



THE REVIEW OF FACTORS AFFECTING THE HOSPITALIZATION PERIOD OF PATIENTS WITH FRACTURES

Hamid Reza Khalkhali¹, Reza Samarei², Sajjad Kazem Alilu³, Hossein Habibzadeh⁴, Seyfolah Rezaei^{5*}

1. Associate Professor in Biostatistics Inpatient's Safety Research Center, Urmia University of Medical Sciences, Urmia, Iran.
2. Urmia University of Medical Sciences, Department of Otolaryngologist, Urmia, Iran.
3. M.D, Patient Safety Research Center, Urmia University of Medical Sciences, Urmia, Iran.
4. School of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran.
5. M.D, Urmia University of Medical Sciences, Urmia, Iran.

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ABSTRACT

The present research intends to review the frequency of diverse types of fractures, the causes and locations of fractures, the relationship between demographic features of patients and these factors as well as the factors affecting the hospitalization period of patients with fractures. To this end, patients, 9 years and younger, suffering from Maxillofacial Trauma injured during August 2011-August 2014 were studied. For the purpose of the present research, 182 hospitalized patients suffering from fractures to the different parts of the face participated in this study. The mean of the age of the patients, in this study, was 6.32 ± 2.64 years and the mean of the hospitalization period for these patients equaled 3.21 ± 2.24 days. Amongst the 182 participants, 116 (%63.7) and 66 (%36.3) patients were respectively male and female. Nevertheless, of these patients, 160 (%87.9) with Nasal fracture, 9 (%4.9) with Mandible fracture, 3 (%1.6) with Maxilla and 10 (%5.5) with Orbital fracture were examined. The most frequent cause of fracture was related to falls. The results of the current research indicated that there is not any statistically significant relationship between the type and the cause of fractures and the sex of the patients. Furthermore, the hospitalization period was longer in ENT ward for patient who were fractured due to motor vehicle accident than patients fractured due to other causes.

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Introduction

In Maxillofacial Trauma (Face and Jaw), the mostly injured parts are mainly the bones of nose, cheek, lower jaw and upper jaw. The external nose is composed of two structures, bone and cartilage. The former, nasal bone, is composed of two nasal bones (Nose Bridge), the frontal process of the upper jaw, the frontal bone of the nose (nose root) and nasal spine (1). The nasal bones are supported by the frontal process of the upper jaw and due to their prominent position on the middle of the face, these bones are the most prevalent fractures of the body (2). The cheek bones (Zygomatic bones) are located on the face such that their posterolateral processes are attached to temporal bones to which mastication (chewing) muscles are attached. The upper internal appendages of the cheek bones compose the external and lower walls of the eye socket (Orbits); its lower internal parts compose the lower walls of the Orbits and are attached to the upper jaw (2). Drooping eyes is a common complication of unrepaired or partially repaired fractures of the cheek bones (2).

The bone of the upper jaw are externally attached to the cheek bones and internally attached to nasal bones; meanwhile they compose the internal part of the lower walls as well as the anterior floor of the orbits (eye sockets); nevertheless, they support the nasal bones (2). The upper jaw includes Maxillary Sinus and is an infra orbital branch of nerve 5 which can be injured by the fractures to this bone (2). The lower jaw is located in one-third of the lower parts of the face, having two branches which

are symmetrically attached to the skull base (2). The horse-shoe shape of the lower jaw and its bilateral attachment to the skull enable it to attract the incoming forces well. Hence, multiple fractures to the lower jaw are caused by an unusual single force (2). The inferior alveolar nerve is a branch of trigeminal nerve which passes through the bone of lower jaw; thus, it is necessary to take enough caution not to damage this nerve while repairing the fracture of this bone (2).

In terms of diagnosis and management, nasal bone fractures in children is very different from the same fractures in adults. In children, nose has more mobility since it is mostly made of cartilage; for this reason, the incoming forces from any stroke to the nose can easily damage the surrounding structures (2). Since the structure of nose is mostly made of cartilage and has incomplete ossification in children, nasal fractures in children is limited to cartilage and greenstick fractures (3-6).

