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DEVELOPMENT AND IMPLEMENTATION OF COMPREHENSIVE TREATMENT AND REHABILITATION APPROACHES FOR PAIN DYSFUNCTION OF THE CROP IN PATIENTS WITH JAW FRACTURES

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Annotation. The work presents a study aimed at improving the effectiveness of treatment for temporomandibular joint pain disorder (TMJ) in patients with mandibular fractures. The relevance of the topic is due to the high prevalence of injuries to the maxillofacial region and the significant percentage of post-traumatic functional disorders of the maxillofacial region, leading to pain syndrome, limitation of mandibular movement, and a decrease in the quality of life of patients.

Keywords: pain syndrome, temporomandibular joint, CNS dysfunction, mandibular fractures, post-traumatic disorders, rehabilitation.

Relevance of the work. The pathology of the temporomandibular joint (TMJ) is still insufficiently studied and a frequently encountered problem in modern dentistry. Medical literature presents various figures on the prevalence of WCFS diseases among the working-age population from 20% to 80%. Among mandibular injuries, fractures of the maxillary process of the mandible (MONCH) occupy a special place, which are often combined with trauma to the temporomandibular joint (TMJ). Numerous publications on temporomandibular joint pain dysfunction are dedicated to the etiology, pathogenesis, morphology, clinical presentation, diagnosis, and treatment of this multifactorial disease. In isolated studies, the long-term consequences of

mandibular fractures have been reflected as a possible cause of temporomandibular joint pain disorder.

Globally, in recent years, fractures of the mandible account for 13 to 37% of injuries to the temporomandibular joint, while fractures of the temporomandibular joint account for 24 to 32% of cases, and despite modern diagnostic methods, fractures of the maxillary process and temporomandibular joint in 17% of cases are not recognized in a timely manner, which often leads to complications such as arthrosis, ankylosis, occlusion disorders, and impaired mandibular function (Gutwald R., Schramm A., 2012). In this regard, the number of patients with temporomandibular joint pain disorder syndrome (TMDS) has increased among the adult population of developed countries: from 21.1% to 99%. (Ronkin K.Z., 2019). These functional disorders lead to neuromuscular system overstrain, which in turn can lead to disharmony in the stomatognathic system (Tikhonov V.E. et al., 2021).

In our country, despite certain achievements, the problem of treating injuries to the condyloid process of the maxillofacial region remains one of the most complex in maxillofacial traumatology to this day. In the problem of surgical treatment of the mandible, an important place is given to the development of new technologies that are characterized by low invasiveness, high physiological and cosmetic properties, to which, first of all, endosurgical methods should be attributed. All this determines the need to develop new, more effective methods that ensure an interdisciplinary approach to diagnosis and treatment, which is necessary for achieving a stable result. Our research is devoted to the solution of this issue.

Fractures of the mandible occupy one of the leading places among injuries of the maxillofacial region and are often accompanied by damage to the structures of the temporomandibular joint (TMJ). Even with successful surgical treatment of fractures, there remains a high risk of joint pain dysfunction forming, manifested by persistent pain syndrome, occlusion disorders, limited mouth opening amplitude, and decreased chewing efficiency. Post-traumatic disorders of the CNS significantly worsen the quality of life of patients, slow the recovery period, and can lead to chronic myofascial pain syndromes.

Modern treatment protocols for mandibular fractures do not adequately address the early prevention and correction of post-traumatic CNS disorders. However, data on the comparative effectiveness of such programs in patients with mandibular fractures remain limited, which requires targeted clinical studies.

Thus, the development and implementation of a comprehensive therapeutic and rehabilitation approach to the treatment of pain disorders in patients with mandibular fractures is a pressing task of modern dentistry and maxillofacial surgery, which has important clinical and social significance.

The purpose of the study is to develop and implement a comprehensive therapeutic and rehabilitation approach, including modern diagnostic methods, therapeutic and physiotherapeutic measures aimed at reducing pain, restoring joint function, and preventing the formation of chronic CHFD**.**

Materials and methods of research. The study included ___ patients who received treatment for mandibular fractures and had signs of temporomandibular joint pain disorder. Patients were divided into two groups: the main, in which the developed complex of therapeutic and rehabilitation measures was applied, and the control, receiving standard treatment according to current clinical recommendations.

