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Frequency of Infraorbital Nerve Injury Associated with Zygomaticomaxillary Complex Fractures in Patients Reporting to Lady Reading Hospital Peshawar

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ABSTRACT

Background: infraorbital nerve injury is very common in patients sustaining Zygomaticomaxillary complex fractures. As a result patient's suffer from paraesthesia, anaesthesia or huperalgesia in the infraorbital region.
Objective: To determine the frequency and type (anaesthesia, paraesthesia, dysesthesia and hypoesthesia) of infraorbital nerve injury associated with zygomaticomaxillary complex (ZMC) fractures.
Materials and Methods: This descriptive study was conducted at department of Oral & Maxillofacial Surgery Lady Reading Hospital Peshawar from Ist Jan 2020 to Sep 2020. Total 72 patients diagnosed with zygomatic bone fractures, age between 16 to 65 years and Pakistani nationals were included in the study. Patients who presented with only maxillary and Lefort III fractures, previous infraorbital nerve sensory disturbances, diabetic and neurological disorders were excluded. Descriptive statistics were calculated using SPSS version 22.0. P=0.05 was considered significant.
Results: Overall mean age was 31.36±10.043 years and mean pain score was 2.96±3.29. Males (72.22%) were more than females (27.78%). Frequency of infraorbital nerve injury was in 50 (69.4%). Among types of infraorbital nerve injury most common type was paraesthesia (n= 20, 40%) followed by anaesthesia (n=15, 30%) and hypoesthesia (n=5, 10%). Overall infraorbital nerve injury was more in males than females and results were statistically significant (P=0.026). Types of infraorbital nerve injury stratified by genders (P=0.135) and age groups was not statistically significant (P=0.324).
Conclusion: The frequency of infraorbital nerve injury in ZMC fracture is quiet higher so the clinician should be vigilant about infraorbital nerve injury while managing ZMC fracture.
Keywords: Infra orbital nerve injury, Oral and maxillofacial trauma, Zygomaticomaxillary complex fracture.

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INTRODUCTION

In the facial skeleton the malar or zygomatic bone provides an aesthetic bony prominence. It largely contributes to the normal contour of the cheeks. Zygomatic bone provides origin to masseter muscle and thus it affects the process of mastication.[1] Zygomatic bone forms the lateral and inferior walls of the orbital socket, thus determines the movement of extra ocular muscles and the correct position of the globe. It forms a bony barrier between the contents of orbit, maxillary sinus and temporal fossa.[2]

Zygomaticomaxillary complex (ZMC) is the most projecting part of the facial skeleton.[3] Due to its prominence, the zygomatic bone is prone to injuries in intentional and accidental trauma. Nasal bone is the most common injured bone followed by ZMC.[4-6] The traumatic injuries of ZMC accounts for 45% of mid facial fractures and 25% of all facial fractures.[2,7,8] Besides other traumatic injuries the reasons which commonly lead to ZMC fractures are personal alterations, fall, fights, domestic violence, fire arms and sports injuries. ZMC fractures are common in males as compared to females of age between 20 to 30 years.[9] Such cases present to the emergency department as an isolated injury as a result of fight or violence or as poly trauma case due to road traffic accident (RTA).[10] RTA commonly results in ZMC fractures in developing countries. The most common of the vehicle causing ZMC are the motor bike accidents which followed by car accidents.[11] The common causes in the western world are fights and interpersonal violence.[12]

Common symptoms associated with ZMC fractures are depression of affected side, pain, sub conjunctival haemorrhage, periorbital ecchymosis, limited mouth opening etc. Sensory disturbances followed by infraorbital nerve injury include hypoesthesia, dysesthesia, paraesthesia or anaesthesia of the upper lip, cheek ,lower eye lid, skin of the nose, anterior gums and teeth of the affected side.[13-15] Traumatic injury to the infraorbital nerve may be due to compression, oedema, ischemia or laceration of the neural bundle.[16]

