CLINICAL CASE

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A CLINICAL CASE OF TREATMENT OF TEMPOROMANDIBULAR JOINTS DISEASE CAUSED BY OCCLUSIVE DISORDERS

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КЛИНИЧЕСКИЙ СЛУЧАЙ ЛЕЧЕНИЯ ДИСФУНКЦИОНАЛЬНОГО СОСТОЯНИЯ ВИСОЧНО-НИЖНЕЧЕЛЮСТНЫХ СУСТАВОВ, ОБУСЛОВЛЕННОГО ПАТОЛОГИЧЕСКОЙ ОККЛЮЗИЕЙ

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A method of treatment, described in this clinical case, is aimed at eliminating disorders of occlusal relationships of the dentition, (Patent No. 2797641 dated 06/07/2023) contributing to the normalization of TMJ functioning. At the first stage of treatment, a repositioning occlusal splint was used, applied to all teeth of the lower jaw, which was being corrected for six months. This stage was considered completed on the basis of the following criteria: absence of the patient`s complaints and smooth movements of the mandible without deviations and clicks on objective examination, as well as formation of symmetrical graphs of the TMJ condyles movement on axiographic ex-

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amination, an optimal location of the TMJ condyles on sagittal projections of MSCT and positive changes in the bioelectric activity of the masticatory muscles, towards higher and more symmetrical values on both sides.
Further treatment was carried out by an orthodontist with a non-removable technique, using a brace system. Wearing of the occlusal splint continued until the braces system was put on the teeth of the lower jaw. It was then replaced by composite linings in the projection of the first molars of the upper jaw.
Dynamic monitoring of the patient for half a year after the end of the treatment indicated remission of TMJ disease.
Normalization of occlusal relationships of dentitions in intact dentitions and small defects through splint therapy followed by the use of a brace system is a minimally invasive and effective method of treatment TMJ diseases.
Keywords. Axiography, electroneuromyography, brace system, temporomandibular joint.

Существует проблема повышения эффективности функциональной реабилитации пациентов с заболеваниями височно-нижнечелюстного сустава путём применения комплексного подхода к коррекции окклюзии.
В представленном клиническом случае описан способ лечения, направленный на устранение нарушений окклюзионных взаимоотношений зубных рядов (патент № 2797641 от 07.06.2023), способствующий нормализации функционирования височно-нижнечелюстного сустава (ВНЧС). На первом этапе лечения использовали репозиционную окклюзионную шину, наложенную на все зубы нижней челюсти, коррекцию которой проводили на протяжении шести месяцев. Критериями для окончания данного этапа служило отсутствие жалоб пациента, а при объективном обследовании – плавные движения нижней челюсти без девиаций и щелчков, а также формирование симметричных графиков движения мыщелков ВНЧС при аксиографическом исследовании, наличие оптимального расположения мыщелков ВНЧС на сагиттальных проекциях МСКТ и положительных изменений показателей биоэлектрической активности жевательных мышц в сторону более высоких и симметричных значений с обеих сторон.
Последующее лечение проводилось врачом-ортодонтом несъёмной техникой посредством брекет-системы. Ношение окклюзионной шины продолжалось до этапа расположения брекет-системы на зубах нижней челюсти, в этот период она была замещена композитными накладками в проекции первых моляров верхней челюсти. Динамическое наблюдение за пациентом в течение полугода после окончания лечения свидетельствовало о ремиссии заболевания ВНЧС.
Таким образом, нормализация окклюзионных взаимоотношений зубных рядов посредством сплинттерапии с последующим применением брекет-системы при интактных зубных рядах и малых их дефектах является малоинвазивным и эффективным способом лечения заболеваний ВНЧС.
Ключевые слова. Аксиография, электронейромиография, брекет-система, височно-нижнечелюстной сустав.

INTRODUCTION

According to domestic and foreign studies, temporomandibular joint (TMJ) diseases are a fairly common pathological condition in patients [1–3]. In turn, the World Health Organization notes that dysfunctional TMJ conditions are included in the triad of the most frequently occurring diseases in dental patients [4–6].

Violation of somatic homeostasis, neuromuscular dysfunctions, occlusal disorders are directly related to the state of the TMJ [7–9]. Modern diagnostic methods allow us to determine both the structural component of the disorder and the functional one; however, having a polyetiological nature, TMJ diseases often require an interdisciplinary approach to treatment [10–13].

