ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

DISLOCATION OF THE TEMPOROMANDIBULAR JOINT DISC AS A CONSEQUENCE OF LATERAL MANDIBULAR DISPLACEMENT.

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Objective: Currently, there is an urgent need to address the diagnosis and identification of the causes of temporomandibular joint disorders. The current realities in dentistry significantly contribute to this problem: the use of high-strength and rigid materials, the abundance of total restorations and orthodontic treatment, and the lack of comprehensive diagnosis of the maxillofacial region to identify hidden, compensated temporomandibular joint pathology before dental intervention. All of this leads to the emergence of patients with pronounced, developed symptoms. The goal is to examine the relationship between various occlusal disorders, specifically between lateral mandibular displacement and internal temporomandibular joint disorders (or disc dislocations, intra-articular elements).Methods and materials. Based on literature data, an assessment of the prevalence of disc dislocation was conducted, and various etiological factors of internal temporomandibular joint disorders were considered, particularly certain types of pathological occlusion that can significantly impact the disturbance of the relationship between intra-articular elements. As an example, two clinical cases with temporomandibular joint disorders with similar symptoms and the presence of transverse bite pathology due to incorrect jaw growth and acquired pathology during dental interventions are presented. Conclusion. It has been found that transverse bite pathology typically provokes temporomandibular joint dysfunction and internal joint disorders. Further research will focus on identifying occlusal factors that are highly likely to trigger the development of temporomandibular joint disorders, studying their mechanism of influence, and exploring methods of detection.

Keywords: transverse pathology, temporomandibular joint dysfunction, internal temporomandibular joint disorders.

Introduction. Dislocation of the temporomandibular joint (TMJ) disc is classified as an internal disorder, associated with changes in the relationship between joint structures, specifically the displacement of the disc relative to the condyle forward, sideways, backward, and combinations of these vectors [8, 17].

There is a notion that asymptomatic disc displacement is quite common in the population, and therefore, some researchers suggest considering it as a variant of the norm [8]. However, MRI results of children aged 2 months to 5 years did not reveal any cases of abnormal joint structure relationships [14]. While, in adolescents, its prevalence reaches an average of 6% [10] and tends to increase to 34% in young and middle-aged individuals [1, 5, 11, 13, 16].

ISSN: 2692-5206
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This statistic suggests that the changes are acquired in nature, potentially not physiological, as they were not observed in early age. They may be initial pathological changes associated with the accumulation of factors influencing the destabilization of the relationship between the internal structures of the TMJ.

The aim of this study: to examine the relationship between occlusion, lateral mandibular displacement, and TMJ disc dislocation.

Materials and methods. Researchers identify a number of theories: bacterial, biomechanical, hormonal, traumatic, whiplash injury [13], occlusal factors, joint hypermobility [8].

Undoubtedly, internal disorders encompass a large group of diverse impairments, meaning it's not a singular nosological entity but a complex of various pathologies. Therefore, it is reasonable to assume that their development requires different causes or their combinations. Still, researchers attribute only 10-20% [15] of TMJ disorders to occlusal factors as a potential cause, implying that this type of occlusal pathology is not the primary cause in all cases. However, when considering the scenario where bite pathology is the cause of individual nosological units of specific internal disorders, the statistics would be much higher. Is it possible to find a correlation between a particular bite pathology and a specific type of TMJ disorder, identify their biomechanics, patterns, pathogenesis, and corresponding treatment algorithms?

This article examines one possible mechanism of TMJ disorder formation, related to lateral mandibular displacement.

As is known, the temporomandibular joint (TMJ) is the most complex joint in the human body. This complexity arises from the variety and extent of its movements, the presence of a disc, its paired nature, and the absence of a bony connection. Both joints and muscles work harmoniously as long as there is a certain balance, which is maintained, among other things, by the compensatory capabilities of the human body up to a certain point. When factors arise that disrupt this balance and the possibility of compensation, TMJ disorders appear. One of these factors is lateral mandibular displacement.

