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SCIENTIFIC ACHIEVEMENTS OF UKRAINIAN SCIENTIST IN DIAGNOSTICS OF TEMPOROMANDIBULAR JOINT DISEASES (LITERATURE REVIEW)

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ABSTRACT

The aim: A systematic analysis and generalization of scientific information of Ukrainian scientists about planning of the stages of diagnosis of patients with TMJ diseases, which will allow to optimize the commonly accepted examination algorithm.

Materials and methods: Scientific analysis and generalization of obtained data of literary sources of Ukrainian scientists articles with characteristics of planning stages of diagnosis of patients with TMJ diseases is based on such databases as Scopus, Web of Science, MedLine, PubMed, NCBI, the study of which does not exceed 6 years, including monographs and results clinical research.

Conclusions: The results of scientific research by Ukrainian scientists are the basis for increasing the effectiveness of diagnosis of TMJ diseases by improving complex examination methods and implementing clinical algorithms, which will allow to choose adequate treatment methods.

KEY WORDS: temporomandibular joint, diagnostic methods, efficiency improvement, Ukrainian scientists

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INTRODUCTION

Modern integral medicine considers temporomandibular joint (TMJ) to be the center of body's postural balance, and providing dental rehabilitation is possible only if optimal aesthetics, function, and morphology of the dento-maxillofacial area of an individual are achieved in general, and balanced work of the TMJ in particular [1-4].

Unfortunately, with prevalence of dento-maxillofacial anomalies, a significant place in structure of dental diseases is occupied by TMJ dysfunction [2, 5-7]. TMJ pathology is one of the urgent problems of modern dentistry, which in terms of prevalence ranks third among diseases of temporomandibular system after caries and periodontal lesions [8, 9]. According to various authors, the prevalence of TMJ diseases ranges from 20 to 70% among all patients seeking dental care [10, 11]. Research by the American Dental Association shows that at least 35% of the world's population have TMJ pathology. Among the total number of patients, TMJ dysfunction occurs in up to 80% of women. It has a polyetiological feature and direct dependence on the hormonal state, especially gynecological status, and the leading causes of its occurrence are considered to be anatomical,

occlusive, muscular, neurogenic, post-traumatic and general somatic [12-14].

Due to the presence of a large number of manifestations of clinical signs, absence of generally accepted classification and a single view at pathogenesis, the lack of systematization of TMJ pathology diagnostics methods leads to a fact that patients are treated by specialists of various profiles: dental surgeons, orthopedists, orthodontists, neurodentists, otolaryngologists, rheumatologists [15].

Diagnosis of TMJ diseases is important, because occlusal disorders of maxillofacial system can be the cause and aggravating factors at a whole complex of dental diseases [6]. However, the methods of diagnosis and forecasting of TMJ diseases development need to be improved. All of the above mentioned applies to the population of our country.

THE AIM

The aim of the study is a systematic analysis and generalization of scientific information of Ukrainian scientists about planning of the stages of diagnosis of patients with TMJ diseases, which will allow to optimize the commonly accepted examination algorithm.

MATERIALS AND METHODS

Scientific analysis and generalization of obtained data of literary sources of Ukrainian scientists articles with characteristics of planning stages of diagnosis of patients with TMJ diseases is based on such databases as Scopus, Web of Science, MedLine, PubMed, NCBI, the study of which does not exceed 6 years, including monographs and results clinical research.

REVIEW AND DISCUSSION

Clinical examination of patients is based on generally accepted methodology and includes assessment of general somatic and dental status: clarification of complaints, life and medical history, examination, palpation. It is carried out according to the principle of a screening study, which allows to reveal the main aspect of pathology in a short period of time [3].

Patients with TMJ muscle-articular dysfunctions are recommended to undergo diagnostic psycho-screening and psychotherapist consultation with the aim of mandatory subsequent differentiated correction of behavior in accordance with existing leading psychopathological manifestations [13, 14].

When examining a patient, attention should be paid to the patient's usual posture, head position, cervical and thoracic spine, and upper limbs, as well as to clarify how the intensity of pain syndrome changes according to the change in a body position [4, 13].

