999 to 2001 in three hospitals *Int J PediatrOtorhinolaryngol*., Volume 71, pp. 929–936.

RajibKhadka, Nitesh Kr Chaurasia. 2014. Four years prospective study of the maxillofacial trauma at a tertiary center in Western Nepal. *J OrofacSci*., 6:78-81.

Ramli R, *et al*. 2011. A retrospective study of oral and maxillofacial injuries in Seremban Hospital, Malaysia. *Dent Traumatol*., 27(2):122–126.

SojotAJ, Meisami T, SandorGK, Clokie CM. 2001. The epidemiology of mandibular fractures treated a the Toronto general hospital: A review of 246 cases. *J Can Dent Assoc*., 67:640-4.

Subhashraj K., N. Nandakumar, C. 2007. Ravindran Review of maxillofacial injuries in Chennai, India: a study of 2748 cases *Br J Oral MaxillofacSurg*, Volume 45, pp. 637–639.

Tanaka N, Tomitsuka K, Shionoya K, Andou H, Kimijima Y, Tashiro T, *et al*. 1994. Aetiology of maxillofacial fracture. *Br J Oral MaxillofacSurg*., 32: 19-23.

Ugboko VI, Odusanya SA, FagadeOO. 1998. Maxillofacial fractures in a semi-urban Nigerian teaching hospital: A review of 442 cases. *Int J Oral MaxillofacSurg*., 27:286-9.

van den Bergh B, *et al*. 2012. Aetiology and incidence of maxillofacial trauma in Amsterdam: Retrospective analysis of 579 patients. *J CraniomaxillofacSurg*., 40(6):e165-e169.

Wulkan M, Parreira JG Jr, Botter DA. 2005. Epidemiology of facial trauma. *Rev Assoc Med Bras*., 51:290-5.

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