In a study of maxillofacial fractures, nasal fractures accounted for %95.2 (4). The mean of the age of children with maxillofacial (face and jaw) was 5-6 years among which male children were most susceptible cases of fractures (5,7,8). Most vulnerable cases of fractures in children aged 0-12 years have been due to the fall from height and subsequently caused by accident (5). The most occurring fractures in children are nasal and mandible fracture. Mandible fracture occur mostly in the area of mandibular condyle (5,9,10). On the contrary, in some other studies, mandible fractures had the highest percentage in maxillofacial (face and jaw) amongst children (6,11,12).

Since epidemiological studies can be effective in reducing the human and financial costs by identifying the prevalent causes and types of fractures, the present research intends to review the frequency of diverse types of fractures, the causes and locations of fractures, the relationship between demographic features of patients and these factors as well as the factors affecting the hospitalization period of patients with fractures.

Methodology:

This cross-sectional study was a descriptive and retrospective research. 182 patients, 9 years and younger, with maxillofacial trauma during August 2011-August 2014, who were hospitalized in Imam Khomeini Hospital, participated in this study. The information related to the types, causes and locations of the fractures in these patients together with their hospitalization period and demographic information were prepared in a checklist and derived from their dossiers. The results of the data including the frequency of types, causes and locations of fractures as well as the hospitalization period and demographic data were analyzed by SPSS statistical software and their relationships to one another were investigated. The criterion for the significance level, in this study, was %0.05. The aforementioned data were subsequently analyzed after being collected.

Research results:

Patients, 9 years and younger, injured by various fractures to different parts of the face due to Maxillofacial Trauma for 3 years during August 2011-August 2014 were studied. The results of the study are presented hereunder.

The mean of the age of the patients, in this study, was 6.32 ± 2.64 years and the mean of the hospitalization period for these patients equaled 3.21 ± 2.24 days. Amongst the 182 participants, 116 (%63.7) and 66 (%36.3) patients were respectively male and female. Nevertheless, of these patients, 160 (%87.9) with Nasal fracture, 9 (%4.9) with Mandible fracture, 3 (%1.6) with Maxilla and 10 (%5.5) with Orbital fracture, who referred to Imam Khomeini Hospital and hospitalized at ENT ward, were examined.

Table 1 below thoroughly presents the frequency of the causes of fractures in 182 patients under study; accordingly, the most frequent cause of fracture has been reported to be related to falls from height and the least frequency was associated with accident with bus.

Table 1: The Frequency of the Causes of Fractures in Studied Patients.

Causes of Fracture	Frequency	Percentage
Pedestrian	8	4.5
Cyclist	1	0.6
Driver	9	5.1
Falls	110	61.8
Fight	1	0.6
Collision	14	7.9
Not Recorded	25	14
Other	2	1.1
Damages by Animals	4	2.2
Total	182	100.0

Furthermore, Table 2 shows the frequency distribution of the causes of fractures for both male and female groups in which the frequencies were different according to the Chi-square statistics; hence, sex does not have any statistically significant effect on the cause of the fracture (P-value: 0.125).

Table 2: The Frequency of the Causes of Fractures for both Male and Female Groups.

			Sex		Total
			Male	Female	
Causes of Fractures	Pedestrian	No.	4	4	8
		Percentage	50.0%	50.0%	100.0%
	Cyclist	No.	0	1	1
		Percentage	.0%	100.0%	100.0%
	Driver	No.	4	5	9
		Percentage	44.4%	55.6%	100.0%
	Falls	No.	65	45	110
		Percentage	59.1%	40.9%	100.0%
	Fight	No.	1	0	1
		Percentage	100.0%	.0%	100.0%
	Collision	No.	10	4	14
		Percentage	71.4%	28.6%	100.0%
	Not Recorded	No.	21	4	25
		Percentage	84.0%	16.0%	100.0%
	10 Explosion	No.	4	0	4
		Percentage	100.0%	.0%	100.0%
	Other	No.	2	0	2
		Percentage	100.0%	.0%	100.0%
Damages by Animals	No.	3	1	4	
	Percentage	75.0%	25.0%	100.0%	
Total	No.	114	64	178	
	Percentage	64.0%	36.0%	100.0%	

Table 3 hereunder presents the frequency of the types of the fractures for both male and female groups. The significance level for each type of fracture has been reported separately (P-value: 0.87).