Inclusion criteria: presence of a clinically and radiologically confirmed fracture of the lower jaw; development of painful dysfunction of the temporomandibular system; age from 18 to 60 years; absence of severe concomitant somatic pathology.

Exclusion criteria: multiple combined injuries, pronounced psycho-emotional disorders, acute inflammatory processes of the CNS, refusal to participate in the study.

Diagnostic methods:

- clinical examination (assessment of pain on a visual-analog scale, measurement of the mouth opening amplitude, determination of occlusion disorders);
- Palpation of the chewing muscles and assessment of muscle tone;
- Orthopantomography and CLCT for analyzing the condition of joint structures;
- Functional diagnostics of the temporomandibular system (registration of mandibular movements, analysis of the mouth opening trajectory);
- Electromyography of the masticatory muscles to assess functional activity.

The treatment and rehabilitation program implemented in the main group included:

- surgical stabilization of the mandibular fracture using standard methods;
- Early functional joint load with dosed exercises;
- muscle relaxation techniques and therapeutic gymnastics;
- physiotherapeutic methods (ultrasound, laser therapy, magnetotherapy - according to indications);
- use of individual occlusion buses or caps in case of occlusion disorders;

Figure 1 Photographs of the patient's face when measuring the size of the mouth opening.

Research results. The most frequent cause of patient appeals was pain and difficulty opening the mouth, which was recorded in 89.71% of the main group and 80.22% of the control group. External examination of both groups revealed collateral edema of the soft tissues of the affected area in 90.4% of patients in the main group and 90.1% in the control group. The symptom of musculoskeletal dysfunction of the CNS was detected in 97.3% of observations in both groups. In the examined patients, defects of the lateral surfaces of the dental rows and signs of TMJ dysfunction prevailed. All patients in the studied groups experienced unpleasant sensations when palpating the PCOS area, in 3.13% - pain sensations, however, 97.50% of patients experienced pain when palpating the PCOS area, 90.63% of patients experienced pain when palpating the chewing muscles.

When the chin was pressed, the manifestation of pain in the fracture area was noted. On the fracture side, 87.3% of patients experienced a sharp limitation in the volume of joint head movements, up to their complete absence. When assessing the movement of the mandibular joint heads, their asynchronous movement and noise phenomena (noise, crackling, crepitation, etc.) were noted. In 87.5% of patients, there was a limitation in the volume of lower jaw movements in different planes, a deviation from the midline greater than 2 mm when opening the mouth.

Table 2 shows the relationship between the position of the condyle segment fractures according to CT research data.

Table 2

Comparison of the position of the articular segment according to radiological examination data

Research data	Patient number	Patient number	In the pit				Normal
			Before	Before upper+lower	upper+ lower	Low er	
Dislocation	18	18					
Movement	10	5			3		2
Lateral shift	11		1		4	6	
Contralateral	21	1		1		11	8

Note: % of the total number of fractures or contralateral joints, $p<0.01$ (statistically significant for the segmental position according to CT data and the type of fracture of the chi-square criterion)

Using a CT scan of the patient's skull with subsequent reconstruction of its three-dimensional image in the Radi Ant program, an assessment of the anatomical and topographical characteristics of the structures of the mandibular branch and their location relative to the fracture line was conducted.

To determine the linear parameters of the anatomical and topographic structures of the mandible, we selected the following parameters:

1. Distance from the most lateral point of the molar head (Co) to the middle of the mandibular notch, mm (Fig. 3A).

2. Distance from the most lateral point of the molar head (Co) to the lower point of the mandibular angle Go, mm (Figure 3B)

3. Distance from the middle of the mandibular notch to the posterior point of the base of the head of the maxillary process AC, mm (Fig. 3C).

