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IMPROVING THE COMPREHENSIVE TREATMENT OF PATIENTS WITH DISEASES OF THE LOWER JAW

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Abstract: The problem of injuries is going to be one of the most important medical, as well as social, which, due to intense urbanization, an increase in the number of vehicles, the pace and rhythm of life, tend to constantly increase [10].

Keywords: In all countries, in accordance with the frequency as well as the severity of injuries, the growing number of injury cases suggests that the threat of injury is increasing from day to day [9].

Introduction

The problem of injuries is going to be one of the most important medical, as well as social, which, due to intense urbanization, an increase in the number of vehicles, the pace and rhythm of life, tend to constantly increase [10]. In all countries, in accordance with the frequency as well as the severity of injuries, the growing number of injury cases suggests that the threat of injury is increasing from day to day [9]. The number of maxillofacial injuries among the total number of bone injuries ranges from 3.2 to 3.8 % [11]. In the first place in the frequency of occurrence among injuries of the maxillofacial region are fractures of the jaws [14]. The most common fractures of the lower jaw. Special emphasis should be placed on the problematic treatment of fractures of the lower jaw. Domestic and foreign clinicians have developed and implemented many methods of treatment [5]. This is due to an increase in injuries among the population. In 15% of cases, complications develop due to incorrectly selected treatment [13], the frequency of which continues to be high (9-40%), which significantly complicates treatment, the main task of which is to create optimal conditions for the biological law of osteoreparation. Since the bulk of the victims are men aged 20 to 45 years (that is, the most able-bodied part of the population), treatment issues are of social importance [4, 6, 27]. In this regard, it is necessary to note the importance of the requirements for rehabilitation, including anatomical reposition of fragments, their stable fixation for the entire period of fusion, early radical surgical treatment of a bone wound, early restoration of physiological blood supply to tissues, restoration of the functional load of the damaged bone [39].

Most specialists recommend osteosynthesis for fractures of the lower jaw with dislocation of fragments. This type of surgical treatment should be preferred to orthopedic methods of fixation of fragments in order to prevent the occurrence of negative consequences associated with their use, which include traumatic periodontitis, disorders of the temporomandibular joints, slowing consolidation, etc., including long periods of disability. In order to achieve the most optimal therapeutic effect when choosing osteosynthesis as a permanent immobilization of bone fragments, the following conditions must be met: firstly, ensuring reliable fixation of bone fragments, since unstable synthesis lengthens the rehabilitation period, leads to non–

fusion, the formation of false joints, suppuration of bone wounds and the resulting complications, improper consolidation, dysfunction of the temporomandibular joints, deformities of the face and dentition, etc.; secondly, the choice of structures that do not corrode in the body, which will not create conditions for the need for their subsequent removal, do not violate the contours of the face, do not require significant traumatic tissue damage and time spent in the process of their use. At the present stage of medical development, many methods of osteosynthesis have been developed that are used in practical maxillofacial surgery, such as bone suture synthesis with wire, Kirschner spokes, various variants of intramedullary synthesis, the use of bone frames with screws, extra-focal devices, etc. [7, 25, 26].

All of the above surgical methods either have low efficiency or are very traumatic, in addition, devices for extrafocal osteosynthesis contain bulky structures, which in addition to high traumatism causes significant