Table 3: The Frequency of the Types of Fractures for both Male and Female Groups.

			Sex		Total
			Male	Female	
Types of Fractures	Nasal	No.	100	50	150
		Percentage	66.7%	33.3%	100.0%
	Mandibular	No.	6	3	9
		Percentage	66.7%	33.3%	100.0%
	Maxilla	No.	0	1	1
		Percentage	.0%	100.0%	100.0%
	Orbital	No.	1	3	4
		Percentage	25.0%	75.0%	100.0%
	Nasal + Other Fractures	No.	7	3	10
		Percentage	70.0%	30.0%	100.0%
	Maxilla + Other Fractures	No.	1	1	2
		Percentage	50.0%	50.0%	100.0%
	Orbital + Other Fractures	No.	1	5	6
		Percentage	16.7%	83.3%	100.0%
Total	No.	116	66	182	
	Percentage	63.7%	36.3%	100.0%	

The results obtained from COX PH (Proportional Hazards) Model are presented in Table 4 below. Accordingly, the value of HR for the 'cause of fractures' which was divided into fractures by vehicle accident and other causes, i.e. non-accident causes, were reported; the ratio of the risk of non-accident causes of fractures to the risk of fractures by vehicle accident equals 1.801525. However, other variables including age, sex, and the location of fracture did not have any statistically significant effect on the period of hospitalization.

Table 4: COX PH Model for the Mean of Hospitalization Period in ENT Ward

Variable	{%95 Conf. Interval}		P>z	z	Std. Err.	Haz. Ratio
Cause of Fractures	2.955302	1.098193	0.020	2.33	0.4549554	1.801525

Discussion:

In the present research, the mean of the age of the patients was 6.32±2.64 years. Gassner R. et al (13) reported the mean of the age as 7±4.4 years. In a study by Tanwee Karim et al (8), %89 of patients with Maxillofacial Trauma aged above 5 years. Likewise, for H.A. Kambalimath et al (14) only %8.93 of the patients aged under 5 years.

Furthermore, in the current study, %63.7 of patients were male while %36.6 were female; thus, the ratio of male to female patients was 1.75:1. On the contrary, the ratio of male to female patients was 1.8:1 in the study of H.A. Kambalimath et al (15). For Tanwee Karim et al (14), this ratio was 2:1. Sourabh Ramesh Joshi et al (16) reported that male patients were %70 of the all patients.

The results of the present research showed that there is not any statistically significant relationship between the sex of the patients and the type of the fractures. More, the most prevalent location of the fractures was nasal bone, while Mandibular and Maxilla fractures were respectively the subsequent fractures. On the contrary, Tanwee Karim et al (14) found that Mandibular fracture was the most frequent fractures. H.A. Kambalimath et al (15) found that the most prevalent locations of fractures were related to Maxilla and Mandible. Additionally, Sourabh Ramesh Joshi et al (16) reported that Mandibular fractures were more prevalent amongst patients while nasal fractures were the least frequent cases of fractures.

Nonetheless, there was not any statistically significant relationship between the sex of the patients and the cause of the fractures. Furthermore, the most frequent cause of Maxillofacial Trauma was falls from Height. Similarly, in other studies, the most prevalent cause of maxillofacial Trauma was related to falls from height (14, 15 & 16). Although there was not any statistically significant relationship between the sex of the patients and the cause of the fractures, Allareddy V. et al (17), who studied adults, found that there was a statistically significant relationship between the sex of the patients and the cause of fractures; they reported that a majority of male patients injured by maxillofacial Trauma because of using firearms as well as physical fights. Equally, Thiago Bittencourt et al (18) found that male patients suffered from Maxillofacial Trauma caused by physical fights. On the contrary, Kamath R.A. et al (19) found that the most frequent cause of Maxillofacial Trauma was due to road accident. This difference in the causes of Maxillofacial Trauma is because the patients are prone to some causes of Trauma more than the other in different ages.

