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# Optimal Options for Diagnosing the Temporomandibular Joint Irin Pathological Occlusion

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**Annotation:** The article presents the results of studying the features of the biomechanics of the lower jaw in patients suffering from pain syndrome of dysfunction of the temporomandibular joint. The improvement of the efficiency of diagnostics and differentiation of the non-articular nature of the pathology of patients with BSD TMJ is presented.

**Keywords:** biomechanics of the mandible, temporomandibular joint, dysfunction, dysfunction pain syndrome.

## INTRODUCTION

Diseases of the temporomandibular joint (TMJ) are one of the most pressing problems of modern dentistry. This is due, on the one hand, to the frequency of occurrence of TMJ pathology [6,11], and on the other hand, the complexity of diagnosis [4].

The largest group of patients with TMJ lesions are patients with internal disorders, which are

defined as a violation of the anatomical and functional relationships between the components of the joint and account for more than 80% of patients with this pathology at a specialized appointment [10]. In addition to these factors, in the etiology and pathogenesis of pain syndromes of dysfunction (PSD) of the TMJ, both occlusal disorders with pathological processes in the TMJ and masticatory muscles, and psychoemotional disorders are important [1,9,11].

The starting factors of the pathological process in the joint can be different: extraction of teeth and their prosthetics, unusual movement of the lower limb or too wide opening of the mouth when eating, yawning and treating teeth. In this case, some intra-articular ligaments that fix the articular disc are stretched; at the same time, patients complain of pain in the area of the joint, ear, temple, headaches, limited range jaw mobility, clicking, crunching or "locking " feeling of stiffness of the area [2,14]. Often established in the development of BSD TMJ, a decrease in the height of the lower third of the face due to pathological abrasion of teeth, pathological types of occlusion, etc., play an important role in psychological factors of organisms [12,13,14,16].

Modern medicine for the diagnosis of disorders of the soft tissue elements of the joint is carried out using magnetic resonance imaging (MRI), but this method does not always 100% reflect the state and position of the articular disc [15,17,18]. Visualization of the articular disc of the TMJ is possible with the help of ultrasound (ultrasound), but the criteria for the normal position and movement of the disc during this study have not been developed, as well as the assessment of the condition of the disc in digital terms, there is no method for evaluating the effectiveness of the treatment using ultrasound. Publications on the combined use of MRI, ultrasound, R-graphy and functional diagnostic tests in domestic and foreign literature are rare.

Thus, with internal and external disorders of non-articular pathology of the TMJ, it is most difficult to diagnose patients with unreduced displacement of the articular disc, secondary osteoarthrosis and dysfunction of neuromuscular syndromes of a non-articular nature, therefore, the development of new methods for early diagnosis and differential pathology of an articular and non-articular nature in TMJ pathology is relevant.

**The purpose of the study** is to improve the efficiency of diagnosis and differentiation of the non-articular nature of the pathology of patients with BSD TMJ.

**Materials and methods:** To solve the set tasks, a survey was conducted of 167 patients with BSD of the TMJ who were registered at the dispensary or who applied for treatment to a specialist dentist, otorhinolaryngologist and neuropathologist in the departments of "Orthopedic Dentistry and Orthodontics", "Otorhinolaryngology" and "Neralogy" of the Bukhara State Medical Institute, which is located in the bases of the Bukhara Regional children's and adult multidisciplinary hospitals. The patients were diagnosed, according to the revealed decrease in the height of the lower third of the face, their number from the total examined was 90 people in the age groups of 40-45 years (16 patients), 46-50 years (25 patients), 51-55 years (42 patients), and 56-60 years old (patient 7); the mean age was 48.8±4.43 years; According to the sexes of the surveyed, they were women - 55 people (61%), men - 35 (38%).

Complaints from the displacement of the lower part of the face, aesthetically unsatisfactory condition of the lower part of the face, difficulty opening the mouth, frequent headaches, sensations of ear congestion, emotional lability, anxiety, bad mood, sleep disturbance. In addition, we distributed the surveyed by education; secondary education 25 people (27%), secondary special education 30 people (33%) and higher education 35 people (38%).