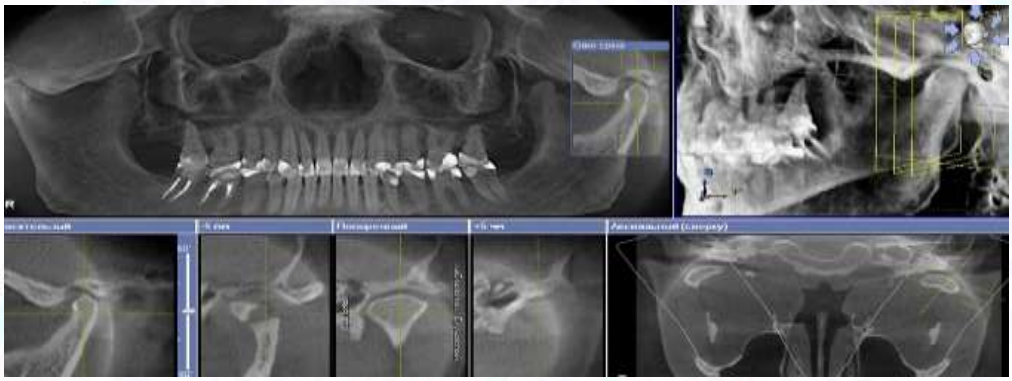

Figure 3 B - Schematic distance from the lateral point of the molar head (Co) to the lower point of the mandibular angle Go, mm.

Surgical intervention was performed under strict indications, depending on the established diagnosis, under endotracheal anesthesia. Surgical treatment consisted of MO replantation with osteotomy of the mandibular branch and metal-osteosynthesis (MOS) with various fixatives. In 7 observations, bilateral replantation was performed with subcondylar osteotomy and metalloosteosynthesis in the region of the condyle processes. As a result of the conducted research, recommendations were developed for improving the treatment of temporomandibular joint pain disorders in high fractures of the maxillary process of the mandible.

The obtained data allowed us to conclude that the chewing time in the main group during the early and long-term period of the study was significantly lower than in the control group, which made it possible to prove the effectiveness of using endoscopic technologies for intraoral osteosynthesis in fractures of the articular process, as well as faster and more effective restoration of chewing muscle groups in the shortest postoperative period. In patients of the main group, the length of stay in the hospital was 17.4±3.8 days, and the period of temporary disability was 26.5±3.9

days. In patients of the control group, an increase in the period of inpatient treatment and loss of work capacity was recorded, which amounted to 24.6±2.8 and 32.3±4.8 days, respectively, while in the control group, the duration of inpatient observation was 41.31%, and the period of loss of work capacity was 21.92% less than in the main group.

Thus, the results of the conducted studies indicate that the clinical and functional indicators of the temporomandibular joint condition, reduction in rehabilitation duration, its qualitative indicators, reduction in pain sensations, and improvement in the quality of life of patients performed using endoscopic technologies due to reduced trauma and rapid restoration of chewing muscles. The obtained data confirm that the proposed and tested method is an effective treatment method, and ultrasound and EMG studies are informative and should be used by dentists and maxillofacial surgeons at all stages of treating patients with mandibular injuries with high fractures of the maxillary process.

Conclusions. Features of the clinical course of musculoskeletal disorders in patients with high fractures of the maxillary process of the mandible are characterized by the initial progression of pain syndrome, impaired occlusion, which depended on the duration of the injury, the presence of pre-traumatic chronic diseases of the temporomandibular joint, as well as the location of the fracture and the proximity of the fracture line to the joint.

When determining morphometric indicators, taking into account the anatomical and topographical characteristics of the temporomandibular joint in patients with mandibular articular fractures, the average values from the lateral point of the articular head (Co) to the lower point of the mandibular angle Go and the distance from the most lateral point of the articular head (Co) to the mandibular lingual (lingula) are statistically significant.

Emotional and personal disorders in patients with temporomandibular joint pain disorder syndrome in connective tissue dysplasia are obligatory and have their own characteristics: a high level of reactive and personal anxiety, a high level of depression, and reduced quality of life indicators. The developed recommendations for improving the treatment of temporomandibular joint pain disorders have pathogenetic orientation and are more effective compared to generally accepted traditional treatment methods.

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