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Modern Methods for Diagnosing Dysfunction of the Temporomandibular Joint and Parafunction of the Masticatory Muscles

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Annotation: A literature review is devoted to the study of improving the methods of clinical and functional assessments and diagnosing the pathological condition of the temporomandibular joint (TMJ). The pathology of TMJ occupies a special place among dental diseases due to the significant prevalence, extremely diverse and complex clinical picture. According to clinical studies, TMJ pathology occurs in 70-80% of the healthy population and is in third place after caries and periodontal disease. Throughout life, each person experienced certain symptoms of dysfunction, manifested by pain in the chewing muscles or clicking in the TMJ. The complexity of the anatomical structure, the large number and originality of the course options, the variety of clinical symptoms of pathological processes make it difficult to diagnose TMJ diseases. Diagnosis of TMJ diseases remains one of the difficult issues of dentistry. Based on this, the authors analyze a number of scientific and literary information and conclude that the diagnosis and differentiation of a TMJ disorder is a very complicated process and combined methods of examining these patients are required.

Keywords: Dentistry, anatomical and topographic features of the temporomandibular joint, diagnosis, functional research methods.

INTRODUCTION

Diseases of the temporomandibular joint (TMJ) are very common, the problem of their final diagnosis today is an even bigger problem for many specialists; as dentists, neuropathologists, endocrinologists, otorhinolaryngologists and infectious disease specialists, because, during the course of the clinic, pathogenetic symptoms and pain syndromes, TMJ dysfunction is complex and diverse. According to clinical studies, TMJ pathology occurs in 70-80% of the healthy population and takes third place after caries and periodontal disease [2]. Throughout life, each person experienced certain symptoms of dysfunction, manifested by pain in the chewing muscles or clicking in the TMJ.

Many patients with TMJ dysfunction generally do not seek medical help or consults general practitioners, rheumatologist, neuropathologists and other specialists, or are identified accidentally when they go to the dental clinic for the treatment and prosthetics of the teeth. The doctor's tactics should be aimed at early detection with TMJ pathology. Early diagnosis, with a dysfunctional state of the TMJ, is very relevant for today, because many dentists do not know how to approach the initial examination of patients who have treated them for violations in the TMJ, it is high, the ear, head, neck, clavicle and dentition.

The complexity of the anatomical structure, the large number and originality of the course options, the variety of clinical symptoms of pathological processes make it difficult to diagnose TMJ diseases. Diagnosis of TMJ diseases remains one of the difficult issues of dentistry and requires the use of modern research methods.

Therefore, an examination approach with preliminary diagnoses of TMJ DS is required to conduct a survey, external examination, examination of the organs PR, palpation and auscultation of the masticatory muscles and TMJ, the study of diagnostic models, targeted and panoramic radiography (R) of teeth and jaws, electroodontodiagnosis (EOD), axiography, tomography, electromyography, electromyotonometry of the masticatory muscles: According to the patient's history, there are primary complaints and complaints of a cosmetic defect, enamel and dentin hyperesthesia, a feeling of soreness and surface roughness, the presence of pathological abrasion in other family members, concomitant pathology such as congenital dysplasias, endocrinopathies, kidney diseases, pathology of the gastrointestinal tract and others: When determining pathological symptoms; the cause of abrasion or other symptoms, the history of the disease, the duration of occurrence, the nature of progression and their relationship with prosthetics of the teeth and jaws, the relationship with the working and living conditions of the patient: On examination, the configuration of the face, TMJ (lower 1/3), the condition of the hard tissues of the teeth, CRF and periodontal disease, soreness, asymmetry of sensations, swelling, hypertonicity, violation of the symmetry of movements, clicked, soreness and others [12].

As we know, examination of patients with TMJ diseases should be carried out according to a certain scheme; including collecting and studying complaints, collecting and analyzing the anamnesis, examining the face, palpation and auscultation of the joint, determining muscle tone, pain points in the muscles and on the face, studying the joint during movement of the lower jaw (l/j), measuring the distance between the cutting edges of the central incisors with maximum open mouth, palpation of lymph nodes and salivary glands, the use of functional diagnostic tests, radiological and laboratory studies. If necessary, patients should be referred to a physician, neurologist, psychiatrist, rheumatologist, otolaryngologist, a specialist in infectious diseases.