In ZMC fractures, the fracture line involves the infraorbital fissure or the infraorbital canal in 95% of cases and the reported incidence of infraorbital nerve injury varies from 18 to 83%.[2,13] Noor et al reported infraorbital nerve paraesthesia was found in 53 patients (70.67%) of ZMC fractures while 22 (29.33%) were normal.[2] Sakavicius et al reported that infraorbital nerve neurosensory disturbances were diagnosed in 64.4% of patients while 35.6% were normal.[17] Jadhav

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et al. reported that accumulative neurosensory deficit (anaesthesia, hypoesthesia and paraesthesia) of infraorbital nerve was found in 89.77% of patients while 10.23% were normal.[16]

Such injuries greatly affect the quality of life depending upon the severity of injury. It may result in altered sensation, pain on touching and continuous pain. The rationale of this study was that it will give us the burden of disease and various types of infraorbital nerve injuries (anaesthesia, paraesthesia, dysesthesia and hypoesthesia) in our locality for which we will update our armamentarium and staff to manage such cases. This study will highlight the magnitude of the problem as it is often ignored during treatment of facial fractures. There is scarcity of local literature. The result of this study may differ from other populations due to genetic, ethnic and environmental variation.

MATERIALS AND METHODS

This descriptive study was conducted at Department of Oral and Maxillofacial Surgery, Lady Reading Hospital, Peshawar from 1st January, 2020 to 1st September, 2020. Ethical approval was obtained from ethical committee of the institute (Ref no 180/LRH dated 17-07-2019). By using openepi software, the total sample size was 72 at 95 %confident interval, 7% margin of error and using proportion of 89.77% for infraorbital nerve injury in ZMC fracture from previous study.[16]

Total 72 Pakistani patient confirmed on National identity card number (NIC) with age between 16 to 65 years who presented to outpatient Department with zygomatic bone fracture were assessed. Consecutive sampling technique was used for selection of patients. Those patients who presented with only maxillary and Lefort III fractures, with evidence of previous infraorbital nerve sensory disturbances, diabetic patients with peripheral neuropathy, with neurological disorders using carbamazepine were excluded from the study.

Fractures were assessed on the basis of history, clinical examination and radiography (A waters view, submentovertex and occipitomental view and computed tomography scan). Non-probability, consecutive sampling technique was used for sampling. An informed consent was taken from the patient after explaining the study protocol and research purpose. Demographic information such as name, age, gender and contact details was recorded on the structured Performa. Inclusion and exclusion criteria was strictly followed to control confounders and bias in the study.

Neurosensory sensory testing was done in the distribution of infraorbital nerve pre-operatively. Patient was initially educated about the testing methods of nerve. Touch sensation was checked by asking the patient to close his/her eyes and 3/0 prolelene suture was touched with the skin and patient was asked to raise their hand when they feel touching of suture. Directional sensation was checked with the help of brush strokes. Pain sensation was checked by applying pin pressure.

Data was collected and analysed by using SPSS version 20.0. Frequencies and percentages were obtained for all categorical variables such as gender, infraorbital nerve injury (Yes, No), type of infraorbital nerve injury (hypoesthesia, paraesthesia, dysesthesia and anaesthesia) while age was presented as mean and standard deviation. Frequency of overall infraorbital nerve injury and type of infraorbital nerve injury was stratified among age groups and gender to see effect modification. Post stratification chi square test was used. P=0.05 was considered significant.

RESULTS

Overall mean age was 31.36±10.043 years with range from 17 to 50 years. The overall mean pain score was 2.96±3.291 on visual analogue scale and ranged from 0 to 9. Males (72.22%) were more than females (27.78%). Male to female ratio was 2.6:1. The most common age group was third decade (n=23, 31.9%) followed by fourth decade (n=19, 26.4%). Least number of cases with ZMC fracture were found in second decade (n=13, 18.1%, Table 01). The frequency and types of infraorbital nerve injury is shown in Table 02. Among all sample the frequency of infraorbital nerve injury was 50 (69.4%). Among types of infraorbital nerve injury, the most common was paraesthesia (n= 20, 40%) followed by anaesthesia (n=15, 30%). Hypoesthesia was the least common pattern (n=5, 10%) of infraorbital nerve injury.

Highest pain score on visual analogue was found in paraesthesia group (6.3±0.923) followed by dysesthesia (7.3±1.337) and least was hypoesthesia (2.8±0.447). The difference in mean pain score among various types of infraorbital nerve injury was highly statistically significant (P<0.001). (Table 03)

Overall the infraorbital nerve injury was more in males than females and the results were statistically significant (P=0.026). Individually in males the frequency of infraorbital nerve injury was statistically significant (P<0.001) while in females the results were not significant (P>0.05). Details are shown in table 04. Overall types of infraorbital nerve injury stratified by genders was not statistically significant (P=0.135). Individually in both gender the results were statistically significant (P<0.005). In males the most common type of infraorbital nerve injury was paraesthesia (n=17, 32.7%) and in female's common type of infraorbital nerve injury was anesthesia (n=5, 25%). The details are shown in table 06.

Overall types of infraorbital nerve injury stratified by age groups was not statistically significant (P=0.324). Individually in all age groups the results were also not statistically significant (P>0.005). The details are shown in table 07.

Table 01. Age distribution of the study

Age Groups (Years)	Frequency	Percent (%)
16-20	13	18.1
21-30	23	31.9
31-40	19	26.4
41-50	17	23.6
Total	72	100

Table 02. Frequency and type of infraorbital nerve injury

		Frequency	Percent (%)
Infraorbital nerve injury (n=72)	Yes	50	69.4
	No	22	30.6
	Total	72	100
Type of infraorbital nerve injury (n=50)	Pareasthesia	20	40
	Anesthesia	15	30
	Dysesthesia	10	20
	Hypoesthesia	5	10
	Total	50	100

Table 03. Mean pain score on VAS among various types of infraorbital nerve injury

Types of Infraorbital Nerve Injury	N	Mean	95% CI for Mean	P-value*
Pareasthesia	20	6.3±0.923	5.87, 6.73	<0.001
Anesthesia	15	0.00±0.00	0.00, 0.00	
Dysesthesia	10	7.3±1.337	6.34, 8.26	
Hypoesthesia	5	2.8±0.447	2.24, 3.36	

*One way ANOVA

Table 04. Frequency of infraorbital nerve injury stratified by gender

Gender	Infraorbital Nerve Injury				P-value	Overall P-value
	Yes		No			
	N	%	n	%		
Male	40	76.90	12	23.10	<0.001	.026
Female	10	50.00	10	50.00	1.00	

*chi-square test

Table 05. Frequency of infraorbital nerve injury stratified by age groups

Age Groups (Years)	Infraorbital Nerve Injury				P-value	Overall P-value
	Yes		No			
	N	%	n	%		
16-20	11	84.6	2	15.4	.013	0.455
21-30	16	69.6	7	30.4	.061	
31-40	11	57.9	8	42.1	.491	
41-50	12	70.6	5	29.4	.090	

*chi-square test

Table 06. Frequency of types of infraorbital nerve injury stratified by genders

Gender	Type of Nerve Injury								P-value	P-value
	Paraesthesia		Anaesthesia		Dysesthesia		Hypoesthesia			
	N	%	N	%	n	%	N	%		
Male	17	32.7	10	19.2	9	17.3	4	7.7	.073	0.135
Female	3	15	5	25	1	5	1	5	.007	

*chi-square test

Table 07. Frequency of type of nerve injury stratified by age group

Age Groups (Years)	Type of Nerve Injury								P-value	P-value
	Paraesthesia		Anaesthesia		Dysesthesia		Hypoesthesia			
	N	%	N	%	n	%	N	%		
16-20	4	30.8	3	23.1	3	23.1	1	7.7	.736	0.324
21-30	8	34.8	3	13.0	3	13.0	2	8.7	.175	
31-40	1	5.3	4	21.1	4	21.1	2	10.5	.108	
41-50	7	41.2	5	29.4	0	0.0	0	0.0	.790	