When examining patients, the somatic, psychological statuses were evaluated and the pathological process lasted an average of 2 years, and the patients were examined according to a certain scheme and began with the identification of complaints, the collection of anamnesis of life and anamnesis of the patient's disease, examination of the oral cavity and maxillofacial area, and others. [3]. To determine the state of occlusion in the children involved in the study, plaster models were taken, the cast was assessed

by the state of occlusion by generally accepted methods. The examined were divided into groups according to the type of occlusion and malocclusion in accordance with the classification of Persin L.S. and ICD-10.

R -th teeth was carried out on a dental apparatus and an orthopantomograph according to the generally accepted method in order to identify pathological processes in the hard tissues of the teeth, in the periodontium, in the periodontium, as well as to plan further orthopedic treatment, the choice of an orthopedic design.

In order to analyze the measurements of the articular elements and their ratios, tomography of the joints was performed at the maximum open mouth and in the position of central occlusion to establish the localization and extent of the pathological process in the TMJ and tissues surrounding the joint. And the intensity and nature of pain sensations were assessed on the basis of visual analogue scale (VAS) of pain (Puzin M.N. 1997) and pain questionnaire MPQ (McGill Pain Questionnaire) [16,17]. With the help of the pain questionnaire, MPQ was assessed; 1) total (in points) rank index of pain (RIB); 2) an indicator for each of the scales evaluating the sensory (RIBS), affective (RIBa) and evaluative (RIBe) components of pain perception; 3) the indicator of the number of distinguished descriptors on the sensory (PNDs), affective (PNDa) and evaluative (NVDE) scales. The values of the total rank index of pain can be in the range from 0 to 78 points (according to the RIBs scale - from 0 to 58, RIB - from 0 to 15, RIB - from 0 to 5 points), according to CVP - from 0 to 13, CVP - from 0 to 6, PVDe - from 0 to 1. At the same time, higher rates indicate a greater intensity of pain perception.

In order to study the peripheral innervation of the masticatory muscles, an electromyographic examination was carried out, with the help of which the total interfered EMG of the masticatory muscles was recorded from both sides. As a functional stress test, an imitation of a stress model was carried out with the determination of the duration of the latent period of the chin reflex. The studies were carried out on an M-400 electromyograph by Medikor and the total EMG was evaluated in accordance with the criteria developed by Yusevich Yu.S. (1958).

Clinical and psychopathological assessment of patients was carried out on the basis of the clinical scale (CS) [7]. The survey also included the following tests: the Abbreviated Multivariate Personality Questionnaire (SMAP), the Beck Depression Scale, the Spielberger Anxiety Scale, the Hostility Scale (SHS), and the Toronto Alexithymia Scale (TSA). The quality of life (QOL) of patients was assessed using the Nottingham Health Profile (NHP) scale.

Statistical analysis and data processing was carried out on the IBM PC using the SPSS 10.0 statistical software package.

**The results of the study and their discussion.**

According to the results of the psychoneurological study, it was shown that in the 40-45 flight groups the Beck Depression Scale was 4.6±0.09; personal anxiety - 2.1±0.16; reactive anxiety - 4.9±0.15; 46-50 flight groups - 4.2 + 0.07; 2.0+0.1; 4.2+0.2: -50-55 flight groups 3.8+0.12; 1.8+0.3; 3.5+0.42: - 4.2+0.07; 2.0+0.1; 4.2 + 0.2: - 56-60 flight groups; 3.2+0.02; 1.3+0.1; 3.1+0.2 respectively.

Analysis of changes in QoL indicators also revealed a significant deterioration (p ◎◎0.01), a greater decrease in the total NHP index than in the older group from 42.2 ◎◎◎.9 to 33.6 ◎◎◎.6 points.

