

# Modern Approaches to Surgical Treatment of Fractures of the Zyno-Orbital Region

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**Annotation.** The scheme of complex treatment of fractures of the zygomatic-orbital region included local ozone therapy by washing the cavity of the maxillary sinus on the side of the injury with ozonized distilled water. The results of clinical, radiological and microbiological studies indicate the high efficiency of the use of local ozone therapy for the prevention of post-traumatic maxillary sinusitis.

**Relevance of the topic.** The problem of surgical treatment of patients with fractures of the zygomatic and arch is far from its final resolution, due to the lack of rational surgical methods that meet all the necessary requirements, which determined the purpose of this study and showed the feasibility of searching for new methods of treating such injuries in surgical practice [1,3,4,10-13].

## Materials and research methods

In the period from 2018 to 2020, 73 patients aged from 18 to 55 years old with traumatic injuries of the COO of various localizations were treated. Of these, left-sided fractures accounted for 53.6% (44 people), right-sided - 46.4% (29 people). All patients, depending on the choice of treatment method, were divided into 2 groups: - the main group (45 people) who underwent complex treatment using local ozone therapy according to the method we developed. - control group (28 people), who were treated according to the traditional scheme. The research methods were: X-ray examination of the bones of the facial skeleton in the pre- and postoperative period; ultrasound Doppler sonography of the blood flow of the external carotid artery on the side of the injury and on the opposite side; microbiological examination of the lavage water of the maxillary sinus on the side of the injury before and after treatment; clinical analysis of blood and urine. The digital material was processed using the Microsoft Excel 2000 software product. The method of variation statistics was used with the calculation of mean values and standard deviation. To assess the significance of differences, the Student's coefficient was used.

## Results and its discussion.

**The nature of the complaints** presented in the main (1) and control (2) groups and their dynamics in the postoperative period are presented in Table 1 (in% of patients).

**Table 1**  
**Distribution of patients in% by the nature of the complaints presented in the main (1) and control (2) groups.**

Complaints	Before operation		In 7-10 days.		In 1 month	
	1	2	1	2	1	2
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Zygomatidepression</b>						
Not determined by edema	15,15	3,45	20,0	6,90		
No fall	3,03		77,14	68,97	100	97,14
Minor	12,13	10,34	2,86	10,34		2,86
Moderately pronounced	33,33	10,34		3,45		
Minor	36,36	89,66				
<b>Enophthalmos, exophthalmos</b>						
Present	6,06	13,79	2,86	6,90		
Absent	96,97	86,21	94,29	93,1	100	2,86
<b>Swelling and bruising</b>						
Absent	36,36	44,83	77,14		100	100,0
Expressed slightly	42,42	10,34	22,86	3,45		
Significantly expressed	12,12	10,34		3,45		
Numbness in the area of innervation of the item decreased						
	21,21		57,14	27,59	77,78	62,86
<b>Impaired nasal breathing on the side of the injury</b>						
Present	9,09	3,45	2,86	17,24		
Absent	90,91	89,66	97,14	79,31	100	100
<b>Difficulty opening the mouth</b>						
Present	75,76	82,76	14,29	34,48		2,86
Absent	30,30	17,24	85,71	65,52	100	97,14
<b>Diplopia or other visual impairment</b>						

Present	6,06	10,34	2,86	6,90		
Absent	96,97	86,21	97,14	79,31	100	100,0

As follows from the presented table, the leading complaints in fractures of the zygomatic-orbital region included depression in the zygomatic and infraorbital regions, the presence of edema and hematomas, difficulty opening the mouth, numbness in the zone of innervation of the infraorbital nerve. All the patients examined by us were in a satisfactory condition, clear consciousness, and an active position. No significant symptoms of internal organs were found.

**The nature of local changes** in the main (1) and control (2) groups and their dynamics in the postoperative period are presented in Table 2 (in% of patients).

**Table 2**

**The nature of local changes in fractures of the zygomatic - orbital area in% of patients for the main (1) and control (2) groups.**

Local changes	Before operation		In 7-10 days		In 1 month	
	1	2	1	2	1	2
1	2	3	4	5	6	7
<b>Localization of edema and hematomas</b>						
Absent	30,30	34,48	80,0	10,34	100,0	75,86
Lower eyelid	18,18	13,79	8,57	27,59		10,34
Sclera+lower eyelid	18,18	13,79	5,71	10,34		
Upper and lower eyelids	6,06	13,79		6,90		
Zygomatic or infraorbital region	12,12	10,34	5,71	31,03		3,45
Multiple hemorrhages	9,09	17,24		10,34		
<b>The nature of bone deformities</b>						
<i>1. The presence of bony protrusions</i>						
Not palpable			91,4	86,21	88,6	70,64
Along the lower orbital edge	45,45	10,34	2,86	10,34	5,71	13,79
Along the cheekbone - alveolar ridge	84,85	78,3	5,71	3,45	5,71	

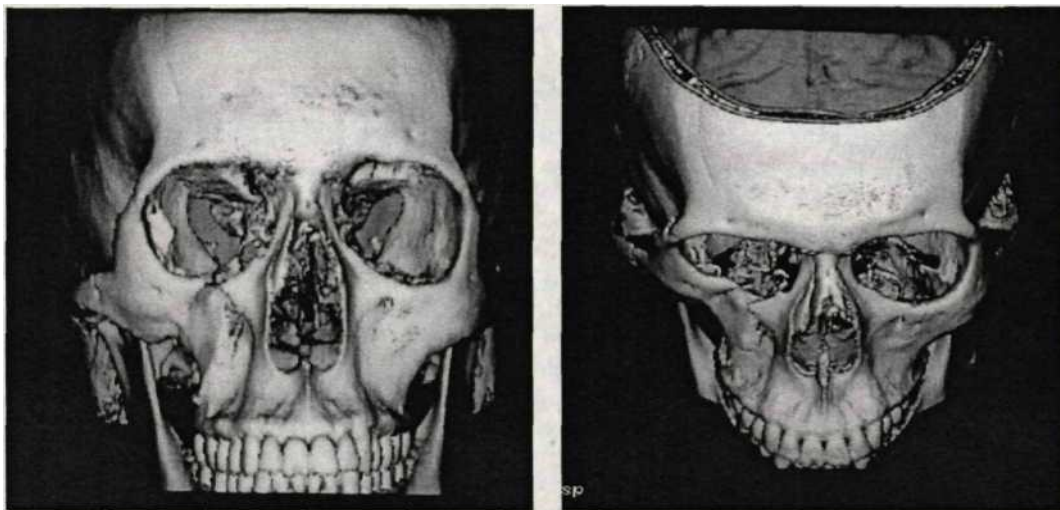
Along the outer edge of the orbit	30,30	6,90				5,34
In the area of the zygomatic arch	15,15	3,45				
At 2 points	45,45	47,93				3,32
At 3 and more points	54,55	52,57				
<b>2. Sinking</b>						
Not determined			77,2	27,59	88,6	31,03
Not determined by edema	3,03	13,79	22,9	48,28		
In the projection of the zygomatic bone or arch slight	36,36	3,45			11,4	10,34
Moderate	9,09	31,03		6,90		10,34
Expressed	18,18	51,72				
Enophthalm	33,33	13,79	2,86	6,90	2,86	6,90
Overcorrection			6,06	10,34		
<b>3. Difficulty opening the mouth</b>						
no	15,15	13,79	85,7	34,48	97,1	68,97
3-5 sm	36,36	37,93	11,4	51,72	2,86	20,69
1-3 sm	45,45	34,48	2,86	6,90		3,45
Less than 1 sm	9,09	13,79				

As follows from this table, the main clinical symptoms of fractures of the bones of the zygomatic-orbital region are edema and hematomas in the zygomatic and infraorbital regions, hemorrhages under the sclera and skin of the eyelids, the presence of bony protrusions at 2-3 points, retraction in the projection of the zygomatic bone and difficulty opening the mouth up to 1-3 cm. The X-ray picture of fractures of the zygomatic-orbital complex in the examined patients for the main (1) and control (2) groups is presented in Table 3 (in% of patients).

**Table 3**  
**X-ray picture of fractures of the zygomatic-orbital complex at the stages of treatment in% of patients for the main (1) and control (2) groups.**

Before operation	Groups		After operation	In 7-10 days		In 1 month.	
	1	2		1	2	1	2
No displacement of fragments	2,86	3,45	There is not secondary displacement	94,2	72,4	88,5	62,1
1 point offset	8,57	6,9	Minor	5,71	6,9	11,4	13,8
At 2 points	48,6	24,1	With a violation of appearance		10,3		20,7
At 3 points	34,3	55,2	Return to additional service position		3,45		3,5
Comminuted	2,86	10,3					
Fracture of the lower wall of the orbit	5,71	10,3					

From the presented table it follows that in most cases there are fractures of the zygomatic-orbital region at 2-3 points; secondary displacement of fragments was more often observed in the long-term period in the control group.



**Figure 1. Reformatted and volumetric image of patient C.**

The results of a microbiological study showed significant differences in the composition of the microflora of the sinuses on the side of the injury compared to the opposite side, depending on the duration of the injury.

With fresh fractures of the zygomatic-orbital region, quantitative counting of microorganisms showed a significant increase in their concentration:  $1.2 \times 10^3$  CFU / ml (at a rate of  $0.22-0.35 \times 10^3$  CFU / ml) ( $P < 0.01$ ) [2,5,8,9]. No differences in the species composition of microflora were observed: as well as from the intact sinus, *St. saprophiticus*, *St. epidermidis*, *Str. viridans*, in isolated cases -*St. aureus*, enterococcus in single quantities. Histological examination of the mucous membrane of the maxillary sinus in this group of patients showed the presence of hemorrhages, foci of necrosis, stromal edema. To control the effectiveness of the local ozone therapy, a repeated microbiological study of the wash water was carried out after the end of the course of treatment. The results of the study showed the high efficiency of local ozone therapy: When using this technique, in the case of fresh fractures, there was a decrease in the microbial colonization of the sinus from  $1.2 \times 10^3$  to  $0.85 \times 10^3$  CFU / ml (by 41%) (Fig.2). When using local ozone therapy in the complex treatment of old and viciously consolidated fractures, a decrease in microbial colonization of the sinus from  $3.2 \times 10^5$  CFU / ml to  $2.9 \times 10^3$  CFU / ml ( $P < 0.001$ ) was found. The species composition of the microflora has also changed with the predominance of *St. epidermidis*, *Str. viridans* at low concentrations.

