GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 5 (350) Май 2024

ТБИЛИСИ - NEW YORK

ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press. Published since 1994. Distributed in NIS, EU and USA.

GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

GEORGIAN MEDICAL NEWS
No 3 (348) 2024

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GEORGIAN MEDICAL NEWS
No 5 (350) 2024

ETIOLOGY, DIAGNOSIS AND TREATMENT OF MUSCLE-ARTICULAR DYSFUNCTION OF THE TEMPOROMANDIBULAR JOINT IN ADOLESCENCE

Yaroslavska J.J, Hrechko N.B, Vlasov A.V, Smorodskyi V.O, Storozheva M.V, Skliar S.O, Lupyr M.V, Nazaryan R.S.

Kharkiv National Medical University, Kharkiv, Ukraine

Abstract.

Etiologic and pathogenetic aspects cause the most contentious issue in the study of temporomandibular joint (TMJ) syndrome in childhood and adolescence. Some researchers have linked the emergence of this group of diseases with abnormal occlusion, others have more emphasis on the age characteristics of a growing organism, or rather on a number of morphological and psychomotor processes arising and ending at puberty and cause physiological abnormalities in the growing organism.

Aim: The aim of the study was to improve the method of complex treatment of TMJ dysfunction in adolescence by exploring its development factors with early diagnosis methods.

Materials and methods: We have examined by clinical and radiological methods 33 patients with TMJ syndrome disorder between the ages of 11 to 18 years, 20 of them (60.6%) girls and 13 (39.4%) boys. All examined patients complained of the presence of clicks in the joint when they open mouth widely, irregular movement of the lower jaw when opening the mouth, the periodic occurrence of unilateral pain in the joint and the ear, increasing when taking rigid and solid food, which allowed us to establish the diagnosis of the TMJ syndrome. A clinical study has focused on the survey of patients, and in some cases their parents, in order to study carefully the history of life and disease, and the patient's complaints. We have found out the factors predisposing to the disease: the presence of various bad habits, family history, trauma of the lower jaw and TMJ, errors in orthodontic treatment.

Results: The data obtained showed that 16 (48.5%) patients had a history revealed various factors that contribute to the TMJ syndrome. The presence of various bad habits was about 38%. In addition, 13 (39.4%) patients reported the presence of emotional stress. The presence of orthodontic pathology was determined in 26 (78.8%) patients, 7 (21.2%) patients had no dentofacial disorders was not determined.

The most common symptom, occurring in 27 (81.8%) patients was clicking in the joint with one or two sides, as well as excessive excursion of articular heads, occurring in 17 (51.5%) patients. A distinctive feature of TMJ syndrome manifestations in children and adolescents is relatively rare, in contrast to adults, the appearance of symptoms: pain when opening the mouth wide detected only 7 (21.2%) patients; pain in the joints - 8 (24.2%) patients; pain in the masticatory muscles - 6 (18.2%) patients.

Conclusions: Based on the above, the etiological factors of musculo-articular dysfunction of the TMJ in adolescence can be not only dental anomalies, but also the presence of bad habits, disproportions in the growth of the bone and muscular skeleton and hypokinetic states caused by psychophysiological responses to chronic stress. Accordingly, treatment of patients with this pathology should be comprehensive and include not only treatment of the dental system, but also be aimed at the uniform development of the musculoskeletal system in children and at eliminating bad habits and chronic stress factors.

Key words. Oral cavity, temporomandibular disorders, temporomandibular joint, muscular-articular dysfunction.

Introduction.

Temporomandibular joints (TMJ) are one of the most complex joints [1]. Each one is located on one side of the face, and are composed of mandibular fossa, joint tubercle, and condylar process of mandible, separated by an articular disk. To these structures are attached ligaments and muscles, which will provide stability and movement that could be detected on computer tomography [1,2].