Strengthening the intensity of pain or worsening of the condition in patients with BSD TMJ is observed in a direct dependence on the growth of age groups. Also, it was determined by an objective examination with BSD TMJ, which arose against the background of a decrease in the height of the lower third of the face, high neuropsychiatric stress and deterioration in QoL; The most modern and popular is the biopsychosocial model proposed by Dvorkin et al. (1992) and this concept takes into account that patients have to deal with a biological problem, a psychological problem and social factors.

The patients themselves, who took part in the study, speaking about the reasons for the development of BSD of the TMJ, called the performed prosthetics, malocclusion, sudden loss of a large number of chewing teeth, trauma to the maxillofacial area. Some patients even named such reasons as

frequently occurring inflammatory diseases of the periodontium and oral mucosa (OM), difficult extraction of chewing teeth (table 1). Other patients emphasized that the symptoms of the disease appeared after dental treatment, both orthopedic and therapeutic. Some patients, on the contrary, indicated that the symptoms of the disease began to manifest themselves as a result of untimely, for one reason or another, applying for dental care. It should be noted that none of the patients independently singled out psychological stress as a cause or initiating factor that contributed to the occurrence of TMJ BSD. The presence of chronic stress was detected already during the collection of an anamnesis of life or an anamnesis of the disease.

**Table number 1.**

**Causes with which patients associated the occurrence of TMJ pain dysfunction syndrome**

| Causes | If-o<br>patients (abs.) | % |
|---|---|---|
| Prosthetics | 33 | 36 |
| Bite anomalies | 7 | 0.7 |
| Loss of chewing teeth | Thirty | 33 |
| Trauma of the maxillofacial region | 3 | 3 |
| Traumatic extraction of chewing teeth | 6 | 7 |
| Inflammatory periodontal disease and oral mucosa | 7 | 7.3 |
| Dental therapeutic treatment | 4 | 4 |
| TOTAL: | 90 | 100 |

As can be seen from the table above, patients most often associated the occurrence of the disorder with the loss of chewing teeth and prosthetics.

During a dental examination of patients, the following were revealed: pathological abrasion of hard tissues of the teeth (80%), caries (90%), complicated caries (56%), inflammatory periodontal diseases (70.6%), periodontal disease (13%), diseases of oral mucosa (12 %), orthopedic structures that do not meet the requirements (62%), halitosis (46%), which indicates a certain role of local factors, as well as the fact that patients did not regularly seek dental care.

As already mentioned, when taking an anamnesis, a stress factor was identified in the vast majority of patients. Dissatisfaction with social conditions, as well as the appearance of the dentition, the lower part of the face leads to the fact that patients become irritable, anxious, unsure of themselves, in the success of further dental treatment. All this prevents the dentist from carrying out diagnostic and therapeutic measures. It is necessary to take into account the fact that the process of treating a decreasing bite is not limited to several visits to the dentist. Often the treatment lasts for months. Patients with a more labile mentality are more difficult to adapt to temporary orthopedic structures, removable prosthetics.

In order to form ideas about the role of psychological factors in the development of BSD TMJ, the structure of psychotraumatic situations preceding or accompanying the development of BSD TMJ was analyzed: Information about the presence of psychotraumatic situations that preceded or accompanied the development of BSD TMJ: a psychotraumatic situation in the family in 18; change in social status in 7; change in life stereotype in 3; chronic psychological trauma in 10; conflict relations in the family in 6; conflict situation at work for 19; lack of funds in 18; 9 people had problems with children. The obtained results show that most of the patients included in the study most often complained about the presence of some kind of chronic psycho-traumatic situation, which the patient had to put up with, despite the internal protest. The most commonly reported stress factors were material hardship, the threat of family breakdown, job dissatisfaction or the inability to find a decent job.

Thus, in most cases with BSD TMJ, combinations of various factors are recorded that complement each other, both dental and psychological.