Clinical examination includes, in addition to general dental external and intraoral, the following examination methods: symmetry assessment of facial and masticatory muscles functioning, position of the lower jaw, displacement of chin relative to nose at rest and when mouth is fully opened (deviation from the median axis), the size and symmetry of mouth opening (deviation and deflection), determination of joint noises, palpation of masticatory muscles, neck and shoulder muscles, determination of their tenderness, detection of occlusal sound and its asymmetry, analysis of eccentric occlusion of teeth and its trauma [3, 4, 13]. Advanced clinical analysis of the TMJ condition is carried out by lateral and dorsal palpation of the articular heads, applying a dynamic joint compression test, studying acoustic phenomena in the joint and their nature (friction, crunching, clicking, etc.), depending on a phase of mandible movements.

At clinical examination stage, special attention is paid to manual functional analysis, which indirectly determines the condition of individual TMJ anatomical structures, such as bilaminar zone, joint capsule, and the muscular system of masticatory apparatus. When evaluating movements of the lower jaw, ca-

capacity of active mouth opening, passive and loading movements of the lower jaw, dynamic compression (to determine the state of the ligamentous apparatus and joint capsule), articular surfaces, as well as passive compression (to characterize the adaptation of bilaminar zone) must be determined [15-17].

Objectively, palpation of the lateral pterygoid muscle is carried out behind the tubercle of the upper jaw, followed, if necessary, by its infiltration with an anesthetic without a vasoconstrictor [4].

An effective method of non-injection diagnosis of lateral pterygoid muscle condition can be considered an isometric test, available in clinical conditions, which does not require special equipment. Also, among the methods of express diagnostics, there is a clinical test for a presence of a certain pathology of joint, which is carried out by opening a mouth from position of maximum protrusion [3, 4, 13].

Palpation should be carried out not only in the area of the joints, but also in all parts of face: parotid salivary glands, exit points of trigeminal nerve branches, lymph nodes of face and neck, chewing muscles both at rest and when they are tense.

When examining the oral cavity, it is especially important to assess the character of occlusion, a ratio of the jaws and occlusal planes, presence of dental defects, state of fillings in previously treated teeth, and a state of chewing surfaces of the teeth. Partial loss of teeth, especially complicated by secondary deformations of dentitions, leads to TMJ and masticatory muscle pathology [3, 4, 8].

TMJ and masticatory muscle dysfunctions are also observed in patients with complete dentition, which is caused by anomalies, deformations of the dentition, which lead to a violation of occlusal-articulation equilibrium and muscle balance, spatial orientation of the lower jaw relative to the upper [4-6].

Electromyography is one of the leading methods of functional research of neuromuscular apparatus, which allows to optimize diagnostic algorithm, as well as differential diagnosis and dynamic monitoring of patients with diseases of temporomandibular joint. Electromyographic research can be used not only for the purpose of primary diagnosis, but also for qualitative differential diagnosis of various forms of pathology of temporomandibular joint, which will contribute to the development of the most rational treatment plan and increase the quality of medical care [18].

It has been shown that the method of functional diagnostics proved to be quite informative when assessing the state of masticatory muscles in patients with temporomandibular joint diseases, as it allows to detect indicators changes at different levels of disorders [19, 20].

According to the results of EMG masticatory muscles, in patients with TMJ dysfunction, the masticatory cycle, which is determined by the activity of central neural generator of mastication in brain stem, undergoes a significant transformation. The duration of this cycle in the presence of TMJ pathology is significantly shorter on average, and the average frequency of chewing movements is higher than in controls, mainly due to reduction of the silent phase in the generated cyclic activity. This is a confirmation of the existing significant modulation of mechanisms activity of chewing action central control by nociceptive influences from the periphery [21-25].

According to the results of T.M. Kostyuk research [26, 27] of EMG and MRI, a decrease in a distance from the back edge of a joint head to the back edge of a joint cavity is responsible for the presence of pain symptoms (8–10 points) and on EMG corresponds to an increase in ratio of bioelectric activity and bioelectric rest of muscles and an increase in degree of severity muscle damage. The number, thickness, and localization of linear compressions of muscle fibers of masticatory muscles (according to MRI data) and the intensity of changes in EMG activity of these muscles in TMJ dysfunction are directly correlated with the value of dysfunction index ($P < 0,05$). The degree of compaction in the mentioned muscles directly depends on the bioelectrical activity indicator and the amplitude of contractions of superficial masticatory muscles of the opposite side. Almost all patients with TMJ muscle and joint dysfunction (up to 95,3%) have noticeable disorders of the vascular bed of the head and neck (deficiency of blood flow in the system of external carotid artery and compression of internal carotid artery); this allows pathogenetically substantiate and include ischemic concept of the development of TMJ dysfunction to the formation of diagnostic and treatment model. An application program «PR» was developed for the systematization of diagnostic indicators and analysis of depth of changes in TMJ structures. This makes it possible to assess objectively dynamics of clinical course and organize a sequence of specific treatment and diagnostic and rehabilitation measures in patients with TMJ muscle and joint dysfunction. A device and, in accordance with it, a method of registering occlusal ratios in patients with TMJ dysfunction, has been developed, which allows to carry out instrumental registration when articulation is limited in patients with this pathology, to improve the quality of orthopedic care for patients and to shorten the duration of diagnostic and treatment period.

