



## Improving the Effectiveness of the Treatment of Periodontal Disease in Patients with Diabetes Mellitus

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### ABSTRACT

Diabetes mellitus (DM) is an endocrine disease with absolute (type I DM) or relative (type II DM) insulin deficiency, causing all types of metabolic disorders [2]. Periodontal diseases are one of the urgent problems of modern dentistry: according to WHO, up to 90% of the adult population worldwide suffers from inflammatory periodontal diseases (IDD). Diabetics suffer from inflammatory periodontal diseases of varying severity in almost 100% of cases. Diabetes affects the rapid progression of periodontal diseases and there is a more severe course of the disease with a significant delay in regenerative and recovery processes [6-9]. Periodontitis in patients with diabetes has a unique morphological structure, characterized by microcirculatory disorders, destruction of the bone tissue of the dentoalveolar system and is directly dependent on the severity of the disease and age; DM is not only a risk factor for the development of periodontal diseases and their further progression, but is also aggravated in the presence of inflammatory processes in the tissues of the periodontal complex [10,13-15]. DM affects all elements of the development of periodontal diseases: blood circulation and sensitivity of nerve endings, immunity and bacterial invasion, regenerative capacity of oral tissues and metabolism of periodontal complex tissues [18]. Damage to microvessels, changes in pain sensitivity thresholds, and conditions favorable for superinfection lead to the development of severe periodontal disease with rapidly increasing tooth mobility and clinically and radiographically detectable significant bone loss. Traditional methods of treatment are ineffective and provide only short-term improvement, without significant remission [2,3,13]. Aggravating factors in patients with diabetes are the high prevalence and intensity of caries, especially proximal and cervical [19]. Wound healing in patients with diabetes mellitus occurs predominantly by secondary intention due to the formation of granulation tissue, which leads to the formation of a microbial reservoir [14-17]. It should be noted that dentists themselves have few guidelines regarding the diagnosis, practice and tactics of treating major dental diseases in patients with diabetes mellitus. The lack of a thoughtful, comprehensive and systematic organization of dental care for patients with diabetes mellitus causes great difficulties for them, makes it impossible to provide timely preventive care in the early stages of the pathological process and leads to the development of inflammation in the tissues of the oral cavity. Underestimation of the relationship between the general condition of the patient and the symptoms of diabetes, ignorance of the specifics of the treatment of diabetes and its complications, the wrong

choice of treatment plan without careful planning of future dental treatment are the most common mistakes made by dentists when working with this category of patients.

**Keywords:**

Diabetes mellitus, dental treatment

**Aim of the study:** To study the diagnostic aspects of VVD in patients with insulin-dependent diabetes mellitus and to develop tactics for the treatment of this condition.

**Materials and methods:** 60 patients were examined. The main group consisted of 30 patients with insulin-dependent diabetes mellitus (21 women and 9 men) with inflammatory periodontal diseases aged 28 to 75 years. The duration of the disease varied from 6 to 30 years. The second group consisted of 30 patients (17 women and 13 men) with inflammatory periodontal disease without impaired glucose homeostasis, aged 25 to 68 years. Stage 1. The state of oral hygiene, hard tissues of the teeth, CPI index, risk factors for the development of periodontal diseases (determination of the hygiene index according to Green-Vermillion, the modified gingival sulcus bleeding index according to Muhleman, the periodontal index according to Russel, indicating the degree and severity of inflammatory-destructive changes in periodontal tissues, the index of the need for periodontal treatment - C). Examination of the oral cavity was carried out according to generally accepted methods using basic and additional research methods. All patients were examined by a doctor and had blood tests for RW, HIV, HBsAg and HBcAg. Based on the results of complex analyzes, individual treatment plans were developed. At this time, a medical examination was carried out by an endocrinologist and the level of glucose and glycated hemoglobin in the blood was measured. Regardless of the severity, treatment began with motivation and modification of personal and professional oral hygiene. Further, oral hygiene included the treatment of caries

and its complications and the elimination of risk factors for the development of periodontal diseases. In the presence of indications, splinting of mobile teeth, selective polishing of the occlusal surfaces of the teeth, and temporary prosthetics were performed. Anti-inflammatory therapy was mandatory in combination treatment [24]. Antibacterial therapy was prescribed individually. Particular attention was paid to the extraction of teeth and assessment of the condition of the bone tissue of previously removed areas. Dentists usually do not pay attention to the special conditions of this group of patients and do not take into account the peculiarities of wound healing in patients with diabetes, their tendency to form granulation tissue, cysts, fistulas and artificial granulomas. Indeed, it has been established that dental surgeons do not fully treat the site of tooth extraction after extraction [11,16,17,20]. As a result, upon re-examination, foci of bone rarefaction are found not only in the area of existing problematic teeth, but also in previously extracted teeth, often with granulomas that spread to the vestibular surface and communicate with each other. Therefore, surgical removal of destructive inflammatory lesions in patients with diabetes mellitus is more indicated. Stage 3 - 6 months after the second treatment, the patient is in good clinical and radiological condition and has undergone reasonable orthopedic treatment, including implants. In case of recurrence of the disease or active inflammation, in-depth microbiological, immunological and biochemical studies were carried out, consultation of an endocrinologist. Treatment of diabetes and dental treatment was prescribed individually according to the indications.