According to Iskhakov I.R., no patients with transverse bite pathology without TMJ disorder symptoms have been identified [6, 7]. However, in cases of combined TMJ dysfunction, increased wear, and transverse or distal mandibular displacement, signs like joint noises, pain on palpation of masticatory muscles, and occlusal disturbances are significantly more common in case of lateral displacement [3, 4, 20]. This is likely due to the lower level of compensation during lateral displacement compared to distalization of the mandible. It's possible that disc displacement occurs more easily with transverse pathology, as the condyle, shifting sideways, provokes changes in disc position, "forcing it to seek a more comfortable position" because the vertical dimensions of the joint space decrease and the disc is pushed into a new relationship by the condyle.

As a rule, transverse pathologies develop over years due to chewing on one side (including with removable dentures), and missing teeth. All of this leads to the formation of unilateral

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

tooth wear and further mandibular displacement. On the opposite side of the displacement, supercontacts usually form, exacerbating the transverse pathology [6, 19].

Patients with unilateral terminal defects experience TMJ disorders more frequently than those with bilateral terminal defects. This might be attributed to the unilateral chewing pattern and asymmetric load on the muscles involved in chewing [8, 24]. When only the frontal group of teeth is present, patients report that chewing food is only possible in the anterior region, leading to less trauma to the distal TMJ structures compared to unilateral terminal or included defects where the posterior or posterolateral structures of the joint are loaded.

Meanwhile, electromyographic data indicate that on the displacement side, the masseter muscle activity is three times higher compared to the opposite side, suggesting muscle strain on the displacement side [5, 13, 22]. Prolonged chewing on full dentures on one side also leads to lateral displacement of the mandible and condyles from the centric relation. In a group of patients with dentures without a loss of vertical dimension and with transverse pathology, 23 out of 25 cases showed three or more signs of TMJ disorder [1, 2, 18, 21]. The presence of inaccuracies in the correction of occlusion of permanent restorations made of rigid materials, similar in strength to enamel, can also lead to the formation of pathological mandibular displacement [5, 10, 23, 25].

This results in the formation of a vicious cycle of pathogenesis: the longer the patient lives with transverse pathology, the more clinical manifestations, the greater the tooth wear, the greater the loss of bite height on that side, which provokes distalization and reduction of the vertical dimensions of the joint spaces, disrupting the relationship of the internal elements of the TMJ.

Clinical Case 1. The patient presented with complaints of diffuse, non-localized pain in the left parotid region, clicking in the left TMJ, and difficulty opening the mouth. Complaints intensified after the start of dental treatment. Orthodontic treatment with a straight wire technique on the upper jaw was initiated a month before presentation. Clinically, lateral displacement of the mandible, tilting of the occlusal plane to the left, clicking in the left TMJ, distalization of the left condyle, and myospasm of the superficial masseter and medial pterygoid muscles (source of pain) were found. The patient did not notice any facial asymmetry. Based on TMJ ultrasound data, compression of the bilaminar zone on the left, anterior-medial disc displacement of the left TMJ, and asymmetry in the tone of the lateral pterygoid muscles were diagnosed. The patient was diagnosed with "lateral displacement of the mandible, TMJ pain dysfunction, anterior-medial disc displacement of the left TMJ."

A session of transcutaneous electromyostimulation was performed using the Myostim device, recordings were obtained in the therapeutic position, and splints were made from thermoformers. The patient noted the absence of complaints when wearing them and the onset of dull pain in the parotid region when removing and clenching teeth in the habitual occlusion. She was referred for repeated orthodontic diagnostics in the therapeutic position, correction of the treatment plan taking into account the desire to correct the inclination of the occlusal plane and eliminate the lateral displacement of the mandible to the left.