According to modern data from domestic and foreign authors, there is a tendency towards an increase in the number of young people with TMJ pathology, including those with intact dental arches [14–16]. As a rule,

this is due to the presence of orthodontic pathology or previously conducted irrational orthodontic treatment [17; 18].

The problem of treating patients with TMJ pathology with intact dental arches and minor defects requires a more detailed study and the introduction of new approaches to the rehabilitation of this category of patients.

Clinical Case

Patient M., 26 years old, came in April 2021 with the following complaints: constant painless clicking in the parotid-chewing area on the right when opening the mouth.

The patient's medical history is not complicated. He denies the presence of other somatic diseases.

Progression of the present disease: In February 2021, severe clicking in the right TMJ, which limited opening of the mouth, accompanied by pain, first appeared. After seven days of taking NSAIDs, the pain gradually subsided.

Palpation of the TMJ and masticatory muscles is painless. When opening the mouth, a deviation of the lower jaw is determined with a click at the beginning of opening the mouth in the area of the right and left TMJ, asynchronous movement of the condyles. The midline is shifted to the right by 5 mm.

In the oral cavity: the mucosa is without visible pathological changes, the anterior teeth of the upper jaw overlap the same teeth of the lower jaw by 1/2 of their height, vestibular displacement 1.3, 2.2, crowded arrangement of the anterior teeth of both jaws.

The closure of the dental arches in the position of central occlusion is sharply hampered with a distal and rightward shift at the end of mouth closure.

The absence of 4.6, the presence of recurrent caries 2.6; artificial metal-ceramic crowns of satisfactory quality 1.5, 2.7 are determined (Fig. 1).

According to the electroneuromyography data, significant differences in the biopotentials of the masticatory muscles were found in the patient's initial state, due to the predominance of muscle contraction on the left (Table 1).

The results of the axiography performed at the diagnostic stage indicated a dysfunctional state of the TMJ, which was characterized by the intersection of tracks during vertical movements of the lower jaw (Fig. 2).

Based on the results of the main and additional research methods, the following diagnosis was established: K07.61 – "clicking jaw" syndrome, forced distal-lateral

	П	П	К	П									П/С	К	
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
	П	О												П	

Fig. 1. Dental formula according to Viola of Patient M.

Table 1

Results of electroneuromyography of masticatory muscles before treatment

Muscle localization	Average amplitude, μV	
	Right (dex)	Left (sin)
Central occlusion position		
Masticatory	485	750
Temporal	358	690
Muscles of the floor of the mouth	135	288

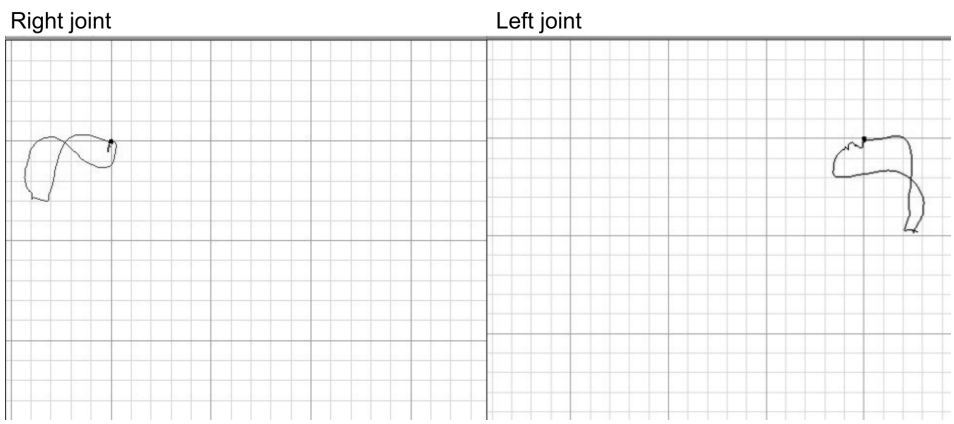

Fig. 2. Axiography of movements of TMJ condyles during vertical movements of the lower jaw before treatment

Fig. 3. The repositioning occlusal splint is located on the teeth of the lower jaw

occlusion, myodysfunctional syndrome, K07.31 – displacement of 1.3, 2.2, K07.30 – crowding of the anterior teeth, K08.1 – partial absence of teeth on the lower jaw, class III according to Kennedy, K02.1–2.6 recurrent dentin caries, class I according to Black.