Anatomical peculiarities as predisposition for inflammatory processes were described early [3-6]. But the problem of diagnosing and treating muscular-articular dysfunction (MAD) of the temporomandibular joint in adolescence is relevant in connection with chewing side preference forming [7-9]. Adolescents seeking help with this pathology make up the bulk of patients with oral cavity pathology of different origin [10-13]. The most controversial issue in the study of TMJ MAD in childhood and adolescence is caused by etiopathogenetic aspects. Some researchers associate the occurrence of this group of diseases with occlusion pathology [8,14], other authors focus more on the age-related characteristics of the growing organism, more precisely on a number of morphological and psychomotor processes that arise and end during puberty and cause physiological deviations in the growing organism. In addition, some authors associate the presence of TMJ MAD with endocrine disorders that occur during puberty, as well as with vitamin deficiency, which leads to depression, muscle soreness, and general weakness.

Simultaneously, there is opinion that hypermobility of the joint heads of the TMJ, which does not cause signs of pathology in the form of masticatory function disorders, discoordination of the masticatory muscles and uncontrolled displacements of the lower jaw, the presence of a pain symptom should be considered as a variant of norm [15]. Due to disagreements arising in matters of etiology, pathogenesis, as well as the clinic and diagnosis of TMJ MAD, a large number of controversial and unresolved issues arise in the treatment of this pathology, which prompted us to continue research into the etiology of this disease and improve the method of complex etiotropic treatment.

The purpose of the study was to improve the method of complex treatment of TMJ muscular-articular dysfunction in adolescence by studying the factors of its development using early diagnostic methods.

Materials and Methods.

We examined clinically and radiologically 33 patients with musculo-articular dysfunction of the TMJ aged from 11 to 18 years, of whom 20 (60.6%) were girls and 13 (39.4%) boys. All examined patients complained of a clicking sound in the joint when opening the mouth wide, uneven movement of the lower jaw when opening the mouth, periodic occurrence of unilateral pain in the joint and ear, aggravated by eating hard and solid food, which allowed us to establish a diagnosis of muscular-articular dysfunction TMJ.

During the clinical examination, special attention was paid to interviewing patients, and in some cases their parents, in order to carefully study the history of life and illness and the patient's complaints. The presence of factors predisposing to the occurrence of this disease was determined: the presence of various bad habits, hereditary burden, injuries of the lower jaw and joint, errors in orthodontic treatment. Complete data on the characteristics of the life history and illness are presented in Table 1.

X-ray examination of patients was carried out for the purpose of differential diagnosis with other diseases of the TMJ and that are [16,17]. The method of orthopanoramic radiography was used. When analyzing the images, attention was paid to the topography of the bone elements of the joint, the width of the joint space, the shape of the articular elements, and a comparison was made between the right and left joints. In all patients, no pathological changes in the joint were detected; the right and left joint spaces were equal. The data obtained made it possible to confirm the diagnosis of TMJ MAD.

During the general examination of patients, attention was paid to physical development. A metric examination of patients was carried out (correspondence to gender, age, height and weight) in order to determine the nature of their physique. 28 (84.9%) people had a normosthenic, 4 (12.1%) asthenic and 1 (3%) hypersthenic physique. All cases of asthenic physique were observed in adolescents aged 11 to 15 years, and the parents of these patients noted a sharp acceleration in the growth of the child's skeleton in the last 1 - 2.5 years.

The work was performed based on research materials from the Kharkov National Medical University of the Ministry of Health of Ukraine, Department of Pediatric Dentistry, Pediatric Maxillofacial Surgery and Implantology "Diagnostics and treatment of diseases of organs and tissues of the maxillofacial area" (state registration number 0113U002274). Ethical approval for the study was obtained from the Regional Ethical Review Board at Kharkiv National Medical University in compliance with the Helsinki Declaration. The presence of psychological stress was assessed by subjective examination during the anamnesis collection. Individual interviews were conducted with patients and parents. The data obtained during the anamnesis collection are stored in the patient's medical record.

Statistical processing was performed using the methods of variation statistics. Correspondence of the distribution to the normal distribution was determined by the Shapiro-Wilk's test, which showed that the samples were close to the normal distribution. Correlation between indicators was assessed using Spearman's correlation coefficient (r). The statistical difference between the studied parameters was considered significant at p less than 0.05. The purpose of the statistical analysis was to identify the odontogenic and non-odontogenic etiological factors of muscle dysfunction syndrome. The data of the statistical analysis are presented in Tables 1 and 2 of this article.

Results and Discussion.