*chi-square test

DISCUSSION

Patient with ZMC fracture presents with depression of affected side, pain, subconjunctival haemorrhage, circumorbital ecchymosis, limited mouth opening etc. Indications for the surgical reduction of zygomatic arch fractures are based on sign and symptoms, cosmetic and functional impairments and on the radiological findings. There is a variety of clinical sign and symptoms including compromised vision, extra ocular muscle dysfunction, visible facial asymmetry, significant functional impairment of mandibular movements, and a step at infraorbital rim or zygomaticofrontal suture and infraorbital nerve malfunctions.[17]

In this study male were more than females (72.22%) versus 27.78%. This may due to the fact that in our country males are outdoor workers and more vulnerable to the maxillofacial trauma. The second reason is the lack of compliance with driving rules which results in increased rate of road traffic accidents. The literacy rate in our country is much lower in females as compared to males as consequently most of them are housewives. The other reasons for less females in maxillofacial trauma are ethical, religious and cultural norms.[18]

Our research found that the most common age group was third decade (31.9%) followed by fourth decade (26.4%). Similar findings were reported by Noor et al in study on evaluation of neurosensory changes in the infraorbital nerve following zygomatic fractures in Lahore.[19]

Sensation is the acceptance and activation of receptors and propagation of impulses from the afferent nerves to the central nervous system. These sensations are present to protect an organism from environmental damage.[20] Nerve injury following fracture may present with various pathophysiology involving traction, pressure, ischemia, inflammation and physical damage of the infra-orbital nerve resulting in sensory neuropathy and motor functions in the area of innervation of infra-orbital nerve both as presenting symptom and as a postoperative complication.[17]

Fractures of the midface, mainly the zygomaticomaxillary complex (ZMC), comprise up to 15% of all facial bone fractures. The frequency of ZMC fractures is second only to nasal fractures, which are the most common type of facial fracture. This is most common in young and middle-aged males.[17] Our findings showed that among all sample the frequency of infraorbital nerve injury was in 69.4%. In a study conducted on zygomaticomaxillary complex reported that infraorbital nerve sensory disturbances were diagnosed in 64.4% of the patients.[17] These results are similar to our findings. This is similar to the findings of Renzi et al who confirmed an injury of the ION in 70.9% of ZMC fracture cases.[21] Similar findings concerning ION injury frequency have been presented by Nordgaard[22] (53%), Balle et al[23] (30.4%) and Kristensen and Tveteras[24] (57.7%). Westermark et al reported an impaired ION function in up to 80% of cases.[25] Other authors, on the other hand, have found far fewer ION sensory disturbances. A study from Iran assessed the sensorimotor nerve damage in patients with maxillofacial trauma and found that infra-orbital nerve was the second most common nerve damaged after trigeminal.[26] An explanation for the differences can be the method used to investigate sensation. It is, however, complicated to make comparisons between studies employing different methods to assess nerve

function. Two-point discrimination, pressure thresholds, pinprick test, masseter silent period, gross assessment with sharp and blunt instruments, thermography and gross temperature assessments with ethyl chloride, ice or warmed gutta percha have all been used to study ION recovery following trauma. Some studies have employed a patient questionnaire, which is highly subjective.[25]

Our results showed that among types of infraorbital nerve injury the most common type was pareasthesia followed by anesthesia. Hypoesthesia was the least common pattern of infraorbital nerve injury. The studies conducted in India reported similar results as our study that pareasthesia was common type of ION injury.[2] Previous study by Sakavicius et al,[17] reported that hyperalgesia was diagnosed in 11.9%of patients and hypoalgesia in 52.5% of patients with ION sensory disturbances. The difference in results can be attributed sample size, ethic and cultural variations.

Limitations

As this study was single snap cross section study which did not involve post-operative status and prognosis of nerve injury. A study on larger scale in which post trauma, post-operative and patient followed up to 18 months will be a good study to know the severity of such nerve injuries and recovery of neve injury.

CONCLUSION

Frequency of infraorbital nerve injury in ZMC fracture is quiet higher so the clinician should be vigilant about infraorbital nerve injury while managing ZMC fracture. Pareasthesia followed by anesthesia is the most common type infraorbital nerve injury and hypoesthesia was the least common. Types of infraorbital nerve injury stratified by genders and age groups was not statistically significant.

Ethical consideration

This study was approved by Institutional Review Board of Lady Reading Hospital, Peshawar, Pakistan.

