

Differential Diagnosis of Patients with Temporomandibular Joint Pain Dysfunction Syndromes

Gafforov Sunnatullo Amrulloevich, Astanov Otabek Mirjonovich.

Tashkent institute for advanced training of doctors
Bukhara State Medical Institute.



Abstract – The article presents the results of a study of a specially developed map proposed by the authors in 84 patients with TMJ DM aged from 20 to 60 years, and 36 patients without TMJ dysfunction were selected as a control. According to the results of the study, the authors found that the main number of patients accounted for 59.6% after 40 years and among women - 61.9% of cases; also found in patients 46.42% occlusive-articulatory syndrome, 33.33% neuromuscular syndrome and 20.23% dislocation of the intra-articular disc; that the relationship between the amplitude of the vertical movement of the lower jaw, changes in the bioelectric potential of the masticatory muscle and the occurrence of these pathologies.

Keywords – Painful Dysfunction Of The Joint, Myofacial Pain Syndrome, Maxillofacial Area.

I. RELEVANCE OF WORK

Today, there is often literature that informs about the diagnosis, treatment and prevention of pathologies of the temporomandibular joint (TMJ) [5, 6, 11, 16]. It is also argued by researchers that among them TMJ pain dysfunction syndromes (SDS) are one of the most common pathologies among people visiting a dentist and one of the main causes of the pathological process are disorders in the dentoalveolar system (DGS) [1, 7, 9]. It is known that the complexity of diagnosing TMJ SD is associated with the lack of a clear understanding of the mechanism of occurrence, the variety and variability of symptoms of this pathology [2, 8, 12], therefore, today, to identify the symptoms of pathology, a number of research methods are carried out, which includes clinical and functional, anthropometric, immune-microbiological and instrumental methods have been studied [9, 10, 15]. SBD TMJ is the most common pathology, which is inextricably linked to the disruption of the masticatory muscles, primarily the lateral pterygoid [7, 13, 17]. Patients most often complain of "noise" phenomena during

movements of the lower jaw (n / h), pain in the masticatory muscles during prolonged chewing or talking, chewing disorders, feeling of congestion and tinnitus [14, 16, 19]. Complaints presented by patients are associated not only with morphological and functional changes in the TMJ, but also with the inclusion of organs and tissues of the entire masticatory apparatus in the pathological process, and in some cases, are the result of changes in the emotional sphere of a person [11, 18, 22]. Patients with TMJ pathology often do not receive timely and adequate medical care [20, 23], especially since it is dental orthopedic methods of treating TMJ pathology that are pathogenetic and most effective [21, 22, 24], therefore, until today, the treatment of patients with SBD TMJ remains one of the most difficult and urgent problems of modern dentistry [24, 25] Thus, the analysis of the literature made it possible to identify shortcomings in the field of early diagnosis of TMJ SD, and also, there are controversial questions about the role of orthopedic and physiotherapeutic measures in the complex treatment of this pathology and it can be concluded that an integrated step-by-

step approach to the diagnosis and treatment of patients is necessary, taking into account, in addition to pathology in the PCA and the somatic status of patients.

II. THE PURPOSE OF THE STUDY

To determine the diagnostic efficacy of research methods for TMJ SD associated with disorders of the dentition and occlusal surface.

III. MATERIALS AND RESEARCH METHODS

The purpose of the study in the Bukhara Regional Children's Dental Clinic, where the base of the department "Orthopedic Dentistry and Orthodontics" is located, Bukhara State Medical Institute, analyzed clinical observations in 120 patients aged 20 to 59 years (78 women and 42 men) with complaints of TMJ including number, 39 - occlusive-

articulation syndromes (OSA); 28 - neuromuscular syndromes (NMS); and 17 - dislocation of the intra-articular disc (VD) without inflammatory - dystrophic changes; was also selected for the control group of 36 patients, who did not complain and did not identify the pathological symptoms of TMJ. The identification of the symptoms of TMJ pathology was carried out with the help of our developed survey map, compiled on the basis of a survey and an objective examination, also, all patients underwent general clinical and special examination methods. Participating each patient gave written voluntary informed consent to conduct a clinical trial using its results in scientific work.

From the data in Table 1 it follows that TMJ SD was more common in women 61.9%, and the majority of patients accounted for 59.6% after 40 years; also of the revealed common pathologies of the TMJ SD, 46.42% was OSA.

Table 1 Distribution of patients by group, age and gender (% x)

Pathology		SBD TMJ			Total patients	Control
age	Floor	SLA (OG-1) NMS	(OG-2) VD	(OG-3) SBD TMJ	SLA (OG-1)	Healthy (KG)
20-29 n=12	M; n=4	2 (6,25%)	2 (6,25%)	-	12(14,28%)	2 (12,5%)
	W; n=8	4 (7,69%)	3 (5,76%)	1 (1,9%)		2 (10,0%)
30-39 n=22	M; n=7	3 (9,37%)	2 (6,25%)	2 (6,25%)	22(26,19%)	5 (31,25%)
	W; n=15	8 (15,38%)	4 (7,69%)	3 (5,76%)		5 (25,0%)
40-49 n=24	M; n=8	3 (9,37%)	3 (9,37%)	2 (6,25%)	24(28,57%)	5 (31,25%)
	W; n=16	8 (15,38%)	5 (9,61%)	3 (5,76%)		6 (30,0%)
50-59 n=26	M; n=13	7 (21,87%)	4 (12,5%)	2 (6,25%)	26(30,95%)	4 (0,25%)
	W; n=13	4 (7,69%)	5 (9,61%)	4 (7,69%)		7 (35%)
M; n= 32 (38,09%) W; n=52 (61,9%)		15 (17,85%)	11 (13,09%)	6 (7,14%)	84 (100%)	16 (44,44%)
		24 (28,57%)	17 (20,23%)	11 (13,09%)		20 (55,55%)
Total patients n=84 (100%)		39(46,42%)	28(33,33%)	17(20,23%)	84	36 (100%)
General survey. n=120	84(70,0%)	39 (32,5%)	28(23,33%)	17(14,16%)	84/36	36 (30,0%)

The examination of the patients in the control group of comparison was carried out according to the generally accepted scheme, for each patient a medical record was filled out and the data of subjective, objective and special research methods were entered. The diagnosis of patients in the main group was carried out according to our proposed survey map

of a patient with TMJ disease, consisting of sections where subjective and objective research methods are described in detail. Also, for the purpose of collecting a complaint; the occurrence of noise phenomena, joint pain, dislocations, blockages of n / h, palpation of the TMJ, localization of symptoms and their time of occurrence, tone, soreness,

compaction, asymmetric muscle contraction, displacement of n/h were checked [22,23,25]. To diagnose deformation of occlusion and the presence of premature contacts, diagnostic models were made in all patients and put into an articulator with averaged parameters; teeth, dentition, type of bite, occlusal contacts, especially those that are not available in the PR for visual examination, also determined the side of displacement n/h , the nature of the occlusal curve, super contacts, areas that caused restriction or obstruction of movements n/h .

With the help of occlusiography revealed premature contacts according to the method [19,21] registration of movements n/h in the vertical direction (Kamenova LA Patent of the Russian Federation for a useful model No. 133709 dated 27.10.2013); the study of the bioelectrical activity of the masticatory muscles was carried out on a four-channel adaptive electromyograph (EMG) for dental research "Synopsis" by "Neurotech" (Taganrog, Russia); To study functional changes in the masseter and temporal muscles proper in patients with TMJ pathology, we studied the anterior bundles of the temporal and masseter muscles from both sides simultaneously. Biopotentials were recorded according to the same scheme for all studied: at rest (20 s) and under functional loads, namely, with maximum compression of the jaws (5c), voluntary chewing and chewing alternately on the right and left sides of 0.8 g of dried almonds (15c). When processing electromyograms, the following was determined: the average amplitude of biopotentials in the phases - rest (BEP), when chewing a nut (BEAzH), with maximum compression of the jaws (BEAw) in μV , chewing time in seconds, rest time, chewing frequency and coefficient "K". Spiral computed tomography (SCT) was performed on a spiral multislice tomograph (company "GE Light Speed", with the mouth closed and open and the scanning time of one phase was 5-7 s. Scanning parameters: 120 kV; 140 mA; slice thickness 1.25 mm, with a reconstruction interval of 0.8 mm, multi-planar reconstructions in the sagittal and frontal planes, as well as three-dimensional (3D) image reconstructions with a closed and open mouth were also performed. The line from the top of the articular tubercle (point A1) to the lower edge of the external auditory canal - (point A5); therefore, the line formed the following points of intersection with the articular head and the glenoid fossa: A2 - with the anterior surface of the articular head; A3 - with the posterior surface of the articular head; A4 - with the posterior surface of the glenoid fossa. To the segment A1-A5 from the highest point of the articular head - (point B1), a perpendicular was lowered - point B2; the B2-B1 segment continued upward until the

intersection with the glenoid fossa, this is point B3; angles A1B2B3, A5B2B3 were divided by bisectors. Each bisector crossed the glenoid head and the glenoid fossa at two points. Thus, the analysis of the SCT of the temporomandibular joint allows us to study the width of the joint space between the points: C1-C2 = D1 - superior-anterior dimension; B1-B3 = D2 - top size; C3-C4 = D3 - upper back size; A1-A2 = D4 - front size; A3-A4 = D5 - back size. With the mouth closed, tomograms were studied on a section passing through the highest part of the articular head, and with an open mouth, through the apex of the articular tubercle. We studied the location of the articular head in relation to the articular tubercle, the degree of dislocation of the head of the condylar process by 1-2 mm, 3-4 mm, 5 mm or more, and structural changes in the articular elements. The obtained materials were statistically processed using the Statistika, Microsoft Office software package. The digital data were processed on a personal computer by the method of variation statistics.

IV. RESULTS AND ITS DISCUSSION

When analyzing 84 cards of patients of the main group, we identified the following nosological forms of SD; OAS - 46.42% (OG-1); NMS - 33.33% (OG-2); dislocation of the intra-articular disc (VD) - 20.23% (OG-3). The examined OG-1 consisted of 39 patients with OSA, who presented the following complaints: dull pain in the TMJ - 37 (94.87%), while 27 (69.2%) noted its occurrence during chewing, and 12 (30.76 %) - when opening the mouth. 25 (64.10%) complained of pain on one side, and 13 (33.33%) patients on both sides. Local pain was present in 28 (71.79%), and with radiation to the ear or temple - in 10 (25.64%). Clicking in the middle of opening the mouth was noted by 38 (97.43%) examined, 28 of them (73.68%) on one side, 10 (26.31%) on both sides. In 6 (15.38%) people, a crunch appeared when the jaws were tightly clenched. The sensation of a foreign body in the joint was present in 14 (35.89%) patients; ear pain, ear congestion was present in 18 (46.15%) patients; 6 (15.38%) patients complained of burning of the tongue; fatigue of the chewing muscles during meals occurred in 14 (35.89%) patients; blocking of movements n/h was noted by 14 (35.89%) of the surveyed; hypertonicity of the masticatory muscles and daytime compression of the jaws were detected in 5 (12.83%) patients, bruxism - in 6 (15.38%) patients. Patients OG-2 included 28 patients with NMS TMJ and in 100% of cases complained of acute and short-term pain arising from chewing, of which 24 (85.71%) on one side and 4 (14.28%) - with two sides. Local pain - in 19 (67.85%) people; and in 4 (14.28%) the pain radiated to the ear, temple; into the chewing muscles - in 8 (28.57%), clicking was also noted in 28 (100%) patients, of which 20 (71.42%) on one

side, 5 (17.87%) on both sides; when opening the mouth, clicking occurred in 21 (75%), and when opening and closing, in 10 (35.71) people; in 4 (14.28%) patients, a crunch appeared when the jaws were tightly clenched. Sensation of a foreign body in the joint and "jamming", "blocking" of the joint in 28 (100%) patients; tinnitus and ear congestion on the affected side were noted by 20 (71.42%) people. Patients OG-3, 17 cases (100%) had sharp pain when chewing or talking; of which one side 10 (58.82); on both sides - 7 (41.17%); local pain - in -12 (70.58%) people; - 6 (35.29%) patients have severe pain radiating to the ear, high, in the area of the collarbone; and clicking was also noted in 15 (88.23%) of them 7 cases during opening of the mouth and 8 cases during a conversation; From the history of patients OG-1 revealed that the first symptoms in 14 (35.89%) patients appeared after orthopedic treatment, and in 8 (20.51%) - after orthodontic; 19 (48.71%) patients had fillings in PR; bad habits are characteristic of 39 (100%) patients, and prolonged unilateral chewing - 27 (69.23%) patients. In patients OG-2, during the history of the disease, it was revealed that the first symptoms in 24 (85.71%) patients appeared a year ago, in 6 (21.42%) patients consulted a doctor within two weeks after the onset of pain and clicking in the TMJ ... All patients of this subgroup indicated prolonged unilateral chewing and the presence of bad habits, 10 (35.71%) had a history of simultaneous TMJ dislocation and 8 (28.57%) had long-term emotional stress. In patients, OG-3 is noted according to the results of the anamnesis; diseases revealed that the first symptoms in 14 (82.35%) patients appeared 6 months ago, 3 (17.67%) patients consulted a doctor within two weeks after

the onset of pain and clicking in the TMJ; also 12 (70.58%) patients have emotional overstrain. According to an objective examination of the face of patients OG-1, asymmetry of the face due to displacement of the n / h towards the affected joint was revealed in 9 (23.07%) cases; decrease in interalveolar height in 6 (16.66%) patients; mouth opening with deviation occurred in 38 (97.43%); opening restriction - in 15 (38.46%); defects of the dentition were found in 13 (33.33%) cases, while the deformation of the occlusion was observed in 9 (23.07%); pain on palpation of the TMJ was identified in 39 (100%); proper chewing muscles - 8 (20.51%); lateral pterygoid muscles - 10 (25.64%); temporal muscles - 11 (28.20%) examined; also, it was revealed that orthognathic bite had 31 (79.48%), deep 8 (20.51%) patients. In OG-2, facial examination during an objective examination revealed asymmetry due to displacement of the n / h to the affected side in 28 (100%) cases; in 5 (17.85%) patients, a decrease in tooth-alveolar height was observed; limited opening of the mouth had and deflexion was detected in 28 (100%) patients, moreover, the displacement of the n / h occurred in the sick side, defects in the dentition were also found in 12 (42.85%) cases, while deformation of the occlusion was observed in 9 (32, fourteen%). In OG-1 patients, premature contacts were noted in 38 (97.43%) patients; in 30 (76.92%) patients with intact dentition, premature contacts, while in the central occlusion in 9 (23.07%), in the front in 6 (15.38%), in the lateral in 10 (25.64%) , in all types - in 7 (17.94%). In the presence of defects in the dentition, 12 (30.76%) had supracontacts in the central.

Table 2. Functional characteristics of the actual masseter and temporal muscles in patients with TMJ OADS (n = 29) before treatment

	EMG indicators (μV)	Actually, the chewing muscles		Temporal muscles	
		Struck-I side	Healthy side	Struck-I side	Healthy side
OOG-1	BEP	41,2 $\pm$ 4,9	39,7 $\pm$ 5,1	43,8 $\pm$ 4,2	39,0 $\pm$ 4,9
	BEA (compression)	490,2 $\pm$ 43,2	461,4 $\pm$ 32,2	432,6 $\pm$ 50,3	473,4 $\pm$ 46,2
	BEA (chewing)	377,2 $\pm$ 69,4	367,2 $\pm$ 60,1	334,3 $\pm$ 81,4	354,8 $\pm$ 69,1
	Chewing time (s)	7,98 $\pm$ 0,2	7,47 $\pm$ 0,3	7,98 $\pm$ 0,4	7,54 $\pm$ 0,3
	Rest time (s)	6,44 $\pm$ 0,5	6,33 $\pm$ 0,2	6,56 $\pm$ 0,6	7,21 $\pm$ 0,2
OOG-2	BEP	42,2 $\pm$ 5,1	41,2 $\pm$ 4,3	38,8 $\pm$ 3,6	37,3 $\pm$ 4,1
	BEA (compression)	337,1 $\pm$ 98,2	344,5 $\pm$ 101,3	204,3 $\pm$ 100,3	234,5 $\pm$ 122,1

OOG-3	BEA (chewing)	240±71,3	265±65,4	239±67,4	263±90,3
	Chewing time (s)	9,42±0,3	8,2±0,2	9,47±0,2	9,0±0,2
	Rest time (s)	6,87±0,3	7,71±0,3	7,09±0,1	8,22±0,1
	BEA (compression)	42,4±5,8	40,2±6,3	40,4±2,8	36,3±5,1
	BEA (chewing)	360,1±100,2	376,5±122,3	218,6±125,3	248,4±134,1
	Chewing time (s)	244±70,3	288±80,2	260±87,4	295±93,3
	Rest time (s)	9,42±0,3	8,92±0,3	9,86±0,6	9,03±0,4
	BEA (compression)	7,03±0,6	7,81±0,3	7,48±0,1	8,67±0,4

Note: reliability at $p < 0.05$

According to the results of spiral computed tomography in an oblique projection in the "mouth closed" position, all OG-1, 2, 3 revealed an expansion of the joint space in D4 and a narrowing of the gap - in the D2 and D5 sections on the diseased side, while on the healthy side - expansion in D2 and D5 departments. When examining in the "mouth open" position, the articular heads were located at the apex of OG-1 20 (51.28%); OG-2 12 (42.85%); in OG-3 9 (52.94%), on the posterior slope of the articular tubercle in 18 (46.15%); 13 (46.42%) and 8 (47.05%) patients respectively SCT of the temporomandibular joint in an oblique projection was performed in all patients in OG-1, 2 and 3 in the "mouth closed" and "mouth open" positions during the examination. According to the study of SCT in the "mouth closed" position on the affected side, a narrowing of the joint space in the D3, D5 sections, expansion - in the D4, section, on the healthy side - expansion in the D3 and D5 sections, narrowing - in the D4 sections was revealed. When examining in the "mouth open" position, the TMJ articular heads were located in 37 (94.87%); 28 (100%) and 17 (100%), respectively, patients on the posterior slope of the articular tubercle of the affected side and on the apex of the articular tubercle of the healthy side. For example; an extract from the medical card No. patient No. 28 years old. I contacted an orthopedic dentist on the basis of the clinic with complaints of pain and clicking in the TMJ on the right when chewing, restriction of opening the mouth (up to 2.8 cm); intensifying pain when chewing on the left and yawning - by nature - dull, arising suddenly and gradually increasing, radiating to the ear and temple. Also, on the part of the patient, a feeling of the presence of a foreign body in the joint, daytime compression of the jaws, blocking of movements during chewing was indicated. For the first time symptoms appeared 4 months ago, had not previously sought treatment; it also turned out that the food intake was carried out on the right side for several years. According to the patient, he loves frequent eating of crackers, nuts, and

large hard apples. During an objective examination of the patient, asymmetry was determined due to an increase in soft tissues on the right, limited opening of the mouth (2.3 cm), deflexion, and displacement of the mid-sagittal line to the right.

Occlusionography revealed premature contacts - 14, 16 teeth with anterior, 37, 38, right, 45, 47 with left occlusion. On the SCT-reforms of the temporomandibular joint in an oblique projection on the right, it was determined that the joint space is narrowed (D1 = 1.8 mm, D2 = 1.3 mm, D3 = 1.7 mm). When opening the mouth, the head does not reach the apex of the articular tubercle by 7.2 mm. On the left, the joint space is narrowed (D1 = 1.2 mm, D2 = 1.2 mm, D3 = 1.3 mm). When the mouth is opened, the articular head does not reach the level of the apex of the articular tubercle by 2.1 mm. Thus, when analyzing clinical observations of patients with DMDM, TMJ; OSA, NMS and VD were noted for common complaints - pain, clicking in the joint, tinnitus and muscle fatigue when chewing. Anamnesis revealed that the causes of the disease were - restoration of chewing teeth with fillings without occlusion control, prolonged unilateral chewing and bad habits. In the future, there was a violation of the function of the dentoalveolar apparatus, manifested in the restriction of opening the mouth, blocking the movements of the jaw and impaired chewing function. In the process of diagnosing 84 patients with OSA, NMS and VD, we analyzed about 170 sets of occlusiograms, 84 pairs of diagnostic models, more than 170 graphs for recording vertical movements of n / h, 170 electromyograms and computed tomograms.

V. CONCLUSIONS

The proposed survey cards and database allow you to compile a complete clinical picture of nosological forms of TMJ UDB - OSA, NMS and VD, further will give a reason for systematization and documentation in electronic form of

the data obtained for subsequent processing. When examining patients with SDS, TMJs were found to occur in 100% of cases, taking into account which the basis for a detailed table for the differential diagnosis of OSA, NMS and VD was developed. Special research methods have established a relationship between the amplitude of vertical movements of the n / h, changes in the BEP of the masticatory muscles and the occurrence of OSA, NMS and VD.

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