**Results of the study:** The results of the analysis showed that all the subjects had somatic diseases, among which were cardiovascular and gastrointestinal. The analysis showed that the state of periodontal tissues in people with impaired carbohydrate metabolism did not correspond to that in healthy people. The results of the examination amounted to a set of oral symptoms characteristic of patients with diabetes mellitus (swelling of the mucous membrane 100%, plaque on the tongue 33.3%, swelling and redness of the gums 86.6%, broken tongue 43.3%). Periodontal pathology was characterized by high activity of inflammatory and destructive processes, as evidenced by the indicators and results of functional diagnostics, moreover, inflammatory periodontitis was more common, and systemic periodontitis of varying severity was detected in all patients with diabetes mellitus. Visual assessment of oral hygiene showed the presence of abundant pigmented soft dental plaque, completely or partially covering the crowns of all teeth in 83.3% of patients of the 1st group and 56.7% of patients of the 2nd group. This indicates poor oral hygiene. Viscous thick saliva was observed in 66.7% of the subjects in group 1 and 10% in group 2. Dry mouth was noted by 80% of patients in group 1, but only 3.3% of patients in group 2. The intensity of caries was high in all patients, with an average KPU value of  $16 \pm 6.5$ . Mild and moderate gingivitis was more common in group 2 patients, 66.6% and 23.3% respectively, with very few severe (10.1%). In Group 2, periodontitis was mild in 53.3%, moderate in 16.6%, and severe in 6.6%; in group 1 patients with CAD, mild gingivitis was present in only 10.3% and moderate in 20.1%, with a sharp increase in severe cases to 69.6%. With periodontitis, the mild form was the least common (23.3%), the average form was observed in 46.6%, and the severe form was observed in 83.1%. As can be seen from these results, IHD not only accelerates the progression of gingivitis to periodontitis, but also causes its predominantly severe clinical course. An objective assessment of the periodontal status revealed significant differences in the assessment parameters depending on the severity of the inflammatory

process in the periodontal ligaments. The average values of the simplified hygiene index according to Green-Vermillion, depending on the severity of the clinical course of gingivitis and periodontitis, were  $3.2 \pm 0.2$  points for patients of the 1st group and  $1.7 \pm 0.3$  points for patients of the 2nd group. With periodontitis, higher average values of hygienic indicators were observed in the same proportion:  $4.3 \pm 0.3$  points for patients of group 1 and  $2.68 \pm 0.5$  points for patients of group 2. Russell periodontal scores were 10.1% for PI=1-2 in Group 1, PI=6 for 36.6%, and PI=8 for 53.3%; in group 2 PI=1-2 63.3%, PI=6 26.8% and PI=8 9.9%. The data obtained show that the most negative images reflecting oral hygiene and periodontal inflammatory status were observed in patients in group 1. The results obtained indicate that groups of patients with the clinical course of IOP have more severe consequences, mainly due to poor hygiene oral cavity and imbalance of microflora. Thus, a microbiological study of the oral cavity of the observed group of patients showed that fungi of the genus *Candida* play a leading role in the exacerbation and long-term course of inflammatory periodontal diseases caused by diabetes mellitus. Inflammatory periodontal disease also causes destructive changes in the periodontal ligament, which are thought to decrease microcirculatory vascular tone and cause stasis. Measurement of capillary resistance showed that the circulation in the periodontal ligament functioned normally in 46.6% of patients in group 2 and 13.3% in group 1, while it was found in patients of group 2. Thus, the preclinical symptoms of diabetes lead to impaired capillary resistance, and the more severe the condition, the worse the hemodynamic parameters. The results of the examination of patients with inflammatory periodontal diseases formed the basis of an appropriate complex scheme for the tactics of inserting teeth. Conclusion In outpatient dental intervention, the following main steps are important: - collection of a thorough and targeted history; - confirmation of the presence or absence of diabetic complications; - detailed consideration of diabetic treatment; - a thorough and complete assessment of the functional state of the patient; - Mandatory

measurement of blood sugar levels; - assessment of the state of personal oral hygiene; - appropriate anesthesia, if necessary, the correct choice of anesthesia (premedication or preparation of drugs without adrenaline and adrenaline-like vasoconstrictors); - Careful planning of future dental treatment Assessment of the patient's condition should begin with a thorough and focused history taking to ascertain the type, duration and course of diabetes, determining the methods of treatment used by the patient (drugs and their dosages, dietary habits). It is necessary to start with a targeted collection of anamnesis. The anamnesis should be standardized. Assessment of the psychophysiological status of a diabetic patient must necessarily be carried out in the context of the established features of the psychoemotional status.

**Conclusion:** Support for people with diabetes must be provided through active and close communication between professionals such as dentists and endocrinologists, as well as through the direct and active participation of people with diabetes themselves. And if any of these three links become weak or unaccountable, it will lead to bad results. Oral health education focuses on how to prevent and manage gum and dental disease, and teaches practical techniques for early diagnosis of the symptoms and signs of these lesions. The implementation of these and many other measures can significantly improve the level of dental care and improve the quality of life of patients with diabetes. The application of a multidisciplinary approach to the oral care of patients with diabetes mellitus and the mandatory planning of all stages of treatment by periodontists will help to better control the course of diabetes and periodontitis. The proposed algorithm for managing patients with DM complicated by periodontal disease can reduce postoperative complications of periodontal surgery from 48% to 5%. Early diagnosis and timely and adequate treatment can improve the oral health and quality of life of patients with DM.

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