When analyzing the clinical picture and pathological processes in patients with BSD TMJ - 75%, accompanied by a decrease in the height of the lower third of the face, patients complained of pain, crunching, clicking in the TMJ that appear at the beginning of opening the mouth, during lateral movements of the h / h , with a half-open mouth, at the moment of closing the mouth, at the moment of complete closure of the dentition; for displacement of the jaws or partial blocking during movements in the joint, unsatisfactory appearance of the lower third of the face or dentition, fatigue in the TMJ after chewing: pain in the TMJ area -78%; crunch in the TMJ area - 82%; clicking in the TMJ - 65%; unsatisfactory aesthetic appearance of the lower third of the face, dentition - 70%; fatigue in the TMJ after chewing - 46%; difficulties in chewing food - 48%; blocking movements in the TMJ - 35%; tinnitus - 56 %; congestion in the ears - 12%; dizziness - 9%:

The crunch was also detected by palpation of the joint through the external auditory canal and by listening to the area of the joints with a stethoscope. Clicking was determined by palpation through the skin in front of the ear tragus.

Noise symptoms that appear at the time of opening the mouth arise as a result of the mobility of the meniscus of the joint, its bending and rapid alignment during movement; at the beginning of closing the mouth - due to the loss of a strong connection between the meniscus and the condyle, the lack of combination of their movements. The meniscus moves late from the condyle. Then it overtakes it with a sharp contraction of the lateral pterygoid muscle, moving to its original position on the surface of the condyle. The appearance of a crunch and clicking at the moment of complete closure of the dentition is due to the fact that the condyles move through the thickened posterior meniscus ridge.

The results on the detailing of symptoms revealed that they differ in nature and intensity: acute pain - 5%; short-term - 24%, local - 80%; constant, dull - 27; spilled - 7%; with irradiation - 14%; and aching - 62% of cases.

Constant, aching, dull pains are observed with a decreasing bite, acute, short-term - with irrational prosthetics, with a sliding bite; acute, spilled and radiating - with non-synchronous movements of the condyles, sharp lateral and distal shifts of the lower jaw with a decreasing bite.

The mechanism of these complaints is obvious: when the posterior part of the TMJ, rich in blood and lymphatic vessels, is compressed, congestion occurs, which leads to an increase in intratympanic pressure from compression of the Eustachian tube and from impaired lymphatic outflow from the middle ear.

The next symptom, determined clinically, was the displacement of the condyles of the joints, and, consequently, the displacement of the h / h. Vertical displacement occurs with generalized horizontal increased abrasion of teeth, deep traumatic bite; vertical with simultaneous distal shift of the lower jaw - with a deep traumatic bite, the absence of distal support; the usual lateral position of the lower jaw - with uneven increased abrasion of the dentition, irrational prosthetics, sliding bite, unilateral deformity of the

condyle.

Analysis of the R -x studies of the state of the TMJ revealed that in patients with BSD of the TMJ, which develops against the background of a decrease in the height of the lower face, the contours of the articular surfaces on the R -x are even and smooth, and the condyles are rounded. Thus, during the present study, no organic disorders in the TMJ were detected, moreover, comparing the data of R studies with clinical manifestations, we can conclude that the occurrence of clinical symptoms is largely not associated with morphological changes in the joints.

Results A comprehensive study of the psychological status of patients with BSD TMJ revealed that patients with BSD TMJ showed certain changes. Were diagnosed: anxious - 20%, depressive - 70%, hypochondriacal - 10% syndromes of varying severity: - With anxiety syndrome, internal tension, irritability and anxiety were noted. Patients, asking the doctor questions about their state of health, clearly wanted to get a reassuring answer. They also had sleep disturbances: restless superficial sleep, inability to fall asleep for a long time: When the depressive syndrome was characterized by an oppressed and melancholic mood, sad facial expressions, the patients answered the doctor's questions in monosyllables, sometimes they could not hold back tears when talking on exciting topics: When hypochondriacal syndrome was manifested by unjustified concern for his health, overestimation of the severity of his condition. Obsessive-phobic syndrome was characterized by the appearance of obsessive thoughts, ideas, memories, fear, the desire for obsessive actions.