Ultrasonography may be a useful alternative in cases of internal TMJ disease and in cases where

the patient has contraindications to MRI, such as claustrophobia or the presence of a pacemaker. This research method demonstrates high sensitivity and accuracy in diagnostics of an articular disc location in patient's rest state to identify the anatomical position or to identify a displacement of the disc. On the other hand, this method does not provide enough information to analyze displacements of articular discs in patients with an open mouth and to analyze morphological changes of the disc or articular head [26].

Another non-invasive and easy-to-use method of TMJ auscultation with the help of an electronic stethoscope is used to detect the presence of noise phenomena (crepitations, clicks, friction sounds of articular surfaces). The purpose of the study was to evaluate TMJ auscultation method using an electronic stethoscope as a step in comprehensive diagnosis of TMJ internal disorders in comparison with other methods, such as clinical examination methods (interview, examination, palpation), analysis of diagnostic models in the articulator, radiological examination, electroneuromyography. Audio diagnostics is carried out using a Littmann electronic stethoscope (3M ESPE), after it phonograms are analyzed using a computer program according to the main characteristics of sounds [3, 4, 23].

Axiography can be used as a method that allows to obtain accurate graphic data about trajectory of the articular head during movements of the lower jaw. This research method is used for the purpose of functional diagnosis of TMJ, as well as for adjusting articulators according to the individual parameters of a patient. This individual setting of the articulator eliminates the need to use additional methods of registration of the lower jaw position and allows to achieve maximum occlusal accuracy [4].

When conducting a comparative analysis of an application of software-hardware complex for digital orthopantomography and analog orthopantomograph for TMJ tomography, it was found that the use of digital orthopantomographs is more convenient than analog ones, because they give smaller projection distortions, a patient receives a picture immediately after tomography, there is a possibility of specific processing, analysis, copying and storing the received information [21].

The main diagnostic method for detecting arthropathies today is radiography, which is fairly simple and inexpensive method. With the help of radiography, pathological changes in bone structures of the joint can be fully and reliably detected, but, as a rule, at the late stages of the disease [3, 4]. TMJ is studied on plain X-rays films of the skull, on spot X-ray films of the joint in the lateral projection and on spot X-ray films of the temporal bone in the side projection.

The correctness of the ratios in TMJ is determined by comparing the spot-film radiography in the lateral projection with a patient's mouth closed [21].

Based on known X-ray morphometric indices of the lower jaw, V.M. Novikov [11, 14] proposed a protocol for X-ray morphometric measurements of TMJ based on paired radiographs of the joint according to Parma technique. After visual evaluation and preliminary diagnosis, all radiographs were digitized using a scanner. Evaluation of X-ray density was performed on X-ray visigraph using the densitometric function.

Arthrography or arthrotomography is used to visualize the joint disc, which is a combination of linear tomography and arthrography. It becomes possible to assess visually the articular disc, its shape, position and establish its intra-articular relationship with the bony structures of the joint, and when opening or closing mouth, also determine its biomechanics in motion [3]. But this method has a number of disadvantages: invasiveness of the procedure, emergence of the risk of inflammatory reactions due to joint puncture and development of allergic reactions in response to administration of a contrast agent. In addition, the technique is contraindicated in patients with tumor lesions of the joint and arthritis due to the high risk of developing inflammatory complications. Tomography and contrast arthrotomography, associated with a sufficiently large radiation dose, are quite voluminous methods of examination [4]. Such complications significantly limit the use of arthroscopy and arthrography.

Advent of zonography made it possible to reduce radiation exposure compared to tomography [2, 4], but the problem of clear visualization of TMJ structures remained, because when using orthopantomography, the joint is depicted in oblique projections, which disturb the picture of bony elements, the joint space. It does not eliminate the problem of obtaining a clearer image of TMJ structures and the use of special orthopantomograph programs.

Cone-beam computed tomography and other three-dimensional tomographic imaging tools are considered to be more accurate than panoramic radiographs for evaluating of bony components of TMJ and morphologic changes with high resolution. With the help of spiral computed tomography, it is possible to obtain images of TMJ and surrounding tissues in three mutually perpendicular planes: sagittal, coronal, and axial, to carry out measurements, to evaluate volumetric symmetry of TMJ elements, but the analysis of the condition of joint soft tissue structures remains unavailable [5, 6]. The use of computer densitometric analysis allows to determine the quality of a bone in different segments of the jaws in the form of digital indicators [4].

One of the safest, non-invasive diagnostic methods is magnetic resonance imaging (MRI) of TMJ as the gold standard for joint research, which allows to obtain images of periarticular tissues of TMJ without radiation exposure. Other advantages of MRI are sensitivity, specificity, and diagnostic accuracy [3, 4, 17].

V.M. Novikov et al. [11] proposed a set of diagnostic measures for patients with unilateral and bilateral TMJ disc dislocations associated with the presence of deficit or excess of interdental space with intact dentitions, which includes an assessment of the length of occlusal surface of dentitions, research topographical and anatomical changes of TMJ articular discs by MRI method and assessment of quality of life using the questionnaire «WHOQOL - 100».

T.M. Kostyuk in the research [31-32] developed and scientifically based multidisciplinary algorithm for diagnosis of TMJ muscle-articular dysfunctions. The author characterized for the first time the relationship between the state of vascular bed of head and neck in accordance with the development of dysfunctional disorders of TMJ according to the data of duplex scanning of the vessels and it is scientifically confirmed that 95,3% of all patients with muscle and joint dysfunction of TMJ have disorders of the state of vascular bed of head and neck .

In each clinical situation, it is important to prescribe such additional examination methods that would have adequate diagnostic value with the least contraindications, taking into account its availability [4] for a patient. With the development of modern technologies, Ukrainian scientists have an opportunity to decode received diagnostic information, but the development of new and further improvement of existing research methods remains topical, which is important for determining both the dynamics of TMJ diseases and for the preliminary diagnosis of disorders of structural and functional state of bone tissue.

CONCLUSIONS

The results of scientific research by Ukrainian scientists are the basis for increasing the effectiveness of diagnosis of TMJ diseases by improving complex examination methods and implementing clinical algorithms, which will allow to choose adequate treatment methods.

PROSPECTS FOR FURTHER RESEARCH

To develop an applied computer program for the diagnosis of TMJ diseases with the aim of synchronizing data, simplifying work of dentist and establishing more correct diagnosis.

