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ЖУРНАЛ СТОМАТОЛОГИИ И КРАНИОФАЦИАЛЬНЫХ ИССЛЕДОВАНИЙ

Kubaev Aziz Saidalimovich,  
Rizaev Jasur Alimdjanovich,  
Akhrorova Malika Shavkatovna,  
Aminov Zafar Zayirovich,  
Ibragimov Sherzod Umidovich  
Samarkand State Medical Institute, Uzbekistan

## COMPARATIVE ANALYSIS OF METHODS FOR TREATING DEPRESSED FRONTAL SINUS FRACTURES



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### ABSTRACT

The work focuses on our experience in treating fractures of the front walls of the frontal sinuses. The prevalence of frontal sinus wall fractures is growing intensively. To prevent inflammatory complications, it is necessary to use low-traumatic surgical methods of treatment. Application of bone fragments nasal fixation in depressed fractures of anterior wall of frontal sinus allows to obtain good cosmetic and functional result. Such careful attitude to bone fragments creates favorable conditions for the regeneration of the anterior wall of the frontal sinus and reduce the length of stay of patients in the hospital.

**Key words:** frontal bone, fracture of the anterior wall of the frontal bone, miniplates, sinuses.

Кубаев Азиз Саидолимович,  
Ризаев Жасул Алимжанович,  
Ахророва Малика Шавкатовна,  
Аминов Зафар Зоирович,  
Ибрагимов Шерзод Умидович

Самаркандский государственный медицинский институт. Узбекистан.

## СРАВНИТЕЛЬНЫЙ АНАЛИЗ СПОСОБОВ ЛЕЧЕНИЯ ВДАВЛЕННЫХ ПЕРЕЛОМОВ ПЕРЕДНЕЙ СТЕНКИ ЛОБНОЙ ПАЗУХИ

### РЕЗЮМЕ

Работа посвящена нашему опыту лечения переломов передних стенок лобных пазух. Распространенность переломов стенок лобных пазух интенсивно растет. Для профилактики воспалительных осложнений необходимо использовать малотравматичные хирургические методы лечения. Применение накостной фиксации костных отломков при вдавленных переломах передней стенки лобной пазухи позволяет получить хороший косметический и функциональный результат. Такое бережное отношение к костным фрагментам создает благоприятные условия для регенерации передней стенки лобной пазухи и сократить сроки пребывания пациентов в стационаре.

**Ключивые слова:** лобная кость, перелом передней стенки лобной кости, минипластины, пазухи носа.

Kubaev Aziz Saidolimovich,  
Rizaev Jasul Alimjanovich,  
Akhrorova Malika Shavkatovna,  
Aminov Zafar Zoirovich,  
Ibragimov Sherzod Umidovich  
Samarqand davlat tibbiyot instituti. Uzbekiston.

ПЕШАНА СУЯГИ ОЛДИНГИ ДЕВОРИ БОТИБ СИНИШЛАРДА ДАВОЛАШ ТУРЛАРИНИ  
ТАККОСЛАШ

## АННОТАЦИЯ

Ish frontal sinuslarning old devorlarining yoriqlarini davolash bo'yicha tajribamizga bag'ishlangan. Tarqalishi frontal sinuslarning devorlarining sinishi tez o'sib boradi. Yallig'lanish asoratlarining oldini olish uchun kerak. Kam shikastli jarrohlik davolash usullaridan foydalaning. Ichkarida suyak parchalarini qo'shimcha suyak fiksatsiyasidan foydalanish frontal sinusning old devorining tushirilgan yoriqlari sizga yaxshi kosmetik va funktsional imkoniyatlarni olish imkonini beradi.

Natija. Suyak bo'laklariga bunday ehtiyohtkorlik bilan munosabat oldingi qismini tiklash uchun qulay sharoit yaratadi. Frontal sinusning devorlari va kasalxonada qolish vaqtini qisqartiradi.

**Kalit so'zlar:** peshana suyagi, peshana suyagi oldingi devori sinishi, miniplastinalar, burun bushliklar.

Traumatic injuries of the frontal sinuses account for 5-15% of all craniofacial injuries. The frequency of frontal sinus injuries is 9 cases per 100 thousand adult population. Displacement of the anterior wall fragments into the lumen of the frontal sinus, especially in the lower parts and in the bottom area, can lead to both functional problems due to obturation of the frontal-nasal canal and necrotic changes in the mucosa, as well as cosmetic ones due to the resulting depression and violation of the aesthetic shape of the forehead.