Treatment: the initial stage was the sanitation of the oral cavity, according to the dental formula, then the production of an occlusal repositioning splint was performed (Fig. 3), for this purpose an analog impression was obtained from the lower jaw, according to which a plaster model was made, necessary for the stage of determining the most optimal position of the lower jaw in relation to the upper one using a wax template, according to which an occlusal splint was made from colorless plastic using hot polymerization (Belacril-E GO, Vladmiva, Russia) (see Fig. 3).

Subsequently, periodic reline of the splint occlusal surface was performed for six months. To confirm the effectiveness of the occlusal reline stage, diagnostic measures were repeated, which were characterized by the absence of patient complaints, and during an objective examination, smooth movement of the lower jaw without deviations and clicks.

The graphic representation of the movements of the lower jaw, recorded using axiography, indicated a positive change in the trajectories of the movement of the condyles of the TMJ, which were characterized as symmetrical, harmoniously concave tracks (Fig. 4).

The MSCT visualized the optimal and symmetrical position of the condyles in both TMJs (Fig. 5).

The values of the biopotentials of the masticatory muscles by the end of splint therapy according to electroneuromyography data had minimal differences, which indicated their almost symmetrical contraction on the left and right halves of the face (Table 2).

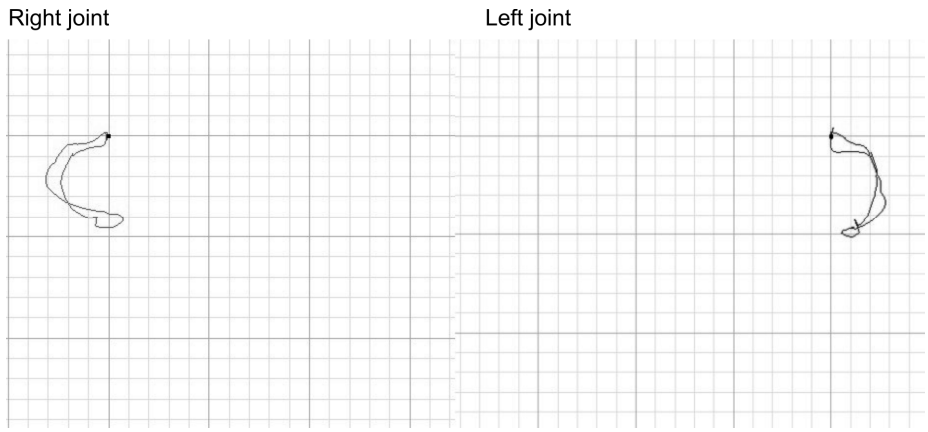

Fig. 4. Axiography of the TMJ during vertical movements of the lower jaw with an occlusal splint

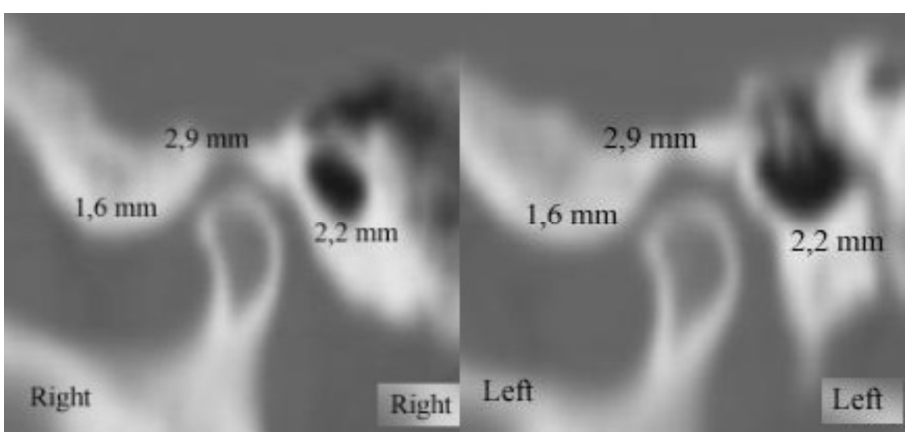

Fig. 5. MSCT of the TMJ (in the position: closed mouth) in the sagittal projection with an occlusal splint

Table 2

Results of electroneuromyography of masticatory muscles with occlusal splint

Muscle localization	Average amplitude, μV	
	Right (dex)	Left (sin)
Central occlusion position		
Masticatory	785	780
Temporal	688	695
Muscles of the floor of the mouth	300	305

The results of the conducted studies allowed us to move on to orthodontic treatment, which consisted of the sequential application of the bracket system first to the teeth of the upper jaw; wearing of the occlusal splint continued at this stage (Fig. 6).