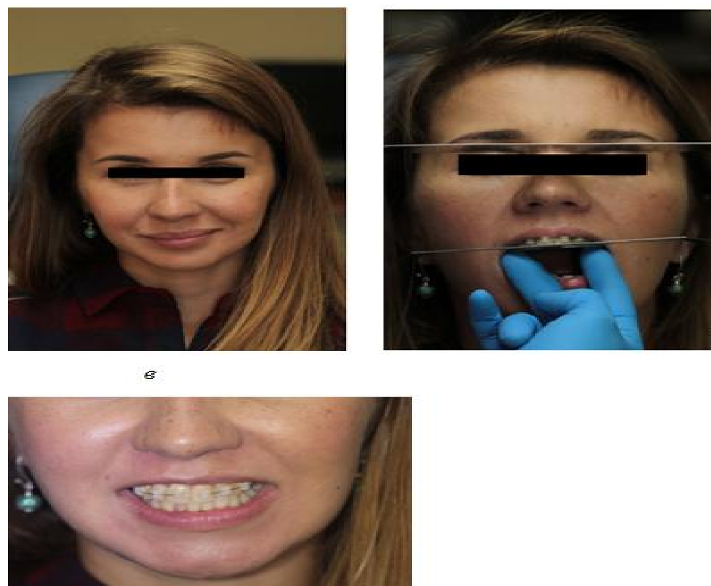

Fig. 1. In the initial situation

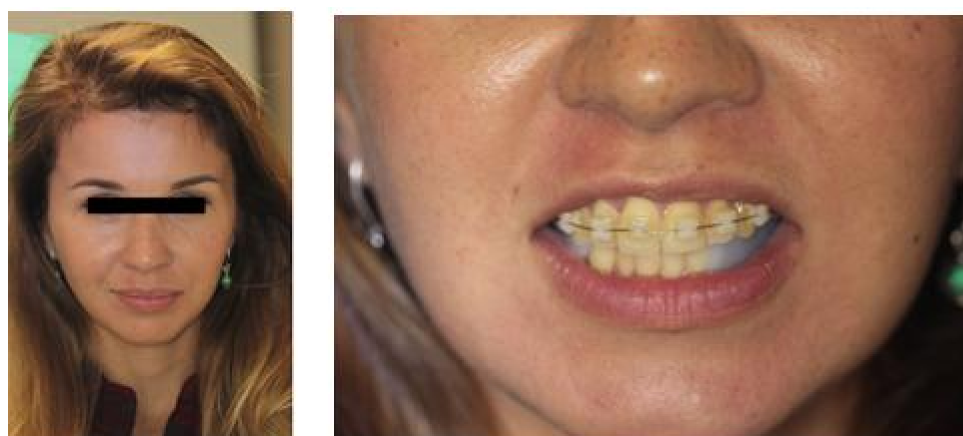

Fig. 2. In therapeutic position

Clinical Case 2. The patient presented to the clinic complaining of diffuse pain on both sides, headaches and neck pain, significantly more intense on the right, facial asymmetry (deviation of the chin and lower lip to the right, change in the position of the eyebrows and eyes), clicking in both TMJs, more on the right, which she did not associate with prosthetics, despite the fact that they arose during the stage of temporary constructions.

The Shimbashi index was 22 mm, the norm in this clinical situation is 17.5 mm. Open bite is about 4 mm, the mandible is shifted to the right by 2 mm. Palpation of the temporal, masseter, medial pterygoid, and occipital muscles is sharply painful. Noises were found in both TMJs, more intense on the right.Lateral displacement of the mandible, orthopedic instability, TMJ pain dysfunction, clicking jaw were diagnosed.

Selective grinding of temporary constructions was performed after muscle relaxation with the Myostim device to reduce the Shimbashi index to 17.5 mm and correct the lateral

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

displacement of the mandible. After reducing the bite height and creating multiple contacts, including in the frontal area, the patient noted the absence of pain in the maxillofacial region, clicking in the right TMJ persists, which may be associated with overstretching of the ligamentous apparatus of the joint. In the future, rational prosthetics in the centric relation is planned.