From the data in Table 1 it follows that 16 (48.5%) patients had a history of various factors contributing to the occurrence of TMJ MAD. Of these, the presence of various bad habits amounted to about 38%. In addition, 13 (39.4%) patients noted the presence of psycho-emotional stress caused by heavy academic loads, worries about further education after school, first love, etc.

Clinical examination revealed the presence of orthodontic pathology. The obtained data is shown in Table 2. From the data in the table, it follows that 26 (78.8%) patients had various bite pathologies; in 7 (21.2%) patients no dental disorders were identified.

When examining the TMJ, the range of movement of the lower jaw was noted; the nature of the excursion of the heads of the lower jaw; the presence of clicking, pain, crunching in the joints; asynchronous movement of the lower jaw; the nature of the movement of the articular heads. The masticatory muscles were palpated to identify trigger zones.

Table 1. *Distribution of patients with TMJ MAD depending on medical history.*

Peculiarities of medical history	**Patient gender**				**Total**	
	Male		**Female**			
	Abs. number	**%**	**Abs. number**	**%**	**Abs. number**	**%**
Without features	4	12.2	13	39.4	17	51.5
Having bad habits: a) chewing on one side;	1	3	1	3	2	6.1
b) chewing gum	-	-	1	3	1	3
c) the prevalence of pureed food in the diet;	1	3			1	3
d) wide opening of the mouth when biting food	2	6.1			2	6.1
Fracture of the lower jaw	3	9.1	-		3	9.1
Epilepsy	1	3	-		1	3
Hereditary burden	1	3	2	6.1	3	9.1
Errors during orthodontic treatment	-	-	3	9.1	3	9.1
Total:	13	39.4	20	60.6	33	100

Table 2. *Distribution of patients with MAD TMJ depending on the state of occlusion.*

State bite	Patient gender				Total	
	Male		Female			
	Abs. number	%	Abs. number	%	Abs. number	%
Orthognathic occlusion	2	6.1	3	9.1	5	15.1
Changeable bite	1	3	1	3	2	6.1
Deep bite	2	6.1	3	9.1	5	15.2
Crossbite		-	2	6.1	2	6.1
Open bite	-	-	1	3	1	3
Prognathia	1	3	3	9.1	4	12.1
Crowded teeth	1	3.1	4	12.1	5	15.2
Anomalies in the position of individual teeth	4	12.1	1	3	5	15.1
Presence of supernumerary teeth	1	3	-	-	1	3
Early removal of individual teeth	1	3	2	6.1	3	9.1
Total:	13	39.4	20	60.6	33	100

The most common symptom, occurring in 27 (81.8%) patients, was clicking in the joint on one or both sides, as well as excessive excursion of the articular heads, occurring in 17 (51.5%) people. A distinctive feature of the manifestation of MAD TMJ in adolescents is the relatively rare occurrence of painful sensations, in contrast to adults. Thus, only 7 (21.2%) people noted pain when opening the mouth wide; pain in the joint - 8 (24.2%) patients; pain in the masticatory muscles - 6 (18.2%) people.

The data obtained in the work suggest that there are several main etiological factors that can equally contribute to the occurrence of TMJ muscle dysfunction syndrome in childhood and adolescence. According to our observations, these factors are pathological changes in the dental system, imbalances in the growth of the musculoskeletal system during puberty, the presence of bad habits (chewing on one side, constant chewing of gum, wide opening of the mouth when biting food, yawning, etc.), frequent psycho-emotional and physical stress.

Thus, the data we obtained while collecting anamnesis allowed us to draw attention to the age-related characteristics of a growing organism. It is known that during puberty, physiological abnormalities occur in the body of adolescents, which are regarded as pathology of puberty. During this period, the relationship between structure and function in many organs and systems of the growing organism is disrupted. One of the manifestations of this condition is age-related disproportion in the growth of the musculoskeletal system. During this period, osteogenic activity is increased, and bone growth outstrips the functional adaptation of the muscles and ligaments of the joints. Muscles reach their greatest strength only 1.5 years after the end of skeletal growth. The pathogenesis of TMJ SMD in such cases can be presented as follows. As a result of the rapid and active longitudinal growth of the mandibular bone, the articular capsule and ligamentous apparatus of the joint come into a state of overstrain. Immature tissues of the ligamentous apparatus and joint capsule are not able to compensate for such overstrain for a long time. During this period, the physiological functional load on the joint is excessive and after some time leads to loss of tone, sprain of the ligaments and joint capsule, and joint dysfunction.

As the right and left joint spaces were equal in all patients, we can suggest about no connection it with effect of chewing-side preference on temporomandibular joint as it was described early [18]. The data obtained made it possible to confirm the diagnosis of TMJ MAD with using of developed technology [19-21] with involvement in diagnostic measures computer vision systems and artificial intelligence [22-24] as about 20% young people have hypermobility of the articular heads of TMJ [15] and its detection require significant efforts of medical service [25].

In addition, the modern intense rhythm of life can lead to the development of TMJ MAD in adolescents against the background of psycho-emotional stress, epilepsy [26,27]. The mechanism by which stress acts on the masticatory muscles may be explained by the adolescent's inability to provide an immediate outlet for stress responses, which are therefore usually suppressed. Constant exposure to situations that cause anxiety and stress can create a state of tension. And the lack of implementation of responses, according to some authors, leads to the development of chronic hypokinetic dysfunctions [28,29]. Psychophysiological responses from the muscles are expressed in their tension and increased tone, which leads to the appearance of many symptoms of TMJ MAD, such as pain, limitation of movements and disruption of functional harmony.

No one of patient remind smocking as harmful habit but local influence of nicotine with pathological consequence [30,31] in combination with chewing disorder [9,18] should be more detail study in future work. Other undescribed possible link is influence of endocrine system on facial skeleton [32,33].

The results obtained in the work allowed us to create a working scheme for the development of TMJ MAD in childhood and adolescence (Figure 1) based on the pathogenesis scheme of TMJ muscular-articular dysfunction syndrome. Based on our results, we prescribed complex treatment aimed at eliminating all the main etiological factors in the development of the disease.

To normalize the occlusion, orthodontic treatment was carried out, multiple occlusal contacts of the teeth were restored (restoration of the anatomical shape of the crowns of the teeth during therapeutic treatment, selective grinding of the teeth).

To relieve overstrain from the ligamentous apparatus of the joint, patients were prescribed a gentle diet (soft pureed food), paying attention to the need for bilateral chewing, for uniform operation of the masticatory muscle group. During the initial phase of treatment, excessive movements of the mandible were

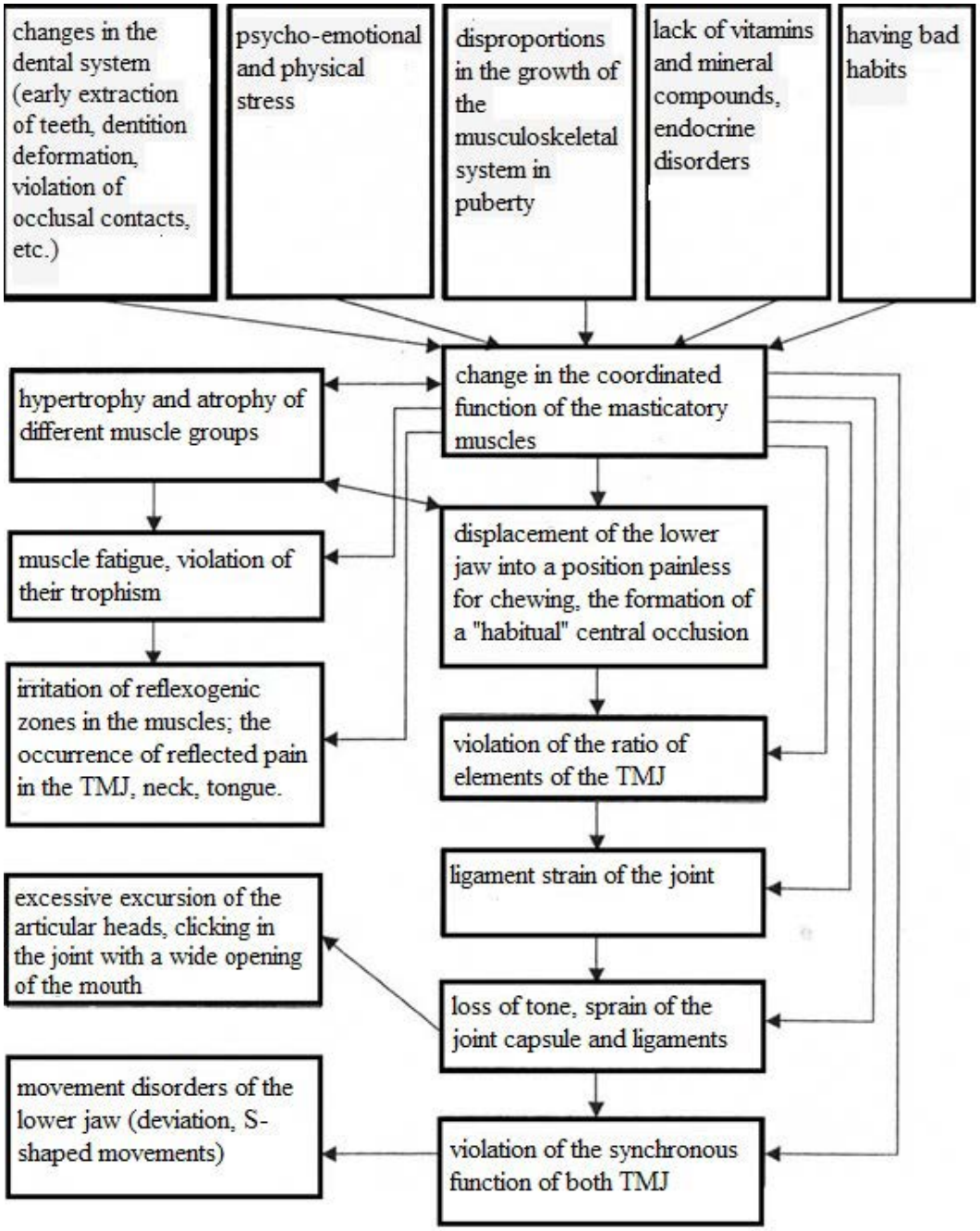

Figure 1. *Etiopathogenesis of changes in the temporomandibular joint and masticatory muscles in adolescents with muscular-articular dysfunction.*

limited by wearing a soft chin sling. Interocclusal orthopedic plates or dental splints were made to relax the muscles and change the relationship between the articular head and the fossa. To relieve pain symptoms, patients were prescribed non-steroidal anti-inflammatory drugs and non-narcotic analgesics. To eliminate the etiological effects of stress and relieve muscle hypertonicity, sedatives of plant origin were prescribed. In addition, the patients were prescribed physiotherapeutic treatment, including myogymnastics, massage, electrophoresis on the joint area, diadynamic currents to relieve muscle hypertonicity and eliminate pain. After the treatment, patients no longer experienced subjective and objective symptoms of the disease.

To relieve overstrain from the ligamentous apparatus of the joint, patients were prescribed a gentle diet (soft pureed food), paying attention to the need for bilateral chewing, for uniform operation of the masticatory muscle group. During the initial phase of treatment, excessive movements of the mandible were limited by wearing a soft chin sling. Interocclusal orthopedic plates or dental splints were made to relax the muscles and change the relationship between the articular head and the fossa. To relieve pain symptoms, patients were prescribed non-steroidal anti-inflammatory drugs and non-narcotic analgesics. Level of specialist and persistence is crucial in prophylactic examination due to low informative significance of laboratory data in detection of temporomandibular disorders [34,35]

with adding information to estimation oral health indices in adolescents [36].

To eliminate the etiological effects of stress and relieve muscle hypertonicity, sedatives of plant origin were prescribed. In addition, the patients were prescribed physiotherapeutic treatment, including myogymnastics, massage, electrophoresis on the joint area, diadynamic currents to relieve muscle hypertonicity and eliminate pain.

Conclusion.

Based on the above, the etiological factors of musculo-articular dysfunction of the TMJ in adolescence can be not only dental anomalies, but also the presence of bad habits, disproportions in the growth of the bone and muscular skeleton and hypokinetic states caused by psychophysiological responses to chronic stress. Accordingly, treatment of patients with this pathology should be comprehensive and include not only treatment of the dental system, but also be aimed at the uniform development of the musculoskeletal system in children and at eliminating bad habits and chronic stress factors.

Financial support and sponsorship: No financial support was received for this study.

Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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