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FEATURES OF DYSFUNCTIONAL STATES OF THE TEMPOROMANDIBULAR JOINT IN PATIENTS WITH VARIOUS TYPES OF FACIAL SKELETON GROWTH

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From previous research, diseases of the temporomandibular joint are a functional pathology and take a special place among diseases that affect both the joint and the structures surrounding it [1]. Disorders of the anatomical relationship between the components of the joint are the most common reason of temporomandibular joint dysfunction [2]. Patients with this disease need a thorough clinical and functional analysis, in order to identify the relationship between pathology and structural features of the facial skeleton.

Keywords: temporomandibular joint; dysfunction; diagnosis; risks; types of growth of the facial skeleton

Introduction

According to scientific studies, diseases of the temporomandibular joint (TMJ) area functional disorder and occupy a special place among pathologies affecting both the joint itself and its surrounding structures [1]. Violations of anatomical relationships betweenjoint components are the most common causeof TMJ dysfunction [2]. Patients with such a diseaseneed a thorough clinical andfunctional examination in order to identifythe relationship of the developed pathology with the structural features of the facial skeleton.

Objective: to conduct a literature review for the period from 2020 to 2026 on the impact of various typesof facial skeleton growth on the development of TMJ dysfunctions.

We analyzed original articles forthe period from 2020 to 2026 on the diagnosis and influence of various types of maxillofacial growth on the developmentдисфункциональныхof TMJ dysfunctional states in the databases eLibrary, PubMed, HubMed, GoogleScholars. The material was searched by keywords: temporomandibular joint, dysfunction, diagnosis, signs-indicators, risks, types of growth of the facial skeleton, bite.

The temporomandibular joint isa small but unique and complexanatomical complex of the human body [1-2].

Its dysfunction is a functional pathology caused by muscle, occlusal andspatial disorders. To understand etiopathogenesis, itis necessary to take into account factors, including psychogenic, predisposing,initiating, preserving or complicating the disease [3-6]. The issue of classification and terminology also remains open, as there is no common point of view in the scientific community. This problem complicates the diagnosis and leads tounpredictable treatment outcomes [7, 8].

According to modern scientists,diagnostic measures for TMJ dysfunction are asolution to a part of the multifactorial problem [9, 10]. Despite the fact that a clinical examination is the basisfor making a preliminary diagnosis,most specialists recommend usinggeneral clinical and special researchmethods to visualize pathologicalprocesses [4, 9, 10].

Examination of a patient presenting any complaintsof pain in the maxillofacial region, which suggest the presence of TMJ dysfunction, always begins with collecting a general medical andstomatological history, clarifying the circumstances of themain disease, studyingthe patient's lifestyle, and then starting clinical diagnostic methods [11, 12].

The dentist identifies clinicalsigns that are common to patients with TMJ dysfunction. In the clinical picture of TMJ functional disorders, otolaryngological manifestations may alsobe present, forexample, ear congestion, sore throat, dizziness, pain and tinnitus, and sometimes hearing loss [11].

The dentist detects the presenceof a painful syndrome when opening the mouth, moving the lowerjaw to the sides, and performs auscultation of the joints in order to detect clicks and other noises.Localization and source of pain is determined bypalpation of the muscles of the maxillofacial region, ligaments and lymph nodes, joints. Accordingto a number of authors, the assessment окклюзионныхof occlusalrelationships is a necessary part ofa comprehensive dental study [12].

X-ray examinations, such as radiographyтопантомография, telerentgenography,and computed tomography [7, 11], according to the review,are used in 95% of cases.стировать асимметрию лицевого скелета, а также определяет патологии прикуса, является телерентгеTelerentgenography using cephalometry, which is a two-dimensional X-ray image obtained by taking the patient's head in the frontal and lateral projections, is the most optimal tool that makes it possible to diagnose the asymmetry of the facial skeleton, as well as determine malocclusion pathologies. Theresult of the study is influenced by the choice of the method of analysis of the obtained image [13]. Today, there are a large number of different methods of cephalometric analysis, and researchers and programmers have developed special computerprograms that makeit possible to calculate the telerentgenogram using several methodsat once [2019]. One of these features, for example, is providedby Gamma Software Software, which includesthe most popular techniques, such as Slavicek, Sato, Ricketts, and many others [8, 12]. This method allows us to evaluate several parameters at once: aesthetic andfunctional data, the direction of growth of the facial skeleton, horizontal and verticalrelationships of the jaws. However, the use of such programs in routine clinical practice is stillsignificantly limited by the financial sideof the issue and personnel lack of training [2].

Magnetic resonance imaging is used to study the soft tissue structures, shape, and position of the articular disc and ligamentous apparatus, as well as to assess the condition of the masticatory muscles [8, 11]. According to some authors, ultrasound examination is used as an additional method for studying the soft-tissue anatomical structures of the TMJ and their interaction during movements of the lower jaw. In modern dentistry, functional diagnostic methods such as functiography, мамastication, axiography, myotonometry, electromyography, rheoarthrography, фоноартрограphonoarthrography, kinesiography, and gnathodynamometry are often used todetect abnormalities in the maxillofacial structures [10, 11].