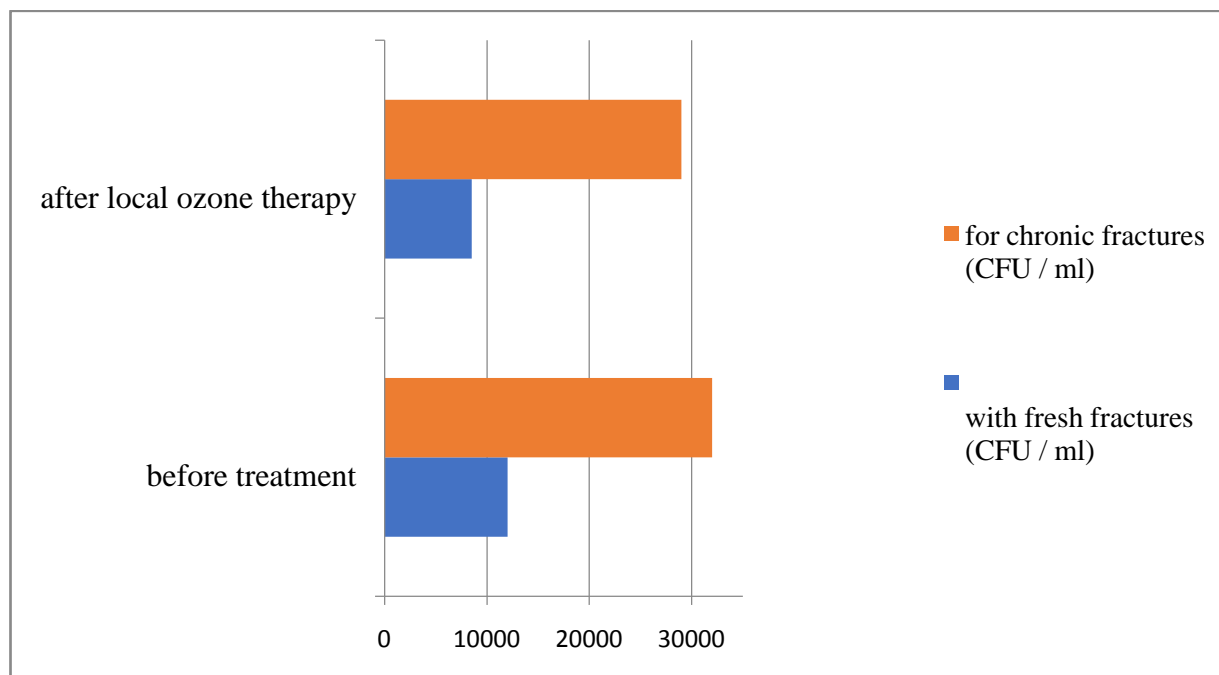


Fig. 2 The ratio of the number of microorganisms in the flushing water from the maxillary sinus on the side of the injury before and after local ozone therapy for fractures of the zygomatic-orbital complex a-with fresh fractures. When using local ozone therapy, a favorable course of the postoperative period is noted: the absence of diffuse postoperative edema and hematomas, their rapid resorption, and a low level of postoperative pain in the wound. The results of the study of LPO (lipid peroxidation) of flush waters from the maxillary sinus on the side of the injury with fractures of the zygomatic-orbital complex are presented in table. 3.

**Table 3**  
**Change in LPO level before and after a course of local ozone therapy**

Index		Before treatment	After treatment	P
OЛ		0,15±0,04	0,16±0,03	P>0,05
OR, rel. units / mg OL		3,67±0,27	4,00±0,15	
ДК	опт. пл.	0,56±0,03	0,54±0,03	
ТК	/мг ОЛ	0,24±0,03	0,25±0,01	
I max		2,11 ±0,05	0,91±0,01	P<0,001
I max/S		0,09±0,015	0,22±0,01	P<0,001

It can be seen from the presented table that no significant changes in the level of both initial (DC, TC) and final LPO products (OR) were found. At the same time, biochemiluminescence data indicate a significant (P <0.001) decrease in the level of maximum luminescence intensity I<sub>max</sub> (by 2.3 times) and a statistically significant ((P <0.001) increase in the I<sub>max</sub> / S indicator (by 2.4 times) characterizing the antioxidant activity of the studied biosubstrate.

### Conclusions

1. According to the data of clinical and radiological examination of patients with trauma to the zygomatic-orbital region, it was found that in most cases fractures are multiple in nature and are combined with a violation of the integrity of the bony walls of the maxillary sinus on the side of the injury.

2. The results of clinical and radiological, microbiological and biochemical studies indicate the high efficiency of the use of local ozone therapy according to the technique developed by us for the prevention of post-traumatic maxillary sinusitis in the complex treatment of patients with fractures of the bones of the zygomatic-orbital region.