When collecting an anamnesis; it is necessary to find out when and how the first symptoms of TMJ began to manifest themselves. To identify etiological factors, it is preferable to ask the patient leading questions, mentioning the main and common causes that contribute to the emergence of various types of pathologies in the TMJ: wide open mouth, trauma of the mouth, prosthetics, solid food intake, difficult extraction of chewing teeth, previous infectious diseases (mumps, purulent otitis media, pertussis, scarlet fever, flu, tonsillitis, rheumatoid and rheumatoid polyarthritis, gout, tuberculosis, etc.) .

When detailing the symptoms; First of all, it is necessary to find out what first arose: pain or clicking (C)in the joint; for example, with the usual dislocations (UD) and subluxations of l /j (SLLJ), C appears most often at first, and then the pain joins, and with arthritis and arthrosis, pain first appears, and then C joins the joint. Point, or strictly local pain, is typical for PV, PVLJ, dysfunctional syndromes (DS) and osteoarthritis.

As we know; diffuse pain, more often with acute and subacute arthritis, specific and nonspecific infectious arthritis, myositis in the joint area and other inflammatory processes around the joint. Irradiating pain is observed with compression of the auditory nerve, branches of the ear-temporal nerve, with trigeminal neuralgia, pulpitis, compression of the musculo-facial cortical zones. The nature of the occurrence of pain is clarified - sudden, gradually arising from a feeling of awkwardness in the joint, spilled, with subsequent localization at a certain point and vice versa (1).

Symptoms clicking of (C); character C - crunch, clapping sound. With a slight opening of the mouth and lateral movements of the l/j, C, observed with neuromuscular syndromes (NMS) and occlusal-articulation syndromes (OAS), meniscus dislocation, arthritis and arthrosis; with wide opening of the mouth and at the moment of the beginning of closing the mouth - with PV and PVLJ. When the jaw is compressed, a crunch, C is observed in patients with a declining bite.

It is important to find out if the patient has a blockage (BA) or, as patients say, “jamming” in the joint. BA can be partial (PBA) or complete (CBA). PBA occurs with excessive mobility of the intraarticular meniscus, PBA occurs with PV as a result of a sharp reflex contraction of the chewing muscle-lifters. Pain in the joint occurs with a complete separation of the meniscus. The above clinical and functional symptoms in the

neck and head make it difficult to differentiate etiological and pathological processes.

We know that the functional movement of l/j by the masticatory muscles is indicated by the term "Articulation", the term "Occlusion" means that the position of the dentition in the stage of their closure. For diagnosis, it is very significant to consider these factors; central, anterior and two lateral - right and left occlusions and bites; physiological (orthognathia, progenia, bipognathia and direct) and pathological (prognathia, progenia, open, deep and cross).

We know with central occlusion (CO) - the central position of the TMJ heads in the articular fossa should be normal: that is:

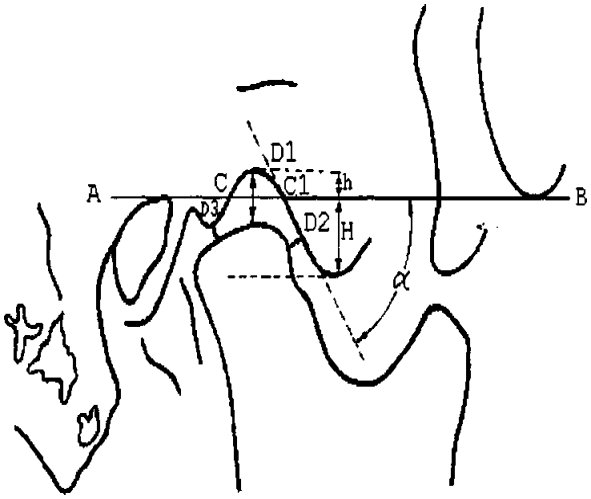
1) each upper or lower tooth joins with two antagonists - the upper and lower teeth - of the same name and standing behind; lower with faithful teeth - of the same name and standing in front:

2) the middle lines between the upper and lower central teeth constitute a continuation of one another and lie in the same sagittal plane:

3) the upper frontal teeth overlap the lower ones by about 1/3 of the length of the tooth crown:

4) the upper first molar, merging with the two lower molars, covers approximately two thirds of the lower first molar and one third of the lower second.

The mesi-buccal tubercle of the upper first molar enters the transverse groove between the buccal tubercles of the lower first molar. At the same time, the position of the articular heads is cranioventral, there is no displacement to the side, the physiological position of the head - disk and the physiological load on all joint structures are the same, the anterior, superior and posterior articular fissures are approximately identical to each other, as well as to the right and left (Fig. 1).



During a clinical examination, the functional state of the TMJ in practice, it is imperative to analyze the occlusal relationships, determine the central premature contacts, the absence of contacts between the individual teeth in the usual occlusion, check the canine management and stability of the occlusion. In this case, it is necessary to

take into account the distinctive features of the TMJ:

1. Jointed surfaces are covered not with hyaline, but with thin fragile connective tissue cartilage, which determines its frequent vulnerability, tendency to quickly melt during inflammation and its replacement with scar or bone tissue:

2. The capsule of the joint has a heterogeneous structure; in front, it is thin, free and easily stretched, and in the back it is significantly thickened:

3. Outside, the joint is strengthened by a strong ligament, the fibers of which, starting widely from the base of the zygomatic process of the temporal bone, go down and back, converge on the outer and back sides of the neck of the condylar process l/j:

4. In the joint cavity there is a joint disk having a biconcave shape: in the center it is thin (1-2 mm), and on the edges it is thick (3-4 mm). It consists of fibrous cartilage, spliced with the capsule on the edges and therefore divides it into two floors: upper and lower. The functional value of the disk lies in the fact that it compensates for the lack of complete congruence of the mating surfaces and provides at the same time a wide range of movements l/j.

Today, the following functional tests are widely used in the process of studying the clinical manifestations of various forms of joint pathology [13], that is: - Sample №1with excessive excursion of the articular heads, they ask the patient to make a limited opening of the mouth, fixing the jaw with one hand on the chin, and the second - palpating the area of one of the TMJ.

The disappearance of symptoms (pain, C) indicates that when limiting the movement of l/j in these patients, the condyles with the meniscus move synchronously, without injured articulated surfaces: - Sample №2;

resting the forefinger of the right hand about the military side on the left, and the thumb of the same hand in the distal chin on the right, slightly shift the jaw to the left and ask the patient to make vertical movements l/j. The disappearance of symptoms (pain, C, crunch) indicates that the condyles in this case have taken an optimal convenient position: - Sample №3;

with distal shifts of the patient's l/j, they are asked to push the l/j forward - to the orthogenetic or direct bite and then make vertical movements of the l/j. At the same time, the doctor holds the patient's l/j in a preset position with his hand. The disappearance of symptoms indicates that the condyles assumed a more comfortable position in the articular fossa: - Sample №4;

displacing l/j distally, set it to the center position. occlusion, fixing the chin. At the same time, they ask the patient to open and close his mouth several times, observing the disappearance of pathological symptoms during the movement of the jaw. The disappearance of the pathological reflex indicates the elimination of the aphisiological movement of the condyle: - Sample №5;

With the usual lateral shifts l/j, the test named Ilina-Markosyan is used. During the

execution of this test in a state of relative physiological rest, observe the position of l/j. If the latter is established along the midline of the face, you should think about a violation of the kinetic activity of the neuromuscular complex: - Sample №6;

With a declining and deep traumatic bite, laying 2 mm strips of cardboard between the tooth and rows in the area of premolars, the patient is asked to make vertical movements. The thickness of the pad gradually increases until the pathological symptoms in the joint are eliminated. The elimination of symptoms indicates the optimal convenient position of the condyles in the articular fossae with closed dentition and the degree of occlusion increase during orthopedic interventions (1).

In addition to the above functional tests, the method of electromyography (EMG) is currently used - automated systems for measuring and processing biomedical information using modern software, this significantly extends the diagnostic capabilities of modern medicine. Using electromyography of the masticatory muscles is carried out using functional tests: closing of the dentition in the central organ, arbitrary and predetermined chewing, recording electromyograms at physiological rest l/j, studying the time of reflex inhibition of the activity of the masticatory muscles during compression of the jaws in the central organ when tapping the chin with a neurological hammer [1, 18, 19, 20].

In recent years, a number of authors have proposed yet another functional method for studying TMJ movement - graphical; that is - a recording of the dynamic movements of the jaw - functioniography. To register l/j movements, they use the oral device inside [14, 16]. Using this method, it is possible to study the function of the TMJ, diagnose the pathology of the joint and chewing muscles. The shape of the Gothic angle allows you to evaluate the function of the joint, chewing muscles and determine whether the movements of the l/j are right and left, whether there is a restriction of movements in one or both directions.

Axiography methods - out-of-mouth registration of l/j movements, allows you to record the trajectory of the TMJ transversal articulated axis during l/j movements. With the help of an axiograph device - mechanical or electronic studies are carried out, axiograms can be obtained in three mutually perpendicular planes [17, 18]. The method allows you to fix the initial state of the DJ of the facial system; to make a diagnosis before treatment; dynamically observe during and after treatment; determine the central ratio of the jaws.

The pathogenesis of functional disorders of TMJ, an important role is played by changes in the hemodynamics of the parotid-articular region. In dentistry, rheography, laser Doppler fluorometry, biomicroscopy are used to study the microcirculation of various tissues. (3, 4, 20). The dynamics of rheography indicators are studied before, on time and at various times after loading [3, 4]. Rheovasograms on the familiar and opposite side of chewing are evaluated qualitatively and quantitatively. According to the

author, in the quantitative analysis of rheograms, the main amplitude of the rheogram, the amplitude of the slow filling of the lowest point of incisure and dicrotic wave [20].

With the help of phonoarthrography, it is possible to determine the articular noise that is observed with intraarticular disorders: joint hypermobility, dislocation of articular heads and discs, arthrosis [5, 6].

Using gnatodynamometry - the efforts of compressing antagonizing pairs of teeth of the anterior group to the appearance of pain in the TMJ are recorded, in the vast majority of cases it is possible to identify painful TMJ and to differentiate it from manifestations of osteochondrosis of the cervical spine [2, 11].

When R research is carried out for all patients without exception, regardless of unilateral or bilateral lesions of the TMJ, R of both joints is performed in the position of the central nervous system and with the maximum open mouth. This is dictated by the fact that often patients complain of one joint, and pathology is detected in another: Survey R gives only a rough idea of TMJ due to projection distortions and layering of other bones of the facial and brain skull. The main role in the diagnosis of TMJ diseases belongs to R-research methods [1R research methods provide the diagnosis of at least 95% of cases of TMJ, especially given the fact that at the same time visualize the state of its bone fragments. Unfortunately, the program available on most orthopantomographs, as well as the orthopantomographs themselves, distort the joint space in the R image, since they display the TMJ oblique projection [1, 9, 12, 13].

Survey R TMJ is a complex study due to the stratification of other bones of the skull, but it makes it possible to recognize a number of diseases of the TMJ such as DS, arthrosis, fractures of the articular process, etc. To obtain survey R, a special technique has been developed and applied that allows to obtain an image of the joint in the lateral projections with closed and maximally open mouth [13].

Tomography has significant advantages over survey R, as it allows you to identify the subtlest changes in the joint without projection distortions, to analyze the measurements of articular elements and their ratios during treatment. When evaluating R, the front, center and rear position of the head l/j can be detected [9,12].

TMJ computed tomography - based on the absorption of part of the radiation by the tissues of the human body. The radiation dose for joint tomography usually does not exceed 0.02 gr. However, even despite this level of radiation, diagnosis is used only according to strict indications to exclude exposure to the parotid salivary glands that are sensitive to radiation [10, 15].

The method has a fairly high resolution, due to which it is possible to differentiate anatomical structures that differ from each other in density within 1-2%. If we compare the tomography with a conventional R-image, then in the latter case, this figure is from ten to twenty percent. The method allows you to get an image in three mutually perpendicular planes: sagittal, frontal and axial, in addition, you can measure and

volume reconstruction of articular elements.

Magnetic resonance imaging (MRI) is currently the gold standard in imaging soft tissue structures. This method is easily tolerated by patients and provides a high contrast of soft tissues, a three-dimensional image and the absence of side effects. MRI allows you to obtain a layered image in various projections, with a step size of 1.5–3 mm, and is used to visualize both bone and soft tissue structures of the TMJ and chewing muscles. This technique allows you to identify changes in the position of the articular disc, effusion into the joint cavity, changes in the articular cartilage, soft tissue tumors of the joint and periandibular tissues, and even hypertrophy of the masticatory muscles [4,7, 8, 11].

We know that according to the classification of V. I. Burgonskaya (1968), arthritis is divided into three groups: arthritis - acute, chronic; arthrosis - sclerosing and deforming; arthritis arthrosis. In turn, they are divided into traumatic, rheumatoid and rheumatic. Also, TMJ diseases can be divided into articular, in which there is damage to the joint tissues, and non-articular, associated with the pathology of the masticatory muscles. For the purpose of diagnosing and diagnosing pathology of TMJs of a non-articular nature, the specialist requires a lot of experience, knowledge of the anatomical and topographic structure of the TMJ region and the addition of informativeness about modern special instrumental devices that are required to be used in research not only in dentistry, but throughout medicine [9].

Conclusions:

Thus, an analysis of the literature on methods for examining patients with TMJ has shown that the need for complex methods of examination as objective, collecting medical history, clinical, functional and special instrumental research methods for the diagnosis and diagnosis of functional disorders and TMJ pathologies for planning treatment of pathological processes and restoration of a functional state in this area.

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