The intensity of pain in patients with BSD TMJ was correlated with such psychological characteristics as anxiety, increased sensitivity to stress, pessimism, and increased attention to one's feelings. Apparently, such a combination of psychological characteristics leads to an increase in sensitivity in relation to the existing discomfort in the oral cavity and affects the intensity of BS.

It was found that in patients with "depressive", "hypochondriac" types of SMOT, the intensity of pain is significantly ($p<0.01$) higher than in patients with "anxious" profile. Analysis of the distribution of all patients included in the study, depending on the height of the SMOT profile, made it possible to distinguish three subgroups: a) with mild psychological maladjustment (in the range of 50-60 T-scores) - 63% of patients, -65 T-points) - 25% of patients, c) with severe psychological maladaptation (above 65 T-points) - 12% of patients. And further analysis made it possible to identify the following most common types of SMOT profiles: 1) "anxious" - 17.8% of patients; 2) "disharmonious" -19.6%; 3) "hyperthymic" - 15.5%; 4) "drowned" -14.7% and 5) "depressed" -5.4% of patients.

The study of QOL with TMJ BSD found a moderate decrease in its total indicator, which, according to the QOL methodology, amounted to 2.9 $\pm$ 0.35 points. This decrease was mainly due (table No. 2) to the negative perception of the need for treatment by patients and the changed attitude of relatives.

**Table number 2.**

**Indicators of QoL (M+ n in points) of patients in the study.**

| Scales of the QOL Methodology | All patients (n=90) |
|---|---|
| Decreased QOL due to:<br>* the need for treatment | -1.12+0.05 |
| * various restrictions | -1.06+0.03 |
| * change of attitude<br>- loved ones<br>- Friends | <br>-1.75+0.12<br>-0.4+0.07 |
| * limitation<br>- activities at work<br>- physical activity<br>- daily activity<br>- in leisure activities<br>- communication with others | <br>-1.06+0.17<br>-1.04+0.16<br>-1.22+0.04<br>-0.19+0.06<br>-1.06+0.14 |

| | |
|---|---|
| - in nutrition<br>- smoking<br>- in intimate life | -0.31+0.24<br>-0.22+0.31<br>-1.09+0.06 |
| * downgrade<br>- social status<br>- income | <br>-1.14+0.14<br>-1.16+0.14 |
| Total QoL | -3.82+0.32 |

In the study of pain in patients with BSD TMJ, the VAS of pain was in the range from 12 to 68 points, while in most patients the scores on the scale were between 30-40 points.

Relationships between the intensity of pain sensations and the peculiarities of the mental status of patients with BSD TMJ have been established. It was found that the intensity of pain in patients with TMJ BSD, which develops against the background of a decrease in the height of the lower third of the face, depends on the severity of mental changes: patients with severe psychological maladjustment were the most intense in TS.

The relationship between the severity of pain and the psychological characteristics of patients was established. Pain perception turned out to be interconnected with an increased level of anxiety, tension, and sensitivity to psychological stress.

The factors influencing the decrease in QoL of patients with BSD of the TMJ were identified: it turned out that it was mainly due to the negative perception by patients of the need to be treated, to wear removable orthopedic structures in the PR. The quality of life was also affected by the intensity of pain and certain psychological characteristics of patients: dissatisfaction, tension, anxiety, rigidity, a sense of injustice and hostility from others, low psychological stress resistance, and getting stuck on negative emotions.

Thus, a wide range of disorders leads to the development of BSD of the temporomandibular joint, among which one can distinguish violations of the TMJ, the muscular apparatus and psychological characteristics.

**Conclusions:**

1. A wide range of disorders leads to the development of BSD of the TMJ, among which are disorders of the TMJ, the muscular apparatus and psychological characteristics; patients with severe psychological maladjustment were distinguished by the greatest intensity of BSD.

2. The inclusion of a psychosomatic approach in the development of a therapeutic strategy in patients with TMJ BD, which develops against the background of a decrease in the height of the lower third of the face, contributes to an increase in the effectiveness of treatment, as well as a reduction in its duration, which affects the patient's compliance and contributes to the quality of medical care.

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