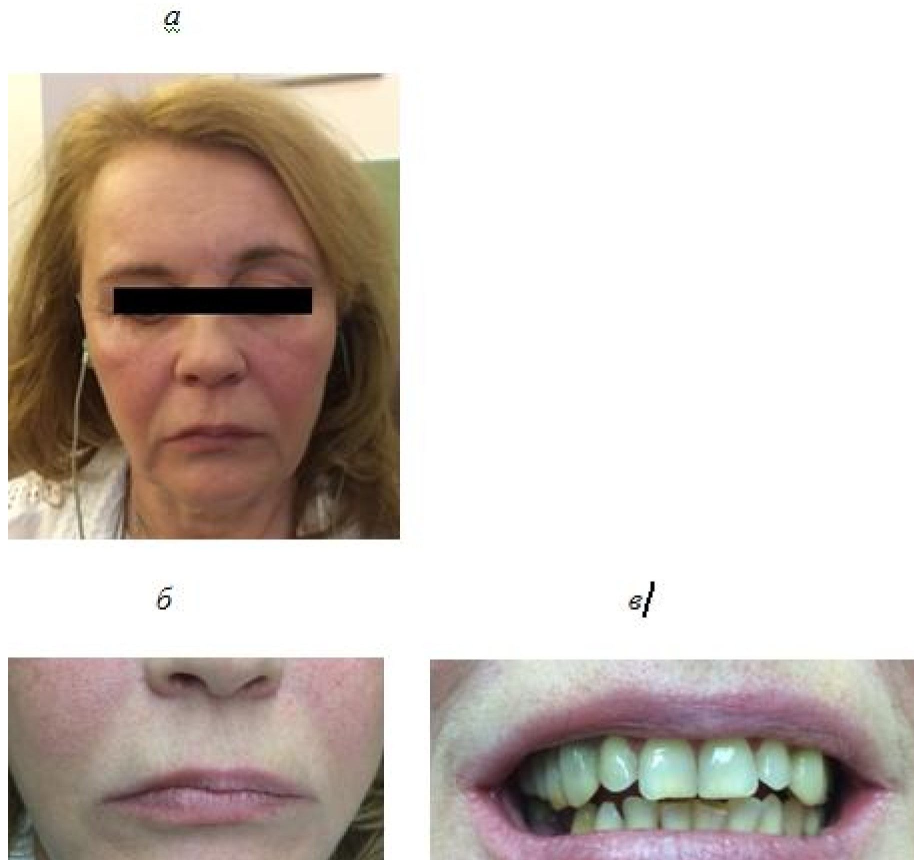

Fig. 3. In the initial situation at multiple occlusion

Fig. 4. After the correction

ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

Results and discussion. Based on the diagnosis and treatment of patients with TMJ disorders, we have reached the following conclusions: Patients with transverse bite pathology exhibited the most significant clinical symptoms. Lateral displacement of the mandible more frequently involves both the muscular and intra-articular components of TMJ disorder.Clinical symptoms are more pronounced on the side of the displacement, which may involve the entire maxillofacial region. According to TMJ ultrasound data, lateral displacement of the mandible is accompanied by significant asymmetry of the face, tone of the masticatory muscles, as well as joint spaces. In all likelihood, with transverse pathology, rapid depletion of compensation and the development of significant TMJ dysfunction occur. Clinical development is influenced by the rate of change in the position of the mandible and individual characteristics of the person. Reducing the lateral displacement of the mandible leads to an improvement in the clinical situation.

Conclusions. It is necessary to identify such mechanisms of TMJ development in patients with compensated pathology in order to prevent complications during dental treatment.

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ISSN: 2692-5206
AMERICAN ACADEMIC PUBLISHER
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