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Conflict of Interest

Authors declared no conflict of interest.

REFERENCES

1. Pandya AR, Panneerselvam E, Vignesh A, Krishnakumar VBR. Evaluation of sub brow approach to the frontozygomatic suture for open reduction and internal fixatrion (ORIF) of zygomaticomaxillary complex (ZMC) fractures: A prospective cohort study. Natl J Maxillofac Surg. 2023;14(1):55-62. DOI: https://doi.org/10.4103/njms.njms_106_22.Epub2023Apr 14.
2. Sakkas A, Christel W, Pietzeka S, Wilde F, Thiele OC, Mischkowski RA. Evaluation of different patterns of zygomaticoorbital complex fractures. Craniomaxillofsc Trauma Reconstr. 2024;17(2):92-103. DOI: https://doi.org/10.1177/19433875231161906
3. Dubron K, Verbist M, Shaheen E, Dormaar TJ, Jacobs R, Politis C. Incidence, aetiology, and associated fracture patterns of infraorbital nerve injuries following zygomacomaxillary complex fractures: a retrospective analysis of 272 patients. Craniomaxillofac Trauma Reconst. 2022; 15(2):139-46. DOI: https://doi.org/10.1177/19433875211022569
4. Sakkas A, Weib C, Pietzka S, Christian O. Evaluation of different patterns of zygomaticirbital complex fractures. Craniomaxillofac Trauma Reconst. 2023. DOI: https://doi.org/10.1177/19433875231161906.
5. Baloch DFK, Shahzad M, Kumar L, Abbas SZ, Mustafa N, Shams S. Comparative evaluation of infraorbital nerve recovery following open and closed reduction of zygomatic complex fracture. Pak J Med Health Sci. 2022;16(02):750-2. DOI: https://doi.org/10.53350/pjmhs22162750
6. Javed A, Jamal M, Khan A, Khan TU, Ullah H, Sardar H, et al. Frequency of trismus and diplopia in patients with zygomatic complex fractures. J Khyber Coll Dent. 2021; 11(01):45-50. DOI: https://doi.org/10.33279/jkcd.v11i01.165.
7. SA Shah, ZQ Bangash, TU Khan, M Yunas, M Raza, SF Shah. The pattern of maxillofacial trauma & its management. J Dent Oral Disord Ther.2016; 4 (4): 1-6.
8. Loong SC, Nadira AA, Syahida RN. Infraorbital nerve sensory disturbances in relation to zygomatic complex fracture: A retrospective study. Malaysian J Oral Maxillofac Surg. 2021; 19(1): 7-11.
9. Han SW, Kim JH, Kim SW, Kim SH, Kang DR, Kim J. Sensory changes and recovery of infraorbital area after zygomaticomaxillary and orbital floor fractures. Arch Craniofac Surg. 2022; 23(6): 262-68. DOI: https://doi.org/10.7181/acfs.2022.01011.
10. Devoti JF, Nicot R, Rolland-Billecat T, Ferri J, Schlund M. Characrterization of infraorbital nerve sequelae after orbital floor or zygomaticmaxillary complex fractures. J Craniofac Surg. 2022; 33(1):52-56. DOI: https://doi.org/10.1097/SCS.0000000000007881
11. TU Khan, ZA Khan, MU Khalid, R Afsar, Z Qayum. Pattern of maxillofacial trau ma: a five years study of 3360 cases. Professional Med J. 2015; 22 (12): 1606-1611. DOI: https://doi.org/10.17957/TPMJ/15.3000
12. Dhabaria H, Kolari V, Sequeira J, Shah A. Evaluation of infraorbital nerve recovery and its effect on quality of lofe following open reduction and internal fixation of zygomaticomaxillary comples fractures- An evaluative study. Annals Maxillofac Surg. 2022; 12(2): 128-32. DOI: https://doi.org/10.4103/ams.ams_100_22.
13. Benoliel R, Birenboim R, Regev E, Eliav E. Neurosensory changes in the infraorbital nerve following zygomatic fractures. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2005;99(6):657-65. DOI: https://doi.org/10.1016/j.tripleo.2004.10.014
14. Ahmed S, Bey A, Hashmi G, Hashmi S. Neurosensory deficit in cases of zygomatic complex fractures. Curr Neurobiol. 2010;1(1):51-7.
15. TU Khan, S Rahat, ZA Khan, L Shahid, SS Banouri, N Muhammad. Etiology and pattern of maxillofacial trauma. Plos One.2022; 17 (9):e0275515. DOI: https://doi.org/10.1371/journal.pone.0275515