inconvenience to patients. In addition, due to the use of structures made of metal alloys that do not have biocompatibility (stainless steels, titanium, tantalum, cobalt-chromium-molybdenum, cobalt-chromium-vanadium- nickel, titanium-aluminum-vanadium, etc.), only rigid fixation is possible, negative aspects related to biocompatibility problems develop. Most of the maxillofacial surgeons in osteosynthesis use bone titanium perforated plates with screw fasteners or synthesis titanium screws [3, 16, 26, 31, 28, 40; 30]. The method of their application is traumatic, since it requires the application of a large number of milling holes and, in accordance with this, the skeletonization of fragments or fragments, the use of self-tapping screws, the heads of which often fall apart when screwed and unscrewed, is associated with large time costs. Titanium mini-plates often erupt into the oral cavity, self-tapping screws migrate into the thickness of surrounding tissues, often in the immediate postoperative period, the phenomena of destruction of bone tissue in the screw fixation zone are radiologically observed, and in persons with porous bones, the effectiveness of this type of osteosynthesis becomes unsatisfactory. In addition, titanium implants in the tissues of the body are corroded due to damage to the oxide layer due to the difference in the behavior of biological tissues and titanium with functional (alternating more than 0.2%) deformation, which leads to the chemical interaction of titanium with the oxygen of the tissue fluid and the release of titanium ions into the surrounding tissues, followed by the formation of titanium oxide. At the same time, these fabrics acquire a metallic color, which many experts call "metallosis". This term does not reflect the essence of the described phenomena and is not scientific, since "metallosis" is characterized by intoxication of the body, accompanied by weakness, increased fatigue, sleep disorders, chronic bronchitis, often with bronchospasm phenomena, the development of respiratory failure, myocardial hypoxia. Locally, inflammatory and destructive changes in the perceiving tissues develop, requiring the removal of implantable structures, excision of altered tissue structures and other interventions leading to tissue defects. The application of titanium nitride and other coatings on titanium and stainless steels does not save from the above-described phenomena, since they do not improve the elastic properties of these materials. Most Russian and foreign experts, considering titanium to be exclusively biologically inert, believe that mini-plates and screws made from it do not require subsequent removal from the body. However, the French scientist M. Champi, being one of the founders of this method, back in 1993 at the 2nd Mediterranean Congress showed titanium mini-plates with corrosion phenomena used in practical maxillofacial surgery and unequivocally expressed his position for their removal even in the

absence of clinical manifestations of incompatibility [29]. M.B. Shvyrkov et al. found signs of corrosion of titanium mini- plates removed from tissues. (1999) [26, 23].

Considering the above, it follows that in order to exclude the development of complications, it is necessary to develop extremely individualized methods of treating fractures of the lower jaw. It is known that an unsuccessfully chosen method of fixing bone fragments increases the period of treatment and rehabilitation, leads to unjustified economic losses [12].

The aim is to identify the positive and negative sides of various types of surgical and conservative methods of treatment of traumatic injuries of the lower jaw based on a detailed analysis of data published in domestic and foreign literary sources.

Russian specialists headed by Yu.V. Efimov, MD, Professor of the Department of Surgical Dentistry and Maxillofacial Surgery of Volgograd State Medical University, optimized the method of osteosynthesis of fragments of the mandible with a wire suture in its unilateral oblique fracture. 69 victims were treated, divided into two groups: a comparison group of 34 (49.28%) patients and the main group, which included 35 (50.72%) patients. Informed consent to their participation in the study was obtained from all patients diagnosed with unilateral oblique fracture of the angle of the lower jaw without concomitant diseases.

Patients of both groups underwent jaw splinting with extraction of a tooth located on the fracture line. For the purpose of anatomical reposition and stable fixation of bone fragments in the comparison group, osteosynthesis was carried out with a titanium mini-plate superimposed on the base of the jaw. The surgical component of the complex treatment of patients of the main group consisted in applying a wire suture according to the method developed by the authors, patented under No. 2565818 dated 09/23/2015. After anesthesia, skeletonization of the zone of violation of the integrity of the mandibular bone was performed by external access and the interposition of soft tissues was eliminated. The next stage was the formation of a platform up to 0.1 cm deep in the spongy layer of the medial fragment along the entire plane of the fracture, while the intact layer of compact bone acted as a stop for the distal fragment, which, after repositioning the fragments, was placed on the site and fixed with one of the bone suture options, after which the wound was sutured in layers. The analysis of the treatment results was carried out on the 7th, 14th and 21st days after surgery.

Upon admission of the injured to the hospital, the mineral saturation index of the intact bone was 158.32 ±

2.19 cu, the ends of the fragments were 87.27 ± 2.17 CU, while the variation of both indicators was weak. The resorption index was 44.88±2.21%. On the 21st day after surgery, 7 out of 34 patients in the comparison group had minor persistent aching pains in the lower jaw area on the side of osteosynthesis. The radiographs showed an increase in the discrepancy between the bone fragments. The fracture gap has retained intense transparency. It was noted that the areas of marginal osteoporosis merged into a single focus, with the formation of the boundaries of a bone defect, along the upper edge of which the presence of sequesters was detected. In patients of the main group, there was a reduction in the width of the fracture gap, a marked decrease in its transparency and the appearance of areas with a bone pattern. The indicator of mineral saturation of patients in the comparison group (59.27 ± 1.69 cu) stabilized at the level of the indicator of 14 days of follow-up (58.37 ± 1.75 CU; $p>0.05$). At the same time, its variability was strong (Cv=32.87%). The decrease in the resorption index (62.56±1.82%) relative to the same indicator of the previous observation stage (63.29± 1.55%) was not significant ($p>0.05$). The data obtained indicated the development of traumatic osteomyelitis in these patients.