Besides, the mean of the period of hospitalization in this study was 3.21±2.24 days; additionally, the results of the COX PH (Proportional Hazards) Model showed that the hospitalization period was longer in ENT ward for patient who were fractured due to motor vehicle accident than patients fractured due to other causes. For Jonathan A. Zelken et al (20) the hospitalization period was longer for patients fractured by vehicle accidents than by other causes of Maxillofacial Trauma. Likewise, Serjio Monterio et al (21) concluded that the period of hospitalization was longer for patients fractured by motorcycle accident than by bicycle accidents. These findings indicate that the more forceful and overful the causes of Trauma, the more harmful and sever the injuries and the longer the hospitalization period will be.

Conclusion:

It seems that since childlike playoffs and activities are more done by children and these activities increase the risk of falls while playing, the most frequent mechanisms of the Maxillofacial Trauma are mainly caused by falls within this age range. On the other hand, with regards to the fact that the type of childlike activities are not specifically related to any particular sex and that both girls and boys can perform these activities, it can be concluded that there is not any statistically significant relationship between the sex of patients and the cause of fractures. As a final remark, since the most developmental changes in the structure of bones in terms of their resistance to powerful forces occur typically after puberty, it can be concluded that there is not any statistically significant relationship between the sex of the patients and the type of the fracture.

Reference:

1. Clinically Oriented Anatomy, Keith L. Moore, Arthur F. Dalley, fifth edition, 2006, page 1013 - 1014
2. Cummings OTOLARYNGOLOGY HEAD & NECK surgery, fifth edition, 2010, volume 1, 496-597