### References

1. Biryulev A.A. Modern aspects of prevention, diagnosis and complex treatment of chronic odontogenic perforated maxillary sinusitis in the early period of the disease: author. dis. ... Candidate of Medical Sciences: 14.01.14., 03.02.03 - M., 2012. -- 25 p.
2. Daminov R.O. Treatment of patients with pathology of the nasal cavity and paranasal sinuses before sinus lifting and dental implantation: dis. ... Cand. honey. sciences. 01/14/14 - M. - 2011, - 156 p.
3. Gatalskaya I.Yu. Treatment and prevention of traumatic sinusitis with zygomatic-maxillary fractures in conditions of concomitant injury: author. dis. ... Cand. honey. sciences. 14.01.14 - M., - 2010 - 24 p.
4. Manzon S., Choudhary N., Philbert R. Towel clip reduction of the depressed zygomatic arch fracture. // J. Oral Maxillofac. Surg. - 2006. - Vol. 64. - P. 1323.
5. Musayev S.S., Shomurodov K.E., Abdusalikov S.F., Narzieva M.I. Patterns of Paediatric Maxillofacial Fractures: A Twelve-Year Retrospective Study // Medico-legal Update, 2021. № 1. Vol. 21. C. 706-708.

6. Rizaev J.A. Influence of fluoride affected drinking water to occurrence of dental diseases among the population // *EurAsian Journal of BioMedicine, Japan*, Vol. 4, Issue 5, P.1-5.
7. Rizaev J.A., Khazratov A.I. Carcinogenic effect of 1,2 - dimethylhydrazine on organism as a whole // *Problems of biology and medicine*, 2020. № 1. Vol. 116. C. 269.
8. Rizaev J.A., Khazratov A.I., Lisnichuk N.E., Olimjonov K.J., Reimnazarova G.J. Pathomorphological changes in the oral mucosa in patients with colon cancer// *European Journal of Molecular & Clinical Medicine*, vol.7, Issue 7, P.666-672.
9. Rizaev J.A., Kubaev A.S. Preoperative mistakes in the surgical treatment of upper retro micrognathia // *International Journal of Pharmaceutical Research*, Vol.12, Issue 1, P.1208-1212.
10. Shomurodov K.E., Khasanov I.I., Rizaev J.A. Specific features of dental implantation in patients with maxillar sinusitis // *EPRA International Journal of Socio-Economic and Environmental Outlook*, 2020. № 5. Vol. 7. C. 9-17.
11. Ubaydullaev K.A., Hiromichi M., Gafforov S.A., Rizayev J.A. Akhunov G.A. Benefit of rehabilitation for patients with postoperative defects due to maxillofacial tumors // *American Journal of Research* | march – April, 2019. Vol. 29. Issue 2. P. 19-21.
12. Wittwer G., Adeyemo W. L., Voracek M., Turhani D, Ewers R., Watzinger F., Enislidis G. An evaluation of the clinical application of three different biodegradable osteosynthesis materials for the fixation of zygomatic fractures // *Oral Surg. Oral Med. Oral Pathol. Oral Radiol. Endod.* - 2005. - Vol. 100. -№6.-P. 656 — 660.
13. Yarmukhamedov B.N., Amanullayev R.A., Pulatova B.J. Assessment of possible risk of Dental implantation according to morphological criteria in patients with a somatic background pathology // *American journal of research* No. 7-8,2020.
14. Irsalieva, F., Razikova, I., Kamalov, Z., Dustbabayeva, N., Nizamov, K. Rationale for sublingual allergen-specific immunotherapy in immunocompromised patients. *International Journal of Pharmaceutical Research*, 2020, 12(2), p. 230–236
15. Dustbabaeva, N., Irsalieva, F., Kamalov, Z., Ziyadullaev, S., Akhmedov, K. Research of the association of IL-17A RS (2275913) gene polymorphism with allergic rhinitis associated with food co-sensitization. *International Journal of Pharmaceutical Research*, 2020, 12(2), p. 758–762
16. Yakubova, O., Ayupova, F., Kamalov, Z., Negmatshaeva, K., Mamarasulova, D. Role of COL1A1 and G2046T genes in Uzbeks with juvenile dysmenorrhea in the presence of criteria for undifferentiated connective tissue dysplasia. *Journal of Critical Reviews*, 2020, 7(2), p. 391–394
17. Tashkenbaeva, E.N, Ziyadullaev, S.K, Kamalov, Z.S, Kadirova, F.S, Abdieva, G.A. Urate regulation gene polymorphisms are correlated with clinical forms of coronary heart disease. *International Journal of Pharmaceutical Research*, 2019, 11(3), p. 198–202
18. Bazarova D. Some problems of counteracting crimes related to laundering of illegal proceeds in Uzbekistan *Journal of Advanced Research in Dynamical and Control Systems*. Volume 11, Issue 7, 2019, Pages 873-885
19. Ismailova, Z., Choriev, R., Ibragimova, G., Abdurakhmanova, S., & Abdiev, N. (2020). Competent model of Practice-oriented education of students of the construction profile. *Journal of Critical Reviews*. Innovare Academics Sciences Pvt. Ltd. <https://doi.org/10.31838/jcr.07.04.85>
20. Ismailova, Z., Choriev, R., Musurmanova, A., & Aripjanova, M. (2020). Methods of training of teachers of university on advanced training courses. *Journal of Critical Reviews*. Innovare Academics Sciences Pvt. Ltd. <https://doi.org/10.31838/jcr.07.05.85>
21. Ismailova, Z., Choriev, R., Salomova, R., & Jumanazarova, Z. (2020). Use of economic and geographical methods of agricultural development. *Journal of Critical Reviews*. Innovare Academics Sciences Pvt. Ltd. <https://doi.org/10.31838/jcr.07.05.84>



