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Common Problems With Dental Implants

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Annotation. Dental implantation is currently one of the most promising areas in the rehabilitation of dental patients. Despite the success achieved, dental implantation, like other surgical methods of treatment, is accompanied by various kinds of complications. The most common complications are of an inflammatory nature.

However, there are many problems in dental implantology. This article presents a review of the scientific literature on risk factors for early and late complications of dental implantation.

It is considered that a well-established and integrated dental implant should function for at least 10 years, satisfy the patient in aesthetic and functional terms, have clinical stability, and be biocompatible with respect to the surrounding tissues.

Keywords: dental implant, mucositis, periimplantitis, risk factors for dental implantation, autoimmune diseases.

Relevance. The success of dental implants depends on the General state of the patient's body, as well as on the technique of implant placement, the skill and experience of the implantologist and the management of the patient in the postoperative period.

Indications for dental implantation are partial defects of the dentition or complete absence of teeth, the inability for various reasons to use removable prostheses (deformities of the jaws, pronounced gag reflex on the prostheses).

Objective : Experimentally and clinically justify the advantages and disadvantages of dental implants. Find the optimal resolve to avoid dental implant problems.

Material and research methods:

Before the implantation operation, the patient must undergo a comprehensive examination, which includes collecting complaints, anamnesis, examination of the oral mucosa, while assessing the condition of the teeth, alveolar processes, the type of bite, the level of oral hygiene, and, if necessary, consulting other specialists. In addition, x-ray examination of the dental system is performed using computed tomography. This method allows to visualize the state of the jaw bones in three dimensions, and to assess bone density, the trabecular nature of the figure, the condition of the sinuses, the volumetric parameters of the alveolar processes, the degree of atrophy of the jaw bone, the distance between al-violarium ridge and maxillary sinus floor, the topography of the mandibular canal. In addition, during the planning of the operation, an instrumental examination is performed, which includes measuring the width of the alveolar processes to select the location of the future implant.

All complications after dental implantation are usually divided into two groups: early (manifested in the period from a few days to 2-3 weeks after surgery) and late (developed after several years). Early complications are typical of the inflammatory process that occurs as a result of mechanical trauma to the tissues of the maxillofacial region, namely: postoperative edema, bleeding in the area of the installed implant, appearing after the termination of the VASO-constrictor action of epinephrine, which is part of the solution for anesthesia. In addition, pain may occur, as well as a rise in temperature to 38°C. divergence of sutures, eruption of part of the implant through the mucous membrane are also early complications, but unlike other complications, they are often not a sign of failed implantation and are usually the result of non-compliance with the patient's precautions during the postoperative period.

Late complications after dental implantation include the appearance of inflammation in the periimplantation zone during the period of osteointegration or after the completion of osteointegration.

At a workshop of the European Federation of periodontists in 2008, an agreed opinion was developed on infectious and inflammatory lesions in the area of dental implants, based on modern scientific evidence, which was proposed to include perimplantation mucositis and perimplantitis.

Mucositis is an inflammation of the soft tissues adjacent to the structure, which is not accompanied by a violation of osteointegration.

Peri-implantitis is an inflammation of the tissues surrounding the implant, accompanied by horizontal or vertical resorption of the supporting bone. According to current data, mucositis develops in 80% of individuals, while peri-implantitis was detected and described in 28-56% of the examined patients.

Let's take a closer look at some of the causes of peri-implantitis. Smoking is a significant risk factor for peri-implantitis. According to S. I. Zhadko and F. I. Gerasimenko, tissue healing after implantation in Smoking patients is significantly worse than in non-smokers [14, 15].

This is due to the fact that people who are addicted to Smoking have an increased formation of plaque, and, consequently, an increased risk of gingivitis and periodontitis, as well as the occurrence of severe bone resorption. Smoking reduces blood supply to tissues due to the vasoconstrictor effect of nicotine on arterioles. Smoking releases toxic by-products, such as nicotine, carbon monoxide, and hydrogen cyanide, which inhibit the reparative function of body tissues. Treatment of dental patients with nicotine dependence using dental implantation, if the patient refuses to smoke, reduces the likelihood of developing complications to the level of non-smokers [16].

Iatrogenic causes that may be risk factors for peri-implantitis include non-compliance with the rules of asepsis and antiseptics; insufficient awareness of the doctor about the patient's health, undiagnosed foci of chronic infection in the maxillofacial region, leading to an unsuccessful result; discrepancy in the size of the implant to the size of the implant bed; formation of a subgingival hematoma at the time of surgery with its subsequent suppuration; destruction of bone tissue caused by excessive force of screwing the implant (more than 45 N / m); overheating and, as a consequence, bone necrosis when dissecting at high speeds; excessive dissection of bone tissues; errors at the stages of prosthetics, namely: chronic trauma and periodontal overload, incongruence of the orthopedic structure; the presence of micro-gaps between the implant and the abutment [17,18].

Systemic violation of bone remodeling is a contraindication to the restoration of chewing efficiency using dental implants [19].

The absence of a keratinized gum may also be the cause of peri-implantitis, since the long-term service of the dental implant, its aesthetic and functional role requires a good condition and structure of the supporting tissues.

The function of protecting the implant and the surrounding bone tissue from the penetration of microorganisms and the traumatic impact of a food lump is performed by an attached gum covered with a multi-layer flat keratinized epithelium, which normally surrounds a healthy tooth or implant. The width of the keratinized gum varies from 4 to 9 mm. Due to the removal or loss of teeth, the attached gum is reduced and rarely exceeds 2 mm or even completely disappears. At the same time, the risk of developing inflammatory phenomena around the implant increases.