Computer axiography and surface electromyography are the most common methods that reflect themorphofunctional interaction of the TMJ joint andmuscle structuresаксиографию и поверхностную электромиогра. The technique for determining the activityof masticatory muscles using needle electromyography israrely used in modern dentistry due to its high invasiveness [10].

Electronic axiography can reveal thepresence of musculoarticular dysfunction, show the relationship between occlusion, both in a static anddynamic state, and functionalchanges in the trajectory of the conditional hinge axis of the TMJ articular heads. Surface electrobiographyis an important tool for characterization of masticatory muscles and diagnosis of patients with orofacial and occlusiveanomalies [12].

At various times, many attempts have been madeto study the complex relationships betweendifferent structural components of the maxillofacial region. The work of the lower jaw is

associated with the muscles that are attached to it andthe bone structures surrounding it. Under unfavorableconditions of the anatomical structure and functioningof the TMJ, it is susceptible to dysfunctional pacdisorders.

According to the current literature, the proportionof muscle pain is 97% of all cases of chronicpain in the maxillofacial region and can be mistakenly attributed to odontogenic or pain associated with dysfunctional TMJ conditions. Due to a lackof understanding of the functional features of the muscle component, it is difficult to make a diagnosis and inadequate and largely ineffective treatment is required.

Occlusal disorders can also cause joint dysfunction. According to somedata, the majority of patients withdysfunctional conditions show signs окоf occlusive disharmony [3].Composite restorationsin the oral cavity are often signs of various disorders, mainly гипертонусамasticatory muscle hypertonia [3,2]. Nevertheless, the influence of occlusion on the development of TMJ dysfunction cannot be called unambiguous. According to A. Michelotti etal. [3], most people with ококclusive disorders adapt well to them, and they do not develop TMJ pathologies. The same conclusion about the ability of structural components of the maxillofacial regionto adapt to moderate occlusal changes is reached by I. Moreno-Hay etal. [3,6], warning specialists that it is incorrect to look for the causeof TMJ dysfunction only in changes окклюзионныхin occlusal relationships. In their study, R. Kanter etal. [3,4] conducted a critical review of articles on the relationshipbetween occlusive disorders and TMJ dysfunction. In this paper, they note the lowlevelof evidence-based research on this topic. This is partially confirmed in the study of S. Abu-Raisi etal., where individuals withdifferent types of TMJ dysfunction did not find anysignificant associations between the type of bite and the severity of the pathology [1,6]. However, it is impossibleto ignore the fact that there is a link between окклюзионнымиocclusaldisturbances and pathological processes occurringin the TMJ.

A number of studies emphasizethe relationship between disorders in the dentoalveolar apparatus and brain function. The closest connection is found between pathologies of the "stomatognathic system" and pathologies of the musculoskeletal system, gastrointestinaltract. Different types of facial skeletal growth: dolichocephalic with a long face and a large gonial angle, brachycephalic with a short face and a smaller gonialным angle, mesocephalic (intermediate type) — are also a link inestablishing the correct diagnosis. All phenotypes canconverge with several Engle classes at once [4]. As for the occlusal load,it is generally assumed that patients with dolichocephalic type of growthare more susceptible to overload. However, it is not necessary that these forces will causedamage to periodontal tissues and teeth. In contrast, in some brachycephals, even inthe absenceрафункцииof muscle dysfunction, the occlusal force is sostrong that it can cause joint dysfunction. It is also worth noting that the shape of an adult's facedepends not only on genetic factors, but also on the volume of the masticatory muscles. A number ofstudies have established a relationship between the cross-sectional area of the masticatory muscles and the morphology of the face. Scientists have found that in people with brachycephalic growth type, the masticatoryand medial pterygoid muscles have large cross-sections. This was later also confirmed by three-dimensional computedtomography. In a number of studies, it was shown that the cause of dislocation of the articular disc can be sagittal discrepancies between the jawsassociated with the size of the lower jaw and itsposition in space. Patients with TMJ displacement had shorter mandibular branches and body, and the authors notedclockwise rotation of the lower jaw during growth comparedнию to subjects with a normal disc position. TMJ disc dislocations have also been associated with mandibular asymmetry [14]. In contrast,craniofacial features, such as the angle of inclination of the occlusal plane to the Frankfurt horizontal or the interpupillarydistance, were not

associated with TMJ dysfunction in other studies. In the literature, little attention is paid to the relationship between the type of growth of the facial skeleton and TMJ dysfunction. Only one recent study has identified a relationship betweenthe morphology of the shoulder bone and TMJ pain

Conclusion

Thus, we can conclude thatthe TMJ dis function is an important problem in modern dentistry. Analysis of currentliterature has shown that the relationship between the facialskeleton phenotype and дисфункциональнымthe TMJ dysfunctional state is practically not studied, and mostarticles reflect only individual relationships between the type of growth of the maxillofacial region and its surrounding structures.

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