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VALIDITY OF COMPLEX MODERN RADIOLOGIC EXAMINATION OF PATIENTS WITH GENERALIZED MARGINAL PERIODONTITIS OF CHRONIC TREATMENT

Purpose of the study. *To conduct a comparative analysis of the clinical and Radiological state of the periodontal complex in patients with chronic traumatic marginal periodontitis. Traditional basic clinical methods of diagnosing the state of the marginal periodontium (periodontium) in 20 patients aged 20-35 years were used, using topical clinical indices reflecting the activity of inflammation and the depth of changes in the studied tissues. The radiological examination included orthopantomography, 3D computed tomography of the upper and lower jaws, using standard programs for determining the degree of osteoporosis activity in individual areas. The functional study of occlusal planes was studied using the T-scan method.* ***Scientific novelty.*** *A comparative analysis of objective clinical data of the marginal periodontium in chronic inflammation in conjunction with the registered traumatic nodes and supracontacts was carried out. The peculiarities of changes in the structure of the upper interalveolar membranes, depending on the presence or absence of supra (hyper) contacts, were revealed. It has been established that standard orthopantomography in patients with chronic traumatic marginal periodontitis of the initial-first degree is not sufficiently informative to determine the degree of change in the architecture of the bone spongy substance in the area of interdental membranes. In order to detail the state of these changes, it is necessary to perform a comparative analysis of bone tissue by digital 3D computed tomography of the jaws. This method, taking into account the existing traditional programs, objectively, in terms of quantitative and qualitative parameters, allows for a comparative topical characterization of the bone. The functional method of T-scan, from the point of view of evidence-based medicine, allows you to identify the presence of traumatic occlusion, supra- (hyper-) contacts, determine the force and time of closure of the dentition. The presented comprehensive diagnostics allows to detect, determine the quantitative and qualitative characteristics of changes in the bone tissue of the apex of the interalveolar membranes. Such a tactic of studying the condition of the marginal periodontium makes it possible to identify the etiotropic and pathogenetic features of chronic inflammation of marginal periodontitis in the initial stages, and to develop methods of treatment and prevention of further complications in the form of bone resorption and ligamentous periodontal apparatus.*

Key words: *generalized traumatic marginal periodontitis, traumatic nodes, traumatic occlusion, diagnostic clinical and paraclinical complex of patient examination, 3D computed tomography of the jaws.*

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ДОЦІЛЬНІСТЬ ПРОВЕДЕННЯ КОМПЛЕКСНОГО СУЧАСНОГО РЕНТГЕНОЛОГІЧНОГО ОБСТЕЖЕННЯ ХВОРИХ НА ГЕНЕРАЛІЗОВАНИЙ МАРГІНАЛЬНИЙ ПЕРІОДОНТИТ ХРОНІЧНОГО ПЕРЕБІГУ

Мета дослідження. *Провести порівняльний аналіз клінічного та рентгенологічного стану періодонтального комплексу у пацієнтів з хронічним травматичним маргінальним періодонтитом. Використано традиційні базисні клінічні методи діагностики стану маргінального періодонту (пародонту) у 20 пацієнтів, віком 20-35 років, з використанням топічних клінічних індексів, що відображають активність запалення та глибину змін досліджуваних тканин. Рентгенологічне дослідження включало ортопантомографію, 3D-комп'ютерну томографію верхньої і нижньої щелеп, використовуючи стандартні програми визначення ступеня активності остеопорозу в окремо досліджуваних ділянках. Функціональне дослідження оклюзійних площин вивчали за допомогою Т-скан методу.* ***Наукова новизна.*** *Проведено порівняльний аналіз об'єктивних клінічних даних станом маргінального періодонту при хронічному запаленні в сукупності з зареєстрованими травматичними вузлами і супраконтактами. Виявлено особливості зміни структури верхніх міжальвеолярних перегородок, в залежності від наявності або відсутності супра (гіпер) контактів. Встановлено, що стандартна ортопантомографія у пацієнтів хронічним травматичним маргінальним періодонтитом початкового – першого ступеня недостатньо інформативно для визначення ступеня зміни архітектоніки губчастої речовини кістки в області міжзубних перегородок. Для деталізації стану цих змін необхідно проводити порівняльний аналіз кісткової тканини методом цифрової 3D комп'ютерної томографії щелеп. Цей метод з урахуванням наявних традиційних програм об'єктивно, з точки зору кількісних і якісних параметрів, дозволяє дати порівняльну топічну характеристику кістки. Функціональний метод Т-скан, з точки зору доказової медицини, дозволяє виявити наявність травматичної оклюзії, супра (гіпер) контактів, визначити силу і час змикання зубних рядів. Представлена комплексна діагностика дозволяє виявити, визначити кількісні та якісні характеристики зміни кісткової тканини вершини міжальвеолярних перегородок. Така тактика дослідження стану маргінального періодонту дозволяє виявити етіотропні і патогенетичні особливості хронічного запалення маргінальному періоді на початкових стадіях, і розробити методи лікування і про-*

філактики подальших ускладнень у вигляді резорбції кісткової тканини і зв'язкового апарату періодонту.
Ключові слова: *генералізований травматичний маргінальний періодонтит, травматичні вузли, травматична оклюзія, діагностичний клінічний та параклінічний комплекс обстеження пацієнтів, 3D-комп'ютерна томографія щелеп.*

In the disease generalized marginal periodontitis the leading role is given to microbial and immune mechanism. The primary triggering factor is periodontopathogens: Parphyromonas gingivalis, Prevotella intermedia, Aggregatibacter actinomycetens comitans, Bacteriodes, Streptococcus salivaris, mutans, Fusobacterium spp and others. They penetrate the marginal periodontal complex, play a determining role in the development of destructive processes, and support chronic inflammation [7, 8, 9].

Today, the diagnosis of marginal periodontitis involves a reasoned choice of modern diagnostic methods, methods and means of treatment. This is primarily due to the need to avoid exacerbation of inflammation and the transition of the disease into a chronic course and remission[1,2,3,5].

This disease begins at a young age and has a wave-like character, accompanied by periodic bleeding, swelling of the gingiva. Carrying out professional oral hygiene by a dentist, teaching patients proper hygiene temporarily suspend the development of inflammation. However, this does not mean the elimination of the disease. In the literature, there is scientific data that the amount of plaque and "hard dental deposits" is not always directly proportional to the degree of destruction of the alveolar bone and the development of inflammation [7, 10, 12,]. There are many classifications of marginal periodontal diseases. This is due to the fact that there are no international norms, unified information space, which takes into account etiological, pathomorphological, pathogenetic factors that determine the systematization of this pathology.

The American classification, which is based on the conclusion of the International Work for Classification of Periodontal Diseases And Conditions (1999) includes 8 nosological forms: gingivitis, chronic periodontitis, aggressive periodontitis, periodontitis as a manifestation of systemic diseases, necrotic diseases, periodontal abscesses periodontitis as a result of endodontic lesions, congenital and acquired deformities and conditions. This classification does not meet all international modern needs, where polytheologic and genetic factors must be taken into account.

In 2017, a classification of periodontal diseases and peri-implantitis was presented in Amsterdam in which clinical forms and histologic examinations were taken into account and the term "healthy periodontium" was introduced. In this systematization a new nosological form of the disease was introduced separately – "traumatic marginal periodontitis" [11].

From our point of view, this is of interest and relevance. It is connected with the fact that young people do not pay, as a rule, much attention to short-term bleeding of the gums. Professional hygiene, which is carried out by a dentist, briefly relieves acute inflammation. However, the manifestation of the disease continues, has a chronic course without pronounced bright clinical manifestations. This subclinical course of the disease does not encourage young people to go to the dentist.

This issue is especially urgent in our country [4, 6], the incidence of marginal periodontitis at the age of 18-35 years reaches 92.3±1.8 %. Our study involves the analysis of clinical and radiologic manifestations of chronic traumatic marginal periodontitis for timely primary diagnosis of the disease, assessment of clinical factors that contribute to the development of this nosological form of the disease.

Purpose of the study. To conduct a comparative analysis of the clinical and radiological state of the periodontal complex in patients with chronic traumatic marginal periodontitis.

Results and discussion. All patients were studied after they had received a professional oral cleaning, hygiene lesson and hygiene follow-up for 1 month. The main objective of the study was to investigate the presence of local traumatic factors that may participate and support the progression of chronic inflammation in the periodontal complex. Dental plaque factors were excluded initially. The main influence was focused on localized sites where clinical inflammation was manifested. All patients formed a single homologous series in terms of the presence of chronic marginal periodontitis, with resorption of the cortical layer and cancellous bone up to 1/3 of the height between the dental septa. During the examination, special attention was paid to changes in the clinical signs of teeth: irregular erasure of tooth cusps and/or cutting edge, incorrect filling of tooth crowns without taking into account the anatomical individual form, multiple vertical cracks of tooth enamel especially in the area of canines and incisors, crowding of teeth, presence of wedge-shaped defects, more pronounced gingival recession, fenestration and increased sensitivity of tooth necks compared to other areas of the oral cavity.

The studied indices indicated in the materials and methods of research section revealed statistical

reliability ($p \leq 0.05$) as indicators of differential difference of clinical manifestation of the disease. All the examined patients showed signs of inflammation aggravation in those or other places where traumatic nodules, hypercontacts were supposed to be present. This clinical initial examination provided the basis for a more in-depth detailed analysis of functional (T-scan) and morphological changes (X-ray examination). The characteristics of periodontal pockets have a statistically significant difference ($p \leq 0.05$). The depth of bony (periodontal) pockets in the areas of traumatic nodules was 1.5±0.5 mm greater than in other areas in the oral cavity. This feature was mandatory for detailing the structure of cancellous bone in these interdental spaces. It should be noted that the reflected changes that occurred due to filling errors or tooth extraction were manifested on the antagonist teeth or on the group of teeth of the opposite side, which is a direct evidence for panoramic radiography.

Radiologic studies showed that all patients had changes in the cortical layer in the area of interdental septa: osteolysis or osteonecrosis in the form of interruption of a homogeneous line. This diagnostic X-ray symptom indicates the presence of periodontal pocket, which is a differential diagnostic sign of generalized marginal periodontitis. The character of changes in the architectonics of the interdental septum – disorientation and deformation of bone beams, increase of intertrabecular spaces in the area of apices, changes in the contouring of the size and radiographic contrast of the periodontal gap are the main signs.

To diagnose the initial – first degree of chronic marginal periodontitis, from the point of view of evidence-based medicine definition of the damaging traumatic factor, it is necessary to identify radiologic symptoms confirming its destructive effect. Such symptoms will be a comparative increase in the area of osteoporosis or a decrease in the height of the apices of the interalveolar septa. Change in their structure due to the severity of localized patchy osteoporosis, its intensity and area. The intensity of osteoporosis is clearly defined on a 3D-computer tomogram in the form of a histogram or densitometry values. The digital value is an objective example of evidence-based medicine, can be evaluated in dynamics as a result of treatment and prognosis of the disease.