Already in 1996, T. Berglundh, T. and Lindhe et al. we performed experiments on dogs and found that when the thickness of the keratinized gum is less than 2 mm, bone resorption occurs around the implant and reaches the visible size within 6 months.

According to T. Linkevicius et al. during the first 2 months after the dental implant is installed, the biological width around the implant is formed, similar to the biological width around

the natural tooth. This phenomenon provokes a loss of bone tissue in the case of initial insufficiency of the soft tissue thickness in the implantation zone to form a minimum volume of biological width (on average 3 mm). A narrow keratinized gum does not provide a tight fit of the soft tissues surrounding the implant, which in turn creates favorable conditions for plaque accumulation and increases the risk of developing mucositis and perimplantitis. This is due to the fact that the tissues around the implant (periimplant tissues) and periodontal tissues differ in structure and resistance to bacterial infection. The gum surrounding the implant consists of a large amount of collagen and contains half as many fibroblasts as the gum around the tooth. In this case, the collagen fibers are not attached to the surface of the implant, but are located parallel to its surface, which leads to the formation of a space in which plaque accumulates, causing inflammation. The pronounced mobility of soft tissues around the neck of the implant or abutment contributes to this. A sufficient width of the keratinized gum forms a dense fibrous cuff around the neck of the implant, thus preventing the penetration of microorganisms and food residues.

Dental implantation is currently one of the most promising areas in the rehabilitation of dental patients. Despite the success achieved, dental implantation, like other surgical methods of treatment, is accompanied by various kinds of complications. The most common complications are of an inflammatory nature.

Results and discussions:

However, there are many problems in dental implantology. This article presents a review of the scientific literature on risk factors for early and late complications of dental implantation.

It is considered that a well-established and integrated dental implant should function for at least 10 years, satisfy the patient in aesthetic and functional terms, have clinical stability, and be biocompatible with respect to the surrounding tissues.

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It should be noted that the absence of a dense keratinized cuff around the implant makes daily hygiene procedures less comfortable due to the high trauma of the mobile mucosa.Increasing the thickness of the soft tissues covering the coronal part is achieved by transplanting a free connective tissue graft, which helps to increase the volume of the gums.

One risk factor for peri-implantitis is the presence of implant rejections in the patient's history. Twenty years ago, many dentists had great doubts about dental implants and considered them unreliable and unpromising, since the treatment was accompanied by quite frequent complications that led to the rejection of implants. Currently, due to the use of new technologies, the number of rejections has significantly decreased and, according to statistical analysis of modern dental practice, is 2-5 % of implant rejections in the first 5 years of their operation.

According to M. D. Perov and V. A. Kozlov, the destruction of bone tissue that occurs after the rejection of implants has a negative effect on the overall health of the patient. In the patient's oral cavity, the consequences of implant rejection are manifested in the form of loss of bone volume in the dentoalveolar region, and in some cases, the impossibility of repeated dental implantation. Therefore, the rejection of implants in the history must be taken into account when selecting patients, determining the indications for surgery and predicting the results of dental implantation.

Speaking of systemic pathologies, when planning implantation, it is necessary to pay attention to the presence of diabetes in the patient first of all. This disease is at the forefront of risk factors and relative contraindications to surgical interventions, including dental implantation.High blood glucose levels negatively affect the ability of tissues to repair. Accordingly, the process of osteointegration is significantly slowed down.

It is important to note another group of diseases that affect the development of mucositis and perimplantitis-thyroid disease. These diseases are characterized by an increase or decrease in the production of thyroid hormones. At the same time, both hyperfunctions and hypofunctions of the thyroid gland have a negative impact on the osteointegration of the implant. According To M. V. Shcherbakov, the risk group includes women with a tendency to hypothyroid States. If both bone resorption and bone formation are slowed down when thyroid hormones are deficient, then hyperthyroidism results in increased bone rearrangement, but its structure is disrupted, in particular, the level of mineralization decreases and bone resorption increases.

Autoimmune diseases (exacerbation of collagenoses, autoimmune thyroiditis, etc.) can be attributed to the risk of developing postoperative complications after implant placement. Diseases

of this category, as a rule, are a direct contraindication for reconstructive operations and dental implantation, since they prevent the successful course of reparative processes and sharply reduce the likelihood of postoperative recovery of functions.

It is known that immunodeficiency conditions of the oral mucosa contribute to the development of violations of microbial biocenosis. At the same time, in gingival tissues, especially in periodontal tissues, there is a tendency to excessive bacterial growth and the formation of an unhygienic state in the oral cavity. In this case, surgical interventions on the alveolar process (reconstructive operations, tooth extraction, immobilization of facial bone fragments, dental implantation, etc.) are performed in conditions of increased risk of inflammation.

One of the key factors in the development of perimplantitis is infection of perimplant tissues by oral microorganisms, which occurs due to poor oral hygiene and the formation of dental plaque on the surface of the implant suprastructure, as well as specific and non-specific reactions that occur under the influence of anti-gene substances of microbial associations of dental plaque. The effect of dental plaque implies microbial contamination of peri-implant tissues.

According to N. Wenz et al., for the formation of dental plaque in the area of the prosthesis on the implant, the nature of the surface of the prosthesis is of great importance. N. Wenz et al. in the experiment, it was noted that twice as much plaque containing numerous bacterial colonies is formed on the rough surface of the suprastructure as on the smooth surface.

Of great importