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Diagnostics and Complex Treatment of Pain Dysfunction Syndrome of Temporomandibular Joint

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Abstract: The aim of the study was to study morphological changes in the tissues of the temporomandibular joint (TMJ) and the width of the x-ray joint space in patients with osteoarthritis (OA) after suffering a pain dysfunction syndrome using spiral computed tomography (SCT). The analysis of computed tomograms of 20 patients with OA of the TMJ was carried out according to the method proposed by us. The analysis of the data obtained made it possible to identify the relationship between the severity of clinical manifestations of osteoarthritis and the narrowing of the joint space in the upper and posterior sections, as well as the appearance of morphological changes in the elements of the joint. Keywords: temporomandibular joint (TMJ), spiral computed tomography (SCT), osteoarthritis (OA), functional disorders of the TMJ.

Keywords: temporomandibular joint, pain dysfunction syndrome, complex treatment.

INTRODUCTION

Diseases of the temporomandibular joint (TMJ) are one of the most common pathologies of the maxillofacial region that dentists have to deal with in their daily practice. According to foreign researchers, the prevalence of TMJ pathology ranges from 10.1% [4] to 75% [9]. Domestic scientists provide data on the prevalence of various TMJ diseases up to 95% [3]. Moreover, the most pronounced clinical manifestations of dysfunction of the temporomandibular joint are observed in women aged 19 to 45 years [3]. The clinical picture of various nosological forms of diseases does not allow making an accurate diagnosis [2]. Therefore, to make a diagnosis and determine further treatment tactics, it is necessary to resort to additional research methods. There are various methods of radiation diagnostics of the temporomandibular joint: panoramic radiography in various settings, orthopantomography, tomography, teleradiography. But the above methods of research are uninformative, difficult to analyze due to the fuzziness of the obtained image, the layering of the skull bones, the absence of coronary and axial projections, which complicates the early diagnosis of various TMJ diseases [2]. The most informative method is computed tomography (CT), which allows you to examine and study the bone elements of the TMJ in detail, determine the size of the joint space in different departments and identify the presence of morphological changes in the joint.

The aim of the study was to study morphological changes in the tissues of the temporomandibular joint and the width of the x-ray joint space in patients with osteoarthritis (OA) using spiral computed tomography.

Materials and research methods. The material for the study was the reconstruction of CT scans of patients with arthrosis of the TMJ in the period from 2017 to 2022. From the archive of the BOMMTS department of maxillofacial surgery. Tomograms were made with a 32-slice multislice tomograph Aquilion 32 (Toshiba, Japan) on the basis of the Department of Radiation Diagnostics and Radiation

Therapy with a course of medical informatics of the State Medical Institute. Reformats of 20 computed tomograms of various patients with TMJ arthrosis were studied in the "mouth open" and "mouth closed" positions, in three planes: coronal, axial and sagittal (240 images in total). Among the examined patients – 1 man (5%) and 19 women (95%) aged 23 to 70 years. The largest group with osteoarthritis was made up of patients in the age group of 45-60 years (45%). The distribution of patients by age is shown in fig. 1.

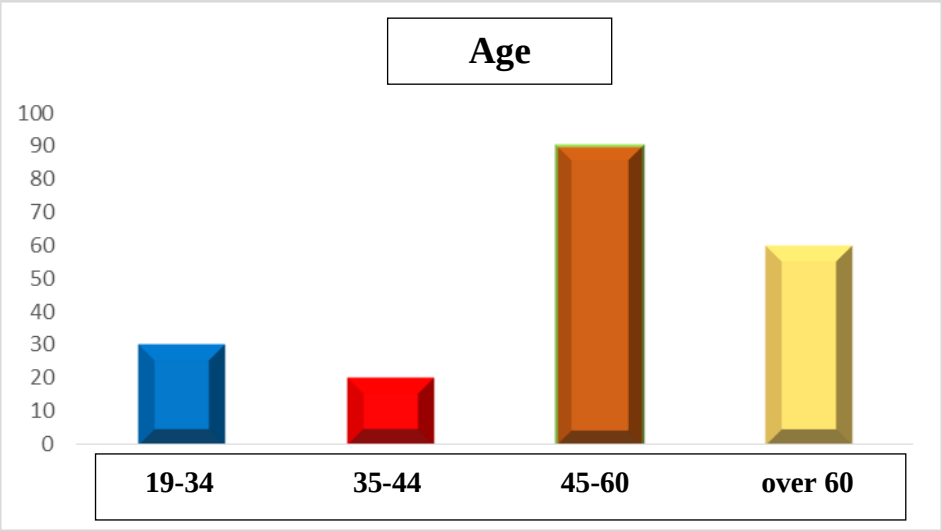

Fig.1. Distribution of patients with TMJ OA by age

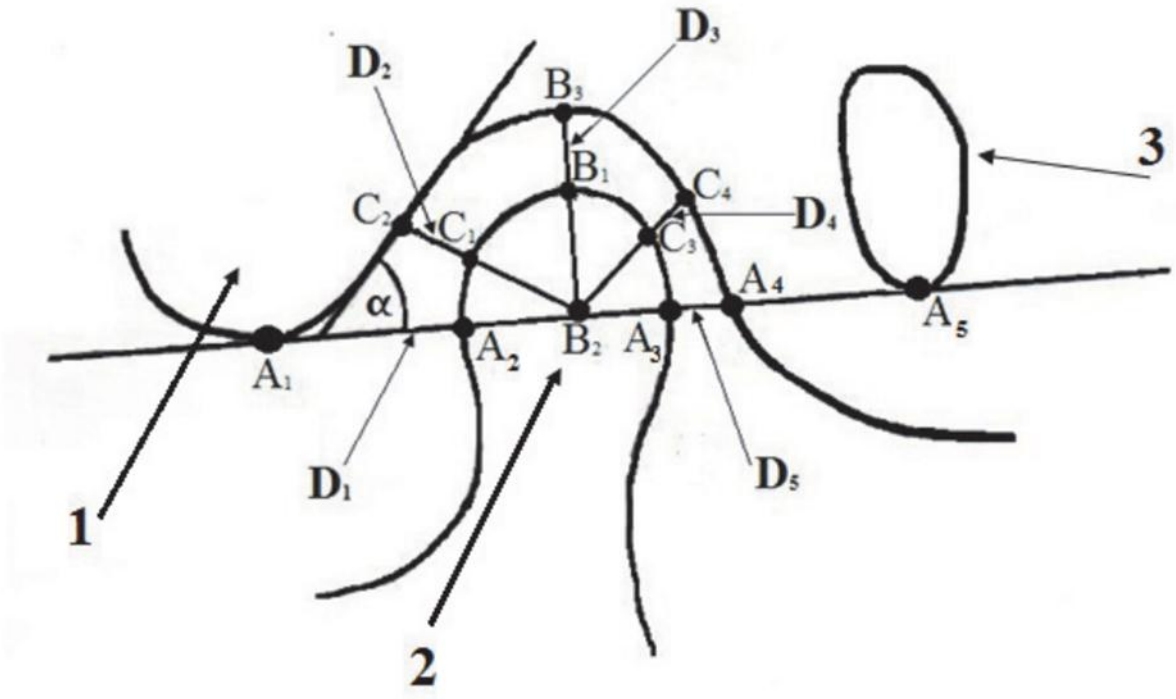

Fig. 2. Scheme of analysis of computed tomography of the temporomandibular joint in our modification

The study of CT reformates was carried out in the frontal, axial and sagittal planes. Of greatest interest to us were the reformates in the sagittal plane, the analysis of which we carried out according to our method (priority certificate No. 2015138970 dated 09/11/15) (Fig. 2)

On a CT scan of the temporomandibular joint, a sagittal plane was drawn along the outer edge of the orbit, passing through the articular head, the center of the glenoid fossa, and other elements of the TMJ. From the top of the articular tubercle 1 – point A1, a straight line was drawn to point A5 – the lower edge of the external auditory canal 3. The line A1-A5 forms the points of intersection with the

articular head 2 and the articular fossa: A2, A3, A4. To the segment A1-A5 from the highest point of the articular head 2 – (point B1), the perpendicular is lowered, forming point B2. Segment B2-B1 continues up to the intersection with the articular fossa (point B3). The resulting right angles A1B2B3, A5B2B3 are separated by bisectors. Each bisector crosses the articular head and articular fossa at two points: C1, C2 and C3, C4. Thus, we obtain guidelines for measuring the width of the five sections of the joint space between the points: A1-A2 anterior joint space D1, C1-C2 anterior-superior joint space D2, B1-B3 superior joint space D3, C3-C4 posterior-superior joint space D4 and between points A3-A4 posterior joint space D5.

RESULTS OF THE STUDY

The main complaints of patients with osteoarthritis of the temporomandibular joint were: the presence of noise phenomena – 14 patients, and in 6 patients clicking was noted on both sides, in 8 patients – on one side; in 11 patients – a crunch when opening the mouth, in 3 – with tight compression of the jaws. Complaints of local pain in the joint were presented by 10 patients. The nature of the pain is different: 6 patients noted prolonged dull pain, 4 – acute short-term pain. Congestion and pain in the ears, hearing loss were noted by 3 patients. All patients noted the limitation and stiffness of the movements of the lower jaw in the morning, the jaw «developed» and the movements returned to normal during the day. 11 patients indicated predominant chewing on one side, due to various reasons: prolonged absence of teeth on the opposite side (6 people), pain in the TMJ of the opposite joint (5 people), 8 people noted preferential chewing on the right side, 3 people on the left side. From the anamnesis, it turned out that the disease began gradually with the appearance of noise phenomena, which were not paid attention to at first. Then other symptoms joined, the frequency of their occurrence increased. The movements became spasmodic and pain appeared in the TMJ. During external examination, 9 patients showed a decrease in the height of the lower part of the face. In 11 patients with predominant chewing on one side, there was a shift in the line passing between the central incisors of the upper and lower jaws towards the affected joint. Palpation of the temporomandibular joint was painful in 4 patients, in 5 patients there was pain during palpation of the external pterygoid muscle. When considering CT of the temporomandibular joint in the sagittal plane in the “mouth closed” position, bilateral narrowing of the joint space (D3, D4) was observed in 9 patients with a decrease in the height of the lower face. The average dimensions on the right were: D1= 8.63 ± 1.41 mm; D2 = 2.5 ± 1.15 mm; D3 = 1.73 ± 0.88 mm; D4 = 2.01 ± 0.69 mm; D5 = 3.24 ± 1.0 mm; and on the left: D1 = 7.95 ± 1.96 mm; D2 = 2.03 ± 1.05 mm; D3 = 1.65 ± 0.46 mm; D4 = 2.24 ± 0.88; D5 = 2.88 ± 1.08 mm. In 3 patients, who noted predominant chewing on the left side, with a shift of the line passing between the central incisors of the upper and lower jaws to the left, there was a unilateral narrowing of the joint space in the upper posterior sections on the left: D3 = 2.2 ± 0.28 mm; D4 = 1.6 ± 0.28 mm; D5 = 2.15 ± 0.77 mm; and on the right, the following parameters were revealed: D3 = 3 ± 0.28 mm; D4 = 2.25 ± 1.06 mm; D5 = 2.8 mm. In 8 patients with predominant chewing on the right side with a shift of the line passing between the central incisors of the upper and lower jaws to the right, there was a unilateral narrowing of the joint space in the posterior upper sections on the right side; D3 = 1.91 ± 1.48 mm; D4 = 3.06 ± 1.16 mm; D5 = 3.6 ± 1.30 mm; and expansion of the joint space in the indicated sections on the opposite side: D3 = 4.23 ± 0.77 mm; D4 = 3.64 ± 0.88 mm; D5 = 4.07 ± 1.24 mm. When comparing the results of measurements of joint spaces on CT reformats and the clinical picture of patients, we noted a directly proportional relationship between the narrowing of the joint space in the posterior superior region and complaints, namely, in addition to crunching and clicking, the presence of pain in the joint at rest and their increase with tight compression jaws. Morphological changes in the bone elements of the temporomandibular joint were determined in 20 examined patients (100%) in the form of: sclerosis of the cortical plate of the articular head of the condylar process of the lower jaw in 6 people, deformities of the articular head and articular tubercle in 14 examined. In 8 patients, morphological changes in the tissues of the joint were observed mainly on the right side, in 3 patients on the left, in 9 patients – on both sides.

CONCLUSIONS When diagnosing osteoarthritis as a complication of pain dysfunction of the temporomandibular joint, it is necessary to give priority to computed tomography as a highly sensitive,

accurate and safe research method, which can later be used to confirm the correctness of the treatment. The more complaints about long-term functional disorders that patients present (crunching, clicking, pain in the joint, aggravated by tight compression of the jaws), the greater the possibility of morphological changes in the elements of the joint, as well as narrowing of the joint space in the upper and posterior sections, which is confirmed by the analysis of 240 images of computed tomograms of the temporomandibular joint. A clear relationship was revealed between prolonged unilateral chewing and narrowing of the joint space on this side in the upper-posterior sections, as well as a shift in the line passing between the central incisors of the lower and upper jaws with tight compression of the jaws in the direction of chewing.

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