This program-methodology is standardized, which allows to avoid technical errors and is the most evidence-based visualized indicators. The obtained data of the functional T-scan examination in the form of a graph of occlusal load changes are presented both digitally and in color. Axial plane, protrusion, lateral movements allow to determine contact surface disruption by force and exposure time. This method demonstrates the presence of supercontacts of traumatic conditions, which is objective evidence of the presence of damaging factors in each patient. The aggregate of clinical signs of chronic periodontal inflammation with comparative analysis of sites and symptoms of more active subacute inflammation in the presence and coincidence of signs of traumatic nodules and supercontacts allows us to conclude about the correctness, validity of the diagnosis: Chronic traumatic marginal periodontitis. The main methods of treatment of this chronic inflammation is the elimination of etiotropic traumatic factors. Chronic trauma leads to subsequent rheological and subsequent specifically immune local disorders with the formation and spread of autoimmune process and manifestation of multifactorial inflammation.

The indices of the studies will be presented in subsequent papers. Thus, the correct diagnosis of chronic traumatic marginal periodontitis requires a combination of symptoms and indices of clinical inflammation with local epic signs of pronounced inflammation in all traumatic nodes or occlusal supercontacts and mandatory radiologic digital computer and functional studies. Comparative sequential analysis of all these studies are objective evidentiary tests for making this diagnosis and carrying out pathogenetic treatments, with mandatory elimination of supracontacts.

Examples of clinical manifestation and diagnostic examination of patients for practicing dentists. A complex of diagnostic examinations for correct diagnosis of chronic traumatic marginal periodontitis is presented (Fig.1-5). This complex includes standard methods of clinical examination, comparative topical indices of inflammation of marginal periodontium, additional X-ray examination, orthopantomography, digital computed tomography, functional T-scan method.

The orthopantomogram (Figure 1) shows an irregular contour of the cortical layer in the area of the apices of the interdental septa on the upper and lower jaw. The structure of bone tissue, interdental septa is not changed, bone architectonics is within the physiologic norm. However, in the area on the left – 35 36 in the area of 26 27 teeth, the cortical layer in the area of the apices of the interdental septa is interrupted.

On clinical examination, the depth of periodontal pockets reaches 3 mm, pitting bleeding was detected. These findings predetermine the need for 3d CT

examination to clarify the bone structure in the area of interdental septa and to detect the presence of X-ray symptom – spotty osteoporosis as an inflammatory, demineralization, and dystrophic local process 21,22,23,11,12 (Fig. 2).

The degree of osteoporosis according to Hounsfield in the area of the interdental septum apex was determined graphically (green triangle) and in the form of tabular data 11 12. The mean bone density value of 700 Hu, with a maximum

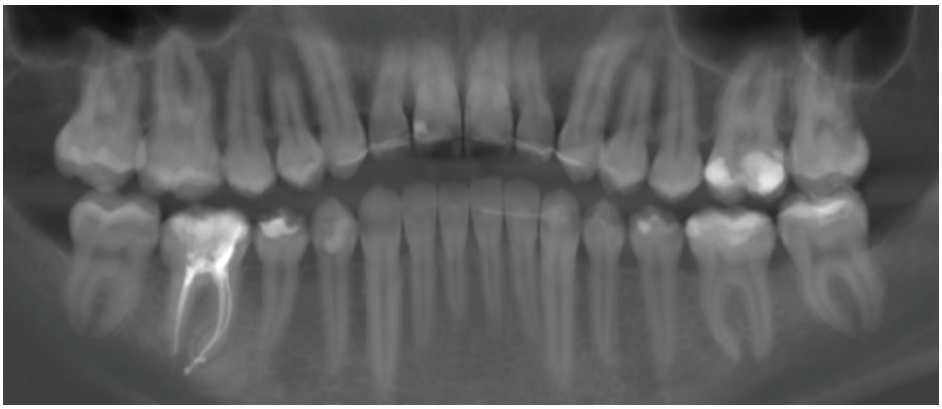

Fig. 1. Orthopantomogram

Fig. 2. Frontal plane, area 11, 12 teeth

density value of 1027 and a minimum of 539, which corresponds to a medium degree of osteoporosis and reaches 50% loss of mineral density in the indicated volume (Fig. 3, 4).

The septum of 26 27 teeth shows an area of osteoporosis. The maximum density of the septum is 772 hu, the minimum density is 393 and the mean value is 3.2. This indicates the absence of the cortical layer in the area of the apex of the interdental septum and changes in the architectonics of bone tissue in the underlying area. The average value – 3.2 indicates the progression of resorption processes, while the bone density in the area of 3.34mm2 remains up to 60% (Fig. 5).

In the area of interdental septum 35-36 cortical layer resorption is determined, with an aver-

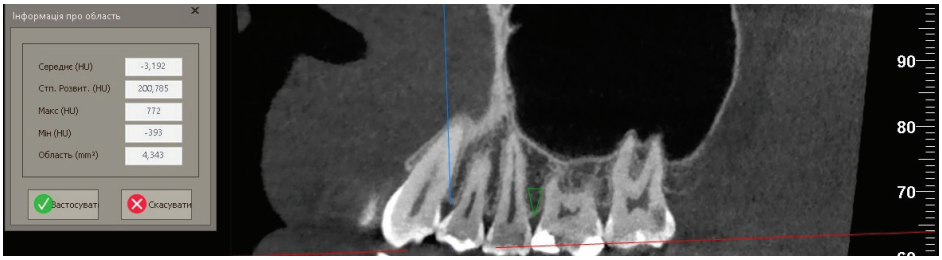

Fig. 3. Sagittal plane, area 25, 26 teeth

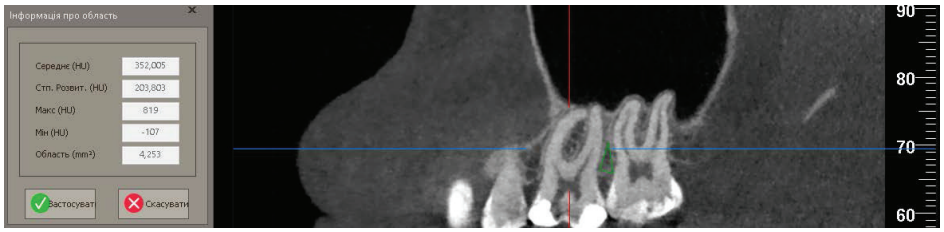

Fig. 4. Sagittal plane, area 26, 27 teeth

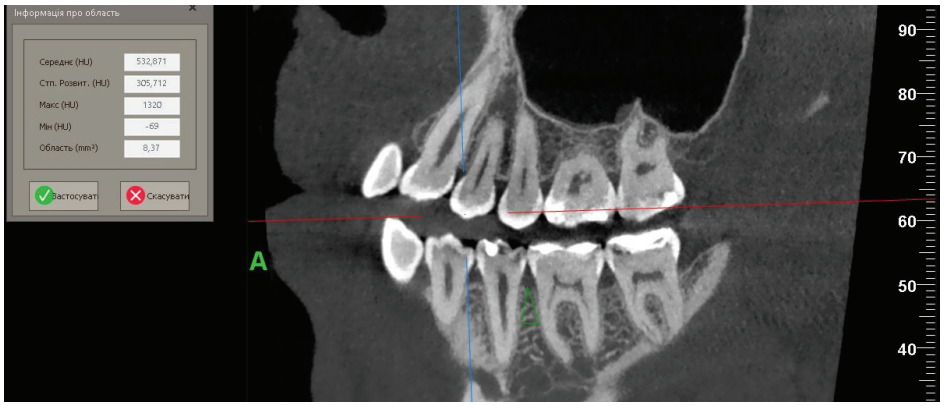

Fig. 5. Sagittal plane, area 35, 36 teeth

age value of bone density 532 Hu, with a maximum value of 1320 and a minimum density of 69, the study area is 8 mm square. This indicates a sharply expressed osteoporosis tendency to further resorption of the interdental septum up to 1/3 of its height.

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