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Features of the treatment of fractures of the zygomatic-orbital complex

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Abstract. Before treating patients with fractures of the zygomatic bone, zygomatic-orbital and zygomatic-maxillary complexes, the condition of patients should be compensated. Brain injuries and ophthalmic injuries are of paramount importance in terms of medical care.

Keywords. Zygomatic-orbital complex, fractures, zygomatic arch, reposition, fixation, displacement, mini-plates, bone fragments, intraoral reposition.

With fractures of the zygomatic-orbital complex, the lines of fractures pass through the zygomatic-alveolar crest - often at the base in the region of the alveolar process of the upper jaw; through the lower edge of the orbit - in the area of the zygomatic-maxillary suture or more medially; in the area of the zygomatic arch - along the zygomatic-temporal suture or near it; in the region of the lateral margin of the orbit, along the zygomatic-frontal suture. Displacement of bone fragments, moderate in the area of the zygomatic-frontal and zygomatic-sphenoid sutures, moderate or pronounced in the area of the lower edge of the orbit and zygomatic-alveolar crest, moderate in the area of the zygomatic arch - along the zygomatic-temporal suture. There are pronounced damage to the anterior and posterior walls of the maxillary sinus. The bone fragment of the zygomatic-orbital complex does not form small fragments.

Before treating patients with fractures of the zygomatic bone, zygomatic-orbital and zygomatic-maxillary complexes, the condition of patients should be compensated. Brain injuries and ophthalmic injuries are of paramount importance in terms of medical care. It is necessary to perform primary surgical treatment and suturing of wounds if the existing wounds are not required for access with open reposition of the bones of the middle zone of the face. It is advisable to perform specialized surgical treatment even when the patient is in the intensive care unit and resuscitation, since fractures of the bones of the middle zone of the face tend to consolidate faster than other fractures.

In the presence of a concomitant injury, delayed treatment of patients for non-life-threatening conditions can be performed simultaneously with the reposition of the facial bones of the skull. If the patient has indications for drainage of intracranial hematomas, it is advisable to have a maxillofacial surgeon present during the work of a neurosurgeon to assess existing damage to the facial skull and provide specialized assistance. The neurosurgeon, if possible, chooses an approach in such a way that it would be possible to fully reposition the bones of the facial skeleton.

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Penetrating injuries of the eyeball are paramount of all craniofacial injuries requiring surgical treatment, with the exception of those that are life threatening. It is justified to postpone assistance for damage to the eyeball only if the patient is transported to a specialized center where this assistance will be provided at a higher professional level, that is, to the ophthalmological department of hospitals.

All currently described methods for the treatment of fractures of the zygomatic bone, zygomatic-orbital and zygomatic-maxillary complexes can be divided into methods of closed and open reposition.

Fractures of the zygomatic bone without displacement do not require surgical treatment.

When repositioning fractures of the zygomatic bone, zygomatic-orbital and zygomatic-maxillary complexes, the standard is general anesthesia. There are methods for treating fractures using local anesthesia during not only closed reposition of the zygomatic arch, but also closed or open reposition of the zygomatic bone. Performing conduction anesthesia in the region of the maxillary nerve on the side of injury in combination with local infiltration anesthesia in the areas along the course of reposition and fixation gives numbness for 90–120 minutes when using a 1% solution of lidocaine with the addition of adrenaline at a dilution of 1: 80,000, and also provides satisfactory pain relief for patients. When assessing the stability of the patient's condition, there are high risks for general anesthesia, or anesthesia. The use of local anesthesia for anesthesia in these cases is an appropriate alternative, provided rapid reduction and fixation.

When performing closed reposition, a number of authors point to the desire to fix bone fragments in a stable position without osteosynthesis using mini- or microplate systems.

The currently widely used method of repositioning the zygomatic bone through a point incision in the cheek area was proposed by L. Stromeyer (L. Stromeyer, 1844). Although the method of closed reposition has a sufficient number of disadvantages and does not allow rigid fixation of the zygomatic th bone after reposition, it is very common. The use of hook reponators, such as the Limberg hook, for repositioning is a simple and inexpensive method of treatment, especially in patients with isolated zygomatic fractures.

An alternative to this method is closed reposition using the 3D-CR method (A. V. Glinnik, O. M. Pavlov).

The 3D-CR method offers a significant advantage in positioning the zygomatic bone, but at the same time it requires a longer surgical intervention and, therefore, endotracheal anesthesia. For Limberg hook reposition, intravenous anesthesia is sufficient due to the shorter operation time.

For questionable fractures of the zygomatic bone, which may require open reduction, it is advisable to start the reduction using the 3D-CR method, since the patient will initially be under endotracheal anesthesia. The development and implementation in clinical practice of the 3D-CR method was associated with the

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limitation of the possibility of accurate reposition of the body of the zygomatic bone using the traditional closed reposition technique using the Limberg hook.

Closed reposition of the zygomatic bone using the Limberg hook does not provide rigid fixation of the instrument bend inside the bone structures, which leads to a displacement of the hook bend relative to the original place of application during closed reposition, impairs tactile sensations when controlling the position of the Limberg hook during reposition, does not provide the possibility of precise changes the position of the body of the zygomatic bone in space does not provide the possibility of accurately changing the angle of rotation of the body of the zygomatic bone.

Some authors suggest manufacturing a device from a Kirschner wire for fixation, which is a U-shaped bracket with two intraosseous elements and a correcting loop made on the crossbar of the bracket.

The use of wires for fixing bone fragments, although relatively simple to perform, does not provide the necessary degree of visualization for fractures of the zygomatic bone before fixation. The disadvantages of this method are that closed reposition is carried out without visualization of fracture lines, but only due to palpation determination of the boundaries of restoration of the bone contour, and fixation with a pin is carried out according to the same anatomical landmarks, which, in case of incomplete closed reposition or errors during its implementation, can lead to incorrect fixation.

A number of authors propose to improve the fixation of bone fragments after reposition by using techniques for fixing the zygomatic bone using self-produced spacers along the zygomatic-alveolar crest or zygomatic-frontal suture. The proposed method does not require complex devices, but at the same time, it does not eliminate the possibility of rotational displacements of the zygomatic bone and zygomatic-orbital complex, which can lead to secondary postoperative deformities. The method of fixation for fractures of the zygomatic bone, zygomatic-orbital and zygomatic-maxillary complexes using spacers cannot be called universal.

Interposition of soft tissues in the area of fracture lines, comminuted fractures, unstable fractures make closed reduction untenable and require open reduction. Some authors note that they abandoned the methods of closed reposition for fractures of the zygomatic complex due to unsatisfactory aesthetic results. Also, with closed reposition, it is not always possible to restore the volume of the orbit, which can lead to unsatisfactory aesthetic and functional results. Restoration of the previous volume of the orbit is an important criterion for assessing the quality of reposition and prevents the development of enophthalmos after surgical treatment.

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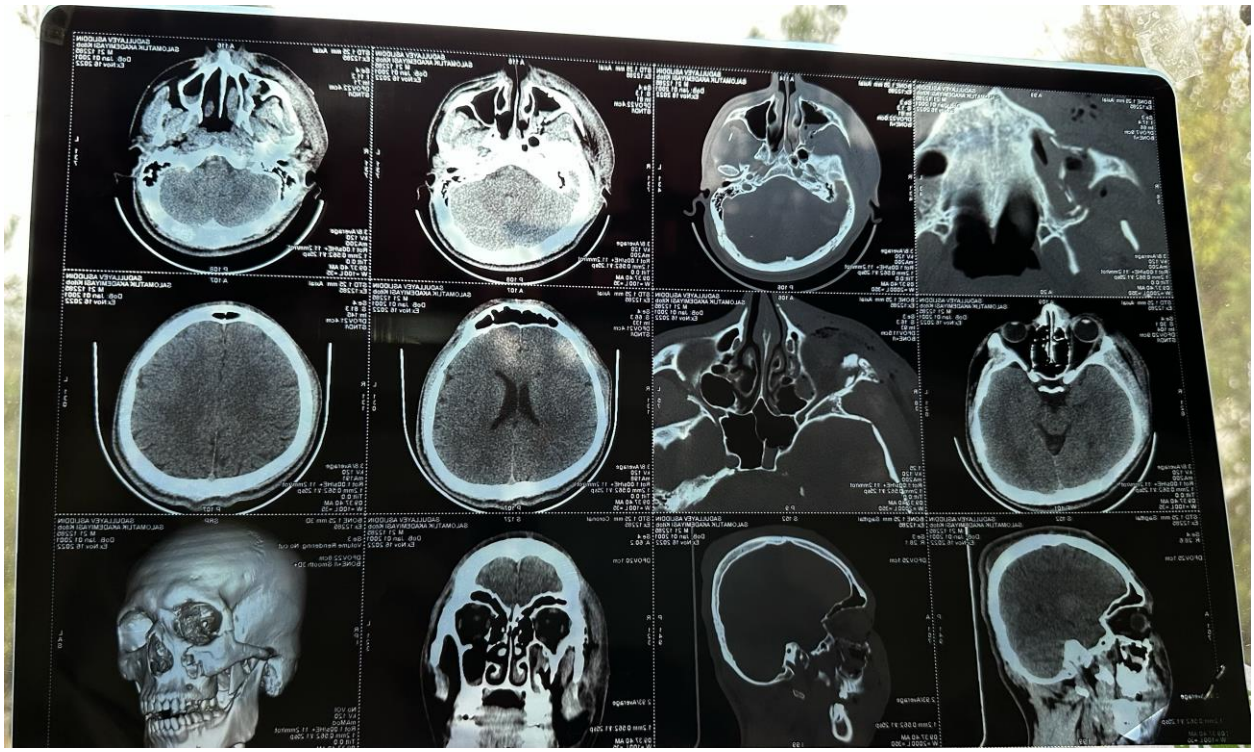

Until recently, open reposition of the zygomatic bone and zygomatic-orbital complex was combined with tight tamponade of the maxillary sinus to hold bone fragments in an anatomically correct position. The use of this method has indications and is often used for small comminuted fractures. This method of treatment can lead to the development of infectious and inflammatory complications, secondary displacement of bone fragments during the formation and formation of scars, impaired ventilation of the maxillary sinus, lack of accurate comparison of bone fragments and, as a result, postoperative deformities. Fixation of bone fragments with an iodoform tampon is not rigid, the tampon tends to increase in size when soaked in blood, which leads to a change in the position of bone fragments, a decrease in the size of the orbital volume, which, in turn, leads to exophthalmos.

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A universal and convenient method of fixation of fractures is the method of rigid fixation using mini-plates.

A feature of the treatment of fractures of the zygomatic bone, zygomatic-orbital and zygomatic-maxillary complexes is that the fixation of the bones must be carried out along buttresses.

The use of mini- or microplates for fixation of fractures excludes rotational displacement of boneohms relative to each other during fixation. When fixing with a wire suture at 2 points, rotation in the zygomatic arch can be observed, which does not happen when fixing with a mini-plate system. When planning the types and methods of surgical approaches, different authors do not have unified approaches in terms of the number of necessary fixation points.

Carrying out intraoral reposition of the zygomatic bone, even as an initial method, reduces the quality of the primary reposition, since it is well known that the zygomatic bone is usually displaced downward, inward, backward, and for correct positioning, the traction forces must be directed in the opposite direction along the axis of displacement. The use of intraoral access for primary positioning often does not make it possible to provide traction of the body of the zygomatic bone along the axis of displacement.

In case of a fracture of the zygomatic-orbital complex, it is preferable to use both a lateral maxillary buttress with fixation points along the zygomatic-alveolar ridge and zygomatic-frontal suture, and a combination of a lateral maxillary buttress with an upper transverse buttress with 3-point fixation along the zygomatic-alveolar crest, zygomatic-frontal suture and zygomatic arch or lower edge of the orbit.

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