REFERENCES

1. Zhachko N.I., Nespriadko-Monborgne T.S., Skrypyk I.L. et al. Improving dental health - is improving quality of life. *Wiad Lek.* 2021;74 (3):722-725.
2. Dmytrenko M.I., Nesterenko O.N. Results of follow-up study of occlusion state in Ukrainian schoolchildren. *J. of Stomatology.* 2016;69(6):725-728.
3. Rybalov O.V. et al. Kompresiino-dyslokatsiina miazovo-suhlobuva dysfunktsiia skronevo-nyzhnoshchelepnykh suhlobiv [Compression-dislocation musculo-articular dysfunction of the temporomandibular joints. Poltava: "ACMI ". 2019, 19p. (In Ukrainian).
4. Makeev V.F. et al. Skronevo-nyzhnoshchelepni rozlady [Temporomandibular disorders]. Monograph. Lviv National Medical University named after Danylo Halytsky. Lviv: Kvart. 2018; 43 p. (in Ukrainian).
5. Kuroedova V.D., Stasiuk A.A., Makarova A.N. et al. Symmetry of elements of temporomandibular joint (TMJ). *Wiad Lek.* 2017; 70(6):1079 – 1082.
6. Smagliuk L.V., Lyakhovska A.V. Osoblyvosti likuvannia patsientiv iz zuboshchelepnyimi anomaliiamy, uskladnenymi dysfunktsiieiu skronevo-nyzhnoshchelepnoho suhloba. [Peculiarities of treatment of patients with dento-mandibular anomalies complicated by temporomandibular joint dysfunction]. *Ukrainian dental almanac.* 2019; 1: 26-30. (In Ukrainian)
7. Dmytrenko M.I., Rybalov O.V., Lunkova Yu.C. Likuvannia miazovoi dysfunktsii skronevo-nyzhnoshchelepnoho suhloba u patsientiv iz ortodontychnoiu patolohiieiu. [Treatment of temporomandibular joint dysfunction in patients with orthodontic pathology]. *Bulletin of problems of biology and medicine.* 2019, 2 (1): 304-307. (In Ukrainian)
8. Volovar O., Malanchuk V., Lytovchenko N. et al. Clinical manifestations of somatic pathology in patients with temporomandibular joint disorders. *Journal of Research in Medical and Dental Science.* 2017; 2 (5): 26–32.
9. Makeev V.F., Telishevska U.D., Telishevska O.D. et al. Rol i znachennia syndromu Kostena v dysfunktsionalnykh stanakh skronevo-nyzhnoshchelepnykh suhlobiv [Role and significance of Kosten's syndrome in dysfunctional conditions of temporomandibular joints]. *Ukrainian Dental Almanac.* 2020;3:34-39. (In Ukrainian).
10. Novikov V.M., Lunkova Yu.S., Berezii M.V. Rezultaty otsinky yakosti zhyttia patsientiv v dynamitsi ortopedychnoho likuvannia pry vyvykhakh meniskiv skronevo-nyzhnoshchelepnoho suhloba [Results of assessment of the quality of life of patients in dynamics of orthopedic treatment for dislocations of menisci of temporomandibular joint]. *Visnyk Ukrainskoi medychnoi stomatolohichnoi akademii "Aktualni problemy suchasnoi medytsyny".* 2017;172 (58): 244–250. (In Ukrainian).
11. Novikov V.M., Rezvina K.Y., Shvets A.I. et al. Vzaiemozviazok dysfunktsii skronevo-nyzhnoshchelepnoho suhloba v patsientok iz hinekolohichnymy zminamy v anamnezi za danymi anketuvannia. [Interrelationship of temporomandibular joint dysfunction in patients with gynecological changes in the anamnesis according to questionnaire data]. *Ukrainian Dental Almanac.* 2020; 4: 53–56. (In Ukrainian).
12. Kostiuk T.M. Fyzykalne obstezhennia patsientiv iz dysfunktsiieiu skronevo-nyzhnoshchelepnoho suhlobu. Physical examination of patients with temporomandibular joint dysfunction. *Ukrainian Journal of Medicine, Biology and Sport.* 2018; 4 (13): 149–153. (In Ukrainian)
13. Kostiuk T.M. Osoblyvosti psykhologichnoho suprovodu khvorykh na miazovo-suhlobovu dysfunktsiiu skronevo-nyzhnoshchelepnoho suhlobu. [Peculiarities of psychological support for patients with musculo-articular dysfunction of the temporomandibular joint]. *Visnyk Vinnytskoho natsionalnoho medychnoho universytetu.* 2019; 4 (23): 594–598.. (In Ukrainian).
14. Tumakova O.B., Novikov V.M., Lunkova Y.S. Koreliatsiinyi zviazok mizh dovhynoiu zubnykh riadiv i topografoanatomichnymy pokaznykamy suhlobovoho dyska (meniska) v patsientiv iz dysfunktsiinymy stanamy SNSchS za danymi MRT [Correlation between length of dentitions and topographic-anatomical indicators of articular disc (meniscus) in patients with TMJ dysfunctional conditions according to MRI data]. *Ukrainian dental almanac.* 2017; 3: 22-25. (In Ukrainian).
15. Smagliuk L.V., Lyakhovska A.V. Electromyography in Dentistry. Poltava: Copy Center A. Tkalic. 2021, 69 p.
16. Smaglyuk L., Liakhovska A., Smaglyuk V. et al. EMH-kharakterystyka zhuvalnykh miaziv u patsientiv iz bruxyzmom [emg-characteristics of masticatory muscles in subjects with bruxism]. *Ukrainian Dental Almanac.* 2020;(1): 43-49. (In Ukrainian).
17. Smagliuk L.V., Lyakhovska A.V. Masticatory muscle activity in individuals with temporomandibular disorder. *Acta Balneologica.* 2021; 3(164): 179-182.
18. Smaglyuk L., Liakhovska A., Kulish N. Features related to EMG-activity of masticatory muscles in patients with unilateral posterior crossbite: a cross-sectional study. *Orthodontic Forum.* 2021; 17(2): 144-121. doi:10.5114/for.2021.107531.
19. Smaglyuk L.V., Liakhovska A.V. EMG-characteristic of masticatory muscles in patients with class II malocclusion and temporomandibular disorders. *Wiad Lek.* 2019;72(5):1043-1047.
20. Smaglyuk L., Solovei K., Liakhovska A. Characteristics of emg-activity of masticatory muscles in functional treatment of patients at retention stage. *Georgian Med News.* 2018;(274):42-47.
21. Smaglyuk L., Liakhovska A., Smaglyuk V. et al. EMG-activity of muscles of the crano-mandibular system during functions of the dento-faci al region. *World of Medicine and Biology.* 2020; 1 (71): 128-132.
22. Yatsenko P.I., Rybalov O.V., Yatsenko O.I. et al. Electromyographic characteristics of temporal and masticatory muscles in patients with compression-dislocation dysfunction of temporomandibular joints of different severity. *Wiad Lek.* 2018; 71(3): 663-670.