Fig. 6. Braces on the teeth of the upper jaw

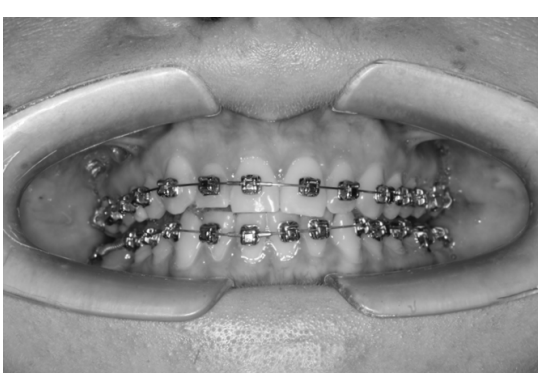

Fig. 7. The stage of applying the brace system to the teeth of the lower jaw

After three months, the bracket system was fixed to the lower row of teeth (Fig. 7) and fixation of photocomposite overlays, which in this clinical case were located in the area of teeth 1.6, 2.6, wearing of the splint was completed at this stage (Fig. 8).

Completion of orthodontic treatment was accompanied by the removal of the bracket system with the installation of retainers on the oral surface of the anterior teeth of the upper and lower jaws, as well as prosthetics with an artificial crown on an implant in the area of the missing 4.6 (Fig. 9).

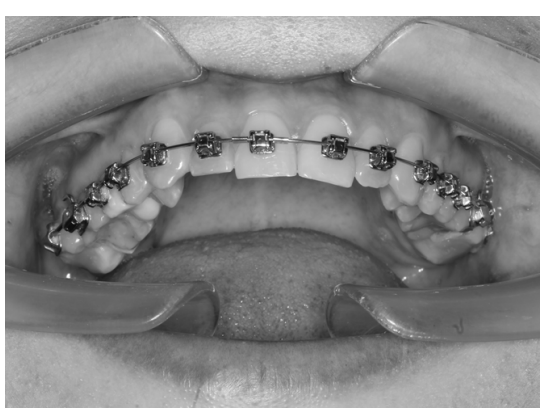

Fig. 8. Photocomposite onlays on the occlusal surfaces of the first molars of the upper jaw

Fig. 9. Closing of the dental arches after completion of treatment

Results and discussion

The presented clinical case describes a method for correcting disorders of the occlusal relationships of the dental arches and, as a consequence, normalizing the functioning of the TMJ.

At the stage of clinical examination, asynchronous movement of the TMJ condyles, clicks, deviation of the lower jaw during opening and closing of the mouth, and the presence of orthodontic pathology of individual groups of teeth were determined.

The graphs obtained during axiography were characterized by the formation of asymmetrical tracks, and the results of measuring the biopotentials of the masticatory muscles during an electroneuromyographic study indicated an asymmetry in the tension of the masticatory muscles of the left and right halves of the face.

At the diagnostic and treatment stage, a repositioning occlusal splint was used on the lower row of teeth. During periodic examinations over a period of six months, the occlusal splint was adjusted until the therapeutic position of the lower jaw was achieved. The criteria for the effectiveness of this stage were the absence of complaints, symptoms in the TMJ area and masticatory muscles during palpation, as well as data from additional diagnostic methods – the formation of symmetrical graphs of the movement of the TMJ condyles during an axiographic study, the presence of an optimal location of the TMJ condyles on the sagittal projections of MSCT and changes in the bioelectrical activity of the masticatory muscles towards higher and symmetrical values on both sides.

Subsequent treatment was performed by an orthodontist using fixed equipment using a bracket system. Wearing an occlusion splint continued until the bracket system was placed on the teeth of the lower jaw, at which time it was replaced by composite overlays in the projection of the first molars of the upper jaw.

Conclusions

Normalization of occlusal relationships of dental arches by means of splint therapy followed by the use of a bracket system for intact dental arches and minor defects is a minimally invasive and effective method of treating TMJ diseases.

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