22. Isakov, A., Tukhtamishev, B., &Choriev, R. (2020). Method for calculating and evaluating the total energy capacity of cotton fiber. IOP Conference Series: Earth and Environmental Science, 614(1), 012006
23. Davirov, A., Tursunov, O., Kodirov, D., Baratov, D., &Tursunov, A. (2020). Criteria for the existence of established modes of power systems. IOP Conference Series: Earth and Environmental Science, 2020, 614(1), 012039
24. Obidov, B., Choriev, R., Vokhidov, O., &Rajabov, M. (2020). Experimental studies of horizontal flow effects in the presence of cavitation on erosion-free dampers. IOP Conference Series: Materials Science and Engineering, 883(1), 012051
25. Khasanov, B., Choriev, R., Vatin, N., &Mirzaev, T. (2020). The extraction of the water-air phase through a single filtration hole. IOP Conference Series: Materials Science and Engineering, 2020, 883(1), 012206
26. Shokhrud F. FayzievThe problem of social stigma during a pandemic caused by COVID-19International Journal of Advanced Science and Technology Vol. 29, No. 7, (2020), pp. 660-664  
<http://sersc.org/journals/index.php/IJAST/article/view/13965/7188>
27. FayziyevShokhrudFarmonovich Medical law and features of legal relations arising in the provision of medical services. International journal of pharmaceutical research Volume 11, Issue 3, July - Sept, 2019 P. 1197-1200  
doi:10.31838/ijpr/2019.11.03.088<http://www.ijpronline.com/ViewArticleDetail.aspx?ID=11016>
28. Bryanskaya Elena, FayzievShokhrud, Altunina Anna, Matiukha Alena Topical Issues of an Expert Report in the Process of Proving in a Criminal Examination. International Journal of Engineering and Advanced Technology (IJEAT)ISSN: 2249 – 8958, Volume-9 Issue-1, October 2019 5345-5349 DOI: 10.35940/ijeat.A2946.109119  
<https://www.ijeat.org/wp-content/uploads/papers/v9i1/A2946109119.pdf>
29. FayzievShokhrud (2019) Legal Aspects of Transplantology in the Republic of Uzbekistan. Systematic Reviews in Pharmacy, ISSN: 0976-2779, Vol: 10, Issue: 2, Page: 44-47 doi:10.5530/srp.2019.2.08  
<http://www.sysrevpharm.org//fulltext/196-1575419211.pdf?1586863081>
30. Tulaganova, G.Some issues of observance of international legal norms of fight against legalization of criminal incomes in the Republic of UzbekistanJournal of Advanced Research in Dynamical and Control Systems12(2 Special Issue), c. 143-155