16. Jadhav A, Deshmukh V. Effect of location of fracture line and surgically visible nerve entrapment in recovery of infraorbital nerve following zygomatico-maxillary complex fracture- a prospective study. Int J Dent. 2017;2:9-13. DOI: https://doi.org/10.1007/s12663-019-01284-z
17. Sakavicius D, Juodzbalys G, Kubilius R, Sabalys GP. Investigation of infraorbital nerve injury following zygomaticomaxillary complex fractures. J Oral Rehabil 2008;35(12):903-16. DOI: https://doi.org/10.1111/j.1365-2842.2008.01888.x
18. Poorian B, Bemanali M, Chavoshinejad M. Evaluation of Sensorimotor Nerve Damage in Patients with Maxillofacial Trauma; a Single Center Experience. Bulletin Emergency & Trauma 2016;4(2):88.
19. Kumar P, Godhi S, Lall AB, Ram C. Evaluation of neurosensory changes in the infraorbital nerve following zygomatic fractures. J Oral Maxillofacial Surg 2012;11(4):394-9. DOI: https://doi.org/10.1007/s12663-012-0348-8
20. Lakshmi R, Chitra A, Singh A, Pentapatti KC, Gadicherla S. Neurosensory assesment of infraorbital nerve injury following unilateral zygomaticomaxillary complex fracture- A prospective study. Open Dent J. 2022;16(1). 1-12. DOI: https://doi.org/10.2174/18742106-v16-e2206140.
21. Renzi G, Carboni A, Perugini M, Giovannetti F, Becelli R. Posttraumatic trigeminal nerve impairment: a prospective analysis of recovery patterns in a series of 103 consecutive facial fractures. J Oral Maxillofacial Surg 2004;62(11):1341-6. DOI: https://doi.org/10.1016/j.joms.2004.05.212
22. Nordgaard JO. Persistent sensory disturbances and diplopia following fractures of the zygoma. Arch Otolaryngol 1976;102(2):80-2. DOI: https://doi.org/10.1001/archotol.1976.00780070058004
23. Balle V, Christensen PH, Greisen O, Jørgensen P. Treatment of zygomatic fractures: a follow-up study of 105 patients. Clin Otolaryngol 1982;7(6):411-6. DOI: https://doi.org/10.1111/j.1365-2273.1982.tb01405.x
24. Rosello EG, Granado AMQ, Gracia MA, Marti SJ, Sala GL, Mamol BB, et al. Facial fractures: classification and highloghts for a useful report. Insights Imaging. 2020;11(49). DOI: https://doi.org/10.1186/s13244-020-00847-w.
25. Yaser I, Maria N, Ahmad FUD, Shafiq MF, FareedA, Hanan S. Assesment of recovery time for the functional status of infraorbital nerve in open versus closed reduction of zygomatico-maxillary complex fractures: a comparative study. Biomedica. 2024;41(2):90. DOI: https://doi.org/10.24911/biomedica/5-1047.
26. Poorian B, Bemanali M, Chavoshinejad M. Evaluation of sensorimotor nerve damage in patients with maxillofacial trauma; a single center experience. Bull Emerg Trauma 2016;4(2):88.

DATA SHARING STATEMENT: The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

AUTHORS' CONTRIBUTION

The following authors fullfill authorship criteria as per ICMJE guidelines;

Shafiq M, Khan TU:	Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.
Hanifullah, Qayyum Z:	Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.
Masood M:	Analysis and interpretation of data, drafting the manuscript, final approval, agreed to be accountable for all the work.
Masooma S:	Analysis and interpretation of data, critical revision,final approval, agreed to be accountable for all the work.

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