23. Novikov V.M., Yassenko P.I., Rybalov O.V. Miofasciálnaya simptomatika v klinike kompressorno-dislokatsionnoy disfunktsii v visochno-nizhnechelyustnogo sustava [Myofascial symptoms in clinic compression of dislocation of the temporomandibular joint dysfunction]. Ukrainian dental almanac. 2017; 1: 32-36. (In Russian).
24. Rybalov O.V., Yatsenko P.I., Yatsenko O.I. et al. Hypermobility of the articular heads of the temporomandibular joint: pathology or variant of the norm? *Wiad Lek.* 2019;72 (10): 1883-1889.
25. Yatsenko P.I., Yatsenko O.I., Rybalov O.V. et al. Differential and diagnostic criteria for hypermobility of the articular heads of the mandible, muscle and joint contracture and compression-dislocation dysfunction of temporomandibular joint (according to the data of tmj zonography). *World of medicine and biology.* 2019; 2(64): 112-114.
26. Kostiuk T., Koval I., Tyshko D., Koval M. Analysis diagnostics and newest pathogenesis aspects of temporomandibular dysfunction (review). *Georg Med News.* 2018; 7–8 (280–281): 44–48.
27. Kostiuk T.M. Elektromiografichne doslidzhennia roboty zhuvalnykh miaziv pry dysfunktsiinykh rozladakh skronevo-nyzhnoshchelepnogo suhloba [Electromyographic study of masticatory muscles in dysfunctional disorders of temporomandibular joint]. *Aktualni problemy suchasnoi medytsyny.* 2018; 16 (3): 212–8 (In Ukrainian).
28. Kostiuk T.M. Mahnitno-rezonansna tomohrafiya v diahnostytsi miazovo-suhlobovoi dysfunktsii skronevo-nyzhnoshchelepnogo suhloba. [Magnetic resonance imaging in the diagnosis of musculoskeletal dysfunction of the temporomandibular joint]. *Suchasna stomatolohiia.* 2020; 1 (112): 108–111.(in Ukrainian).
29. Novikov V., Korostashova M., Dodatko V. et al. The role of magnetic resonance research in the treatment of dysfunction of the temporomandibular joint. *Ukrainian Dental Almanac.* 2021; 2: 59-63. (In Ukrainian).
30. Smagliuk L.V., Lyakhovska A.V., Kulish N.V. Stan skronevo-nyzhnoshchelepnogo suhloba u patsientiv z perekhresnym prykusom zi zmishchenniam nyzhnoi shchelepy za danymy renthenolohichnykh metodiv doslidzhennia [The state of the temporomandibular joint in patients with a cross bite and mandible displacement based on x-ray methods]. *World of medicine and biology.* 2021; 1(75): 152-156.
31. Kostiuk T.M., Kaniura O.A. Rannia diahnostyka miazovo-suhlobovoi dysfunktsii skronevo-nyzhnoshchelepnogo suhlobu za dopomohoiu kompiuternoi systemy-dodatku [Early diagnosis of musculo-articular dysfunction of the temporomandibular joint using a computer system-application]. *Ukrainskyi naukovo-medychnyi molodizhnyi zhurnal.* 2019; 4 (112): 6–11. (In Ukrainian).
32. Kostiuk T.M., Kaniura A., Shinchukovskiy I. et al. Reseach of the chewing muscles in dysfunction disorders of TMG. *Neurophysiology.* 2020; 1 (52): 50–53.

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