3. Pollock RA. Nasal trauma: pathomechanics and surgical management of the acute injuries. *Clin Plast Surg.* 1992;19:133
4. Epidemiologic survey on maxillofacial fractures in patients referred to trauma center of Yazd 2005 to 2010. Akrami Abargooie Shohreh, Navab Azam Alireza, Akabery Fatemeh. *Journal of dental research of medical university of Sadougi yazd.* cycle 2, number 1, 2014:46-60
5. Carolina Collao-González, Alonso Carrasco-Labra, Hsiao-Hsin Sung-Hsieh, Juan Cortés-Araya. Epidemiology of pediatric facial trauma in Chile: A retrospective study of 7617 cases in 3 years. *Med Oral Patol Oral Sir Bucal*; 2014 Mar 1;19(2):e99-105
6. Gassner, R, Tuli, T, Hächl, O, Rudisch A & Ulmer, J. Craniomaxillofacial Trauma in Children: A Review of 3,385 cases with 6,060 injuries in 10 years. *J Oral Maxillofac Surg.* 2004;62:399-407.
7. Alinejad V, Shadmehr A, Kazemi Asfeh Sh, Gholizade R, Tabbakhi E. Examine the Relationship Between Organizational Citizenship Behavior and Organizational Health in Specialty and Subspecialty Seyyed-al-Shohada Hospital Staff, Urmia. *The Social Sciences.* 2016, Volume: 11, Issue: 6, Page No.: 910-917 DOI: 10.3923/sscience.2016.910.917.
8. Jafarizadeh H, Lotfi M, Ajoudani F, Kiani A, Alinejad V. Hypnosis for reduction of background pain and pain anxiety in men with burns: A blinded, randomised, placebo-controlled study. *Burns.* 2017
9. Niknejad E, Alinejad, Factors Affecting the Duration of Decay of the First Permanent Molar Tooth. *Research Journal of Medical Sciences* 2016, Volume: 10, Issue: 2, Page No.: 36-38 DOI: 10.3923/rjmsci.2016.36.38.
10. Baghaee R, Zadeh H.K, Feyzi A, Alinejad V, Niknejad E. Attitude and performance of nurses in oral care in intensive care unit patients. *Journal of Global Pharma Technology*, Volume 8, Issue 12, 2016, Pages 215-220.
11. Peirouvi T, Yekani F, Azarnia M, Massumi M. High neuronal/astroglial differentiation plasticity of adult rat hippocampal neural stem/progenitor cells in response to the effects of embryonic and adult cerebrospinal fluids. *Iranian Journal of Veterinary Research* Volume 16, Issue 1, 2015, Pages 83-89.
12. Razi M, Feyzi S, Shamohamadloo S, Najafi G, Ensafi A, Eyvari S, Peyrovi T. Compensatory ovarian changes, mast cell distribution and luminal structure changes following unilateral ovariectomy in rats. *Iranian Journal of Veterinary Research* Volume 11, Issue 1, 2010, Pages 28-37.
13. Gassner R, Tuli T, Hächl O, Moreira R, Ulmer H. Craniomaxillofacial trauma in children: a review of 3385 cases with 6060 injuries in 10 years. *J Oral Maxillofac Surg.* 2004 Apr;62(4):399-407.
14. Tanweer Karim, Arshad Hafeez Khan, Syed Saeed Ahmed, Trauma of facial skeleton in children: An Indian perspective. *Indian J Surg (May-June 2010)* 72:232-235
15. H. V. Kambalimath, S. M. Agarwal, Deepashri H. Kambalimath, Mamta Singh, Neha Jain, P. Michael. Maxillofacial Injuries in Children: A 10 year Retrospective Study. *J. Maxillofac. Oral Surg.* (Apr-June 2013) 12(2):140-144
16. Sourabh Ramesh Joshi, Harish Saluja, Gowri Swaminatham Pendyala, Shantanu Chaudhari, Uma Mahindra, Yogesh Kini, Pattern and Prevalence of Maxillofacial Fractures in Rural Children of Central Maharashtra, India. A Retrospective Study. *J. Maxillofac. Oral Surg.* (July-Sept 2013) 12(3):307-311
17. Allareddy V, Itty A, Maiorini E, Lee MK, Rampa S, Allareddy V, Nalliah RP. Emergency department visits with facial fractures among children and adolescents: an analysis of profile and predictors of causes of injuries. *J Oral Maxillofac Surg.* 2014 Sep;72(9):1756-65.
18. Thiago Bittencourt Ottoni Carvalho, Launa Renata Londero Cancian, Caroline Gabriele Marques, Vânia, Belintani Piatto, José Victor Maniglia, Fernando Drimel Molina, Six years of facial trauma care: an epidemiological analysis of 355 cases. *Braz J Otorhinolaryngol.* 2010;76(5):565-74.
19. Kamath RA, Bharani S, Hammannavar R, Ingle SP, Shah AG. Maxillofacial Trauma in Central Karnataka, India: An Outcome of 95 Cases in a Regional Trauma Care Centre. *Craniomaxillofac Trauma Reconstr.* 2012 Dec;5(4):197-204.
20. Jonathan A. Zelken, Saami Khalifian, Gerhard S. Mundinger, Jinny S. Ha, Paul N. Manson, Eduardo D. Rodriguez, Amir H. Dorafshar. Defining Predictable Patterns of Craniomaxillofacial Injury in the Elderly: Analysis of 1,047 Patients. *Journal of Oral and Maxillofacial Surgery.* Volume 72, Issue 2, February 2014, Pages 352-361
21. Sergio Monteiro Lima Júnior, Saulo Ellery Santos, Leandro Eduardo Kluppel, Luciana Asprino, Roger William Fernandes Moreira, Márcio de Moraes, A Comparison of Motorcycle and Bicycle Accidents in Oral and Maxillofacial Trauma. *Journal of Oral and Maxillofacial Surgery.* Volume 70, Issue 3, March 2012, Pages 577-583