There are several options for the location of fragments of the walls of the frontal sinuses fractures: 1) freely lying in the lumen of the sinuses; 2) the periosteum fixed on the mucosa and separated from each other and neighboring areas of the bone; 3) fixed on the mucosa, having a connection with other bone areas, constituting a single bone structure separated only by fracture lines; 4) combinations of abovementioned variants.

A surgical revision of the injured frontal sinus (Volkov A.G., Gyusan A.O., 2006, 2007) with subsequent plastics of bone defects is considered a mandatory element of treatment. This intervention can be delayed by 3-8 days depending on the severity of the victim's condition and the presence of combined injuries.

The tactics of surgical treatment of fractures of the upper zone of the face with damage to the walls of the frontal sinuses cause a lot of controversy. Fain et al. indicates five surgical options for traumatic injuries of the walls of paranasal sinuses: obliteration, nasalization, ablation, cranialization, exenteration. The tasks of surgeons, facing the using each of these methods, are to ensure the frontal sinus intervention to prevent the development of early and postoperative inflammatory processes and restore the normal contour of the injured frontal sinus.

**Research objective:** To evaluate treatment methods for patients with depressed fractures of the anterior wall of the frontal sinus and comparative analysis of methods of treatment of depressed fractures of anterior wall of frontal sinus.

**Materials and methods:** the work is based on clinical observations of 95 patients with traumatic damage to the anterior wall of the frontal sinus, who were treated in the maxillofacial department of the Samarkand City Hospital. Between 2016 and 2019. This study excluded patients with damage of the posterior wall of the frontal sinus, as well as with the traumatic organic pathology of the brain substance, which requires neurosurgical surgery. The number of male patients examined absolutely prevailed over female. The majority of patients were people of working age (80 patients – 84.8%). All victims underwent a complete set of diagnostic examinations, including a clinical examination, multispiral computed tomography (MSCT), radiography of the bones of the facial skeleton. Surgical treatment was carried out by a multidisciplinary team consisting of a maxillofacial surgeon, neurosurgeon, anesthesiologist. Unlike traditional radiography, the MSCT method gave us the opportunity not only to visualize, but also to determine the exact dimensions and degree of displacement of bone fragments.

Ophthalmosurgeons and otorhinolaryngologists were involved, when necessary.

Traumatic brain injuries were treated according to neurosurgical treatment standards (Actis L., Gaviria L., 2013). The task of the maxillofacial surgeon was to restore the integrity of the facial skeleton. In the treatment of fractures of the anterior wall of the frontal sinus in combination with fractures of the outer wall of the orbit, fractures of the above-brow arch, bitemporal access was used (Fig. 1a). After mobilization of the skin-aponeurotic flap to the above-brow arches, skeletons were carried out, reposition and fixation of fragments with titanium mini-plates or titanium mesh (Fig. 1b).

Fig. 1.a. Cut line with bitemporal access.



Fig. 1.a. Skeleton of the aponeurotic flap to the above-brow arches

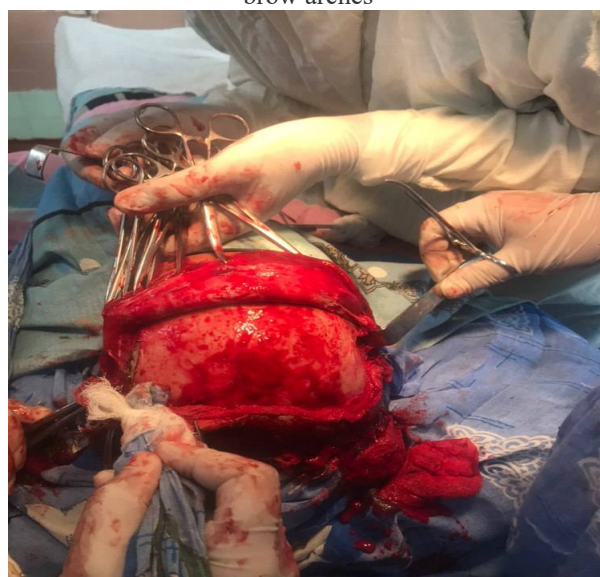


Fig. 2.a. MSCT at admission

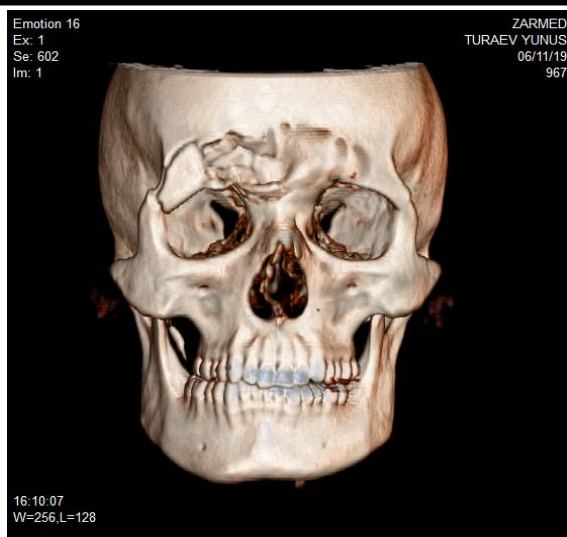
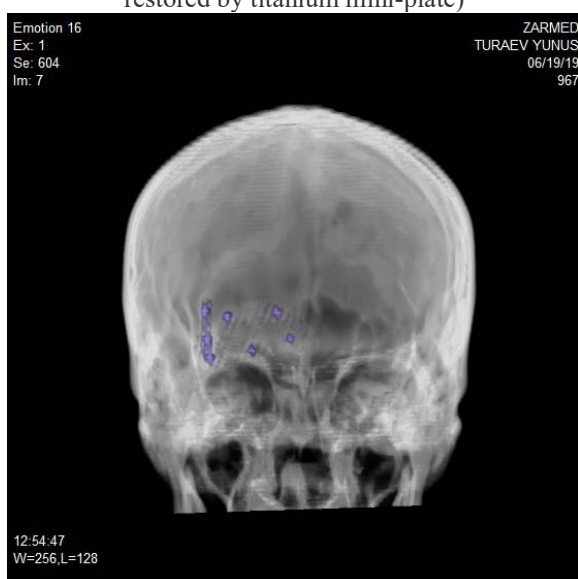


Fig. 2.b. MSCT after surgical treatment (fracture restored by titanium mini-plate)



**Discussion:** According to Volkov et al. (2008), injuries to the bones of the upper zone of the face with damage to the walls of the frontal sinuses range from 3% to 6% of injuries to the facial skull. The consequences of frontal sinus injuries are

manifested not only in facial disfiguration, but also in the development of complications such as post-traumatic frontitis, osteomyelitis of the frontal bone, inflammatory processes in orbit. The desire of patient to get rid of a cosmetic flaw with depressed fractures of the anterior wall of the frontal sinus and the need to restore the physiological integrity of the cavity in order to avoid the development of frontitis prompts us to look for new approaches for the treatment of this pathology. For these purposes, it is known to use materials filling the lumen of the frontal sinus, in particular autogenic bone, demineralized allogenic bone (Wolves et al., 2008), in addition to tamponade techniques, fixation of fragments with chrome ketgut is used (Bertran et al., 1998.), thin wire from titanium nickellide or titanite miniplates.

A disadvantage of the known methods is that when the frontal sinus cavity is obliterated by any material, secondary purulent frontitis are likely to occur, since the natural frontal-nasal fistula is blocked and the unaltered injured mucosa is deprived of the possibility of aeration, which leads to the growth of granulation tissue, the formation of bays in which infected contents accumulate. In this case, the transplanted adipose tissue or spongy bone can become a good nutrient medium for microorganisms. Fixation of bone fragments with titanium nickellide wire or titanium miniplates immersed in tissues entails difficulties in removing them, as well as repeated tissue trauma.

Thus, the use of nasal fixation of bone fragments with depressed fractures of the anterior wall of the frontal sinus statistically significantly reduces the length of stay of patients in the hospital compared to the method of plugging paranasal sinuses. Endoscopic control over the condition of the fistula and the functioning of the frontal-nasal canal in patients with a depressed fracture of the anterior wall of the frontal sinus allows for its selective drainage. Application of bone fragments nasal fixation in depressed fractures of anterior wall of frontal sinus allows to obtain good cosmetic and functional result.

**CONCLUSIONS:** The average length of stay of patients in hospital was statistically significantly lower ( $6.8 \pm 0.8$  days).

Distant complications in the form of secondary purulent frontitis were recorded in 5 patients (13.9%); failure of the newly formed frontal-nasal canal was also noted in only 2 patients (5.5%). The cosmetic result as good was noted in 90 patients (94.7%) and in 5 patients as satisfactory (5.4%).

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