Based on the results of the study, it was revealed that in patients of the comparison group, already on the 7th day of the postoperative period, there was an increase in the difference in the density of the fracture gap and the initial index, which increased by the 21st day of observation, as well as an increase in the resorption index. As for the patients of the main group, on the contrary, by the 7th day after osteosynthesis, there was an alignment of mineral saturation indicators and a decrease in the resorption index. It can be concluded that with a decrease in the stability of fragments, which was noted in patients of the first group (comparison group), metabolic processes in the damaged bone proceed according to the mucopolysaccharide type. Conversely, with sufficient stability of fragments achieved in patients of the main group, an oxybiotic type of metabolic processes in bone tissue is observed.

For the purpose of osteosynthesis of the mandible, Doctor of Medical Sciences A.A. Radkevich and co- authors used fixing structures made of TN-10 alloy based on titanium nickelide with shape memory effect. These structures, developed at the Tomsk Research Institute of Medical Materials and Implants, have such valuable properties as an optimal combination of specific gravity, strength and plasticity, wear and cycle resistance, corrosion resistance and significant fatigue resistance. Titanium nickelide is characterized by the presence of biochemical and biomechanical compatibility with body tissues, which is ensured not only by its chemical inertia to biological fluids, but also by the ability to deform and restore its original shape under load and unloading conditions. In this regard, the harmonious interaction of titanium nickelide-based implants with various tissues and organs in the process of their functioning has been established. For their manufacture, a wire with a diameter of 0.8–2 mm is used, from which legs are formed, immersed in the thickness of the bone, and the middle part connecting them with the presence or absence of bends. The effect of shape memory of these structures during osteosynthesis is that under certain conditions (cooling), such a structure can change the previously set shape and restore it when heated to the patient's body temperature, which allows you to create shape conditions convenient for insertion into body tissues.

In case of violation of the integrity of the mandibular bone in the body area within the dentition, surgical treatment is recommended to be performed by intraoral access, which is advisable both for aesthetic reasons and also because these injuries are usually open (i.e. communicating with the oral cavity). Such operative access can also be used in many cases of angular fractures and injuries localized in the branch area by additional dissection of the tissues of the retromolar region and in the projection of the anterior edge of the jaw branch.

The method of osteosynthesis consists in cutting out an arched muco-periosteal flap above the transitional fold or trapezoidal shape in the projection of the fracture, with an indentation in the distal and medial directions for a length equal to the width of the crown part of 2 or 2.5 adjacent teeth (in their absence by an amount commensurate with them). If there are indications, teeth are extracted with the localization of the roots in the fracture line. On each side of the fracture, the outer compact surface of the lower jaw is released from soft-tissue structures up to its base. After reposition, retreating from the edge of the fragments by 0.5 – 1.5 cm, through milling holes are applied perpendicular to the plane of the fracture, one, two or more on each side with a diameter 0.2–0.3 mm larger than the diameter of the foot of the fixing devices, taking into account the topography of the roots of the teeth, the mandibular canal and other anatomical structures. A titanium nickelide bracket, pre-cooled to + 3 ° C or lower in the refrigerant, having a size of the middle third smaller than the distance between the milling holes by 2-5 mm, is given the desired shape with further complete immersion of

its legs inside the previously applied milling holes. With contact heating up to +35 ° C, the fixing element, thanks to the shape memory effect, restores the original shape, thereby fixing bone fragments. In case of violations of the contours of the lower jaw due to bends in the middle part of the brace, it is

advisable to create a milling notch that promotes its immersion in the thickness of the compact layer. After reaching the planned outcome of the operation, drainage and suturing of the wound are performed. As for fractures of the jaw branch, including its articular process, the most technically convenient is an extraoral access from the post-maxillary or anterior region. To achieve an effective result, the fixation of bone fragments can be carried out in several designs.

Osteosynthesis of traumatic injuries of the lower jaw of various nature and localization by means of titanium nickelide structures with shape memory effect was carried out in more than 2000 patients, persons of both sexes, whose age range ranged from 13 to 80 years. Evaluation of the results of therapeutic measures was carried out in the immediate postoperative period and in the long term during the next 1-5 years after surgical treatment. With this method of osteosynthesis, satisfactory treatment results were obtained in 1910 (95.5%) patients, without signs of any complications. In the long term, there were no functional disorders on the part of the dental apparatus, the cause of which could be performed operations. The data of the X-ray examination of patients in this group indicated a satisfactory position of bone fragments without pathological slit defects between them. 21 days after osteosynthesis, there was a gradual violation of the clarity of the shadows of the fracture lines, which by 45-60 days was determined as an increased intensity of darkening, which indicated the formation of a callus. There was no migration of fixing elements. In a later period (6-60 months), destructive changes in the area of contact of structures with bone tissues and such phenomena as loss of bone tissue, with the exception of the alveolar part in the areas of removed teeth, were not observed. Of the 90 patients with a complicated course of the postoperative period, suppuration of the bone wound occurred in 43 cases, in 20 – complications in the form of traumatic osteomyelitis, which is associated with late treatment and / or suppression of reparative function, 27 patients had delayed consolidation, mainly in older and elderly people, as a result of trophic disorders. These situations required appropriate therapy and, in patients with traumatic osteomyelitis, repeated surgical intervention.

Thus, the use of titanium nickelide structures with shape memory in the surgical treatment of fractures of the mandibular bone contributes to the achievement of maximum clinical and radiological results of osteosynthesis. The advantages of this method include ease of use, low trauma, ensuring stable elastic fixation of any fracture variants, cost-effectiveness in the temporal aspect, the absence of long-term immobilization of the mandible, the possibility of unhindered early functional load, contributing to the rapid fusion of bone fragments. Due to such a property of titanium nickelide as biocompatibility with body tissues, the fixing elements used for osteosynthesis are characterized by the absence of negative effects on bone and soft tissues, do not require repeated operations to remove them.

Professor A.I. Khasanov (Tashkent State Dental Institute) and specialists of the Andijan State Medical Institute (A.A. Khakimov, D.M. Abobakirov) developed their own method of operative access and expanded indications for intraoral osteosynthesis of mandibular fractures.

In the generally accepted protocols for the treatment of traumatic injuries of the mandible, osteosynthesis by intraoral access is recommended for fractures without displacement or with

a slight displacement of bone fragments. At the same time, in order to place the fixing plates of the screws on the base of the jaw during its immobilization, it is possible to make additional incisions through extra-oral access. In cases of ruptures of the oral mucosa, they can be used to form access to bone tissue, in their absence, this can be achieved by performing linear incisions along the transitional fold of the lower jaw.

The victims with fractures of the mandibular bone of various localization, the number of 89 patients who applied to the Andijan branch of the Republican Scientific Center for Emergency Medical Care and to the private clinic "Soglom Avlod", underwent surgical treatment. 65 patients underwent osteosynthesis with titanium mini-plates by intraoral access, with no splinting of the jaws. The remaining 24 patients with the presence of high fractures of the condylar process (the head of the mandible and the neck of the articular process) underwent a surgical method of fixation of bone fragments with titanium mini-plates by extra-oral access, with the imposition of bimaxillary fixation for a period of 7 days.

Analysis of the treatment results showed that osteosynthesis by intraoral access can be used for fractures of the mandible, regardless of the degree of displacement of bone fragments. Among the positive aspects of osteosynthesis by the intraoral method, the following are noted: due to the absence of visible scars on the skin, this method of surgical treatment does not violate the aesthetics of the face, which ensures optimal cosmetic effect; low trauma in relation to surrounding tissues and rapid restoration of the function of the lower jaw, since the integrity of the masticatory and pterygoid muscles is preserved and damage to the facial nerve is excluded. With intraoral osteosynthesis, there is a minimization of clinical manifestations that cause an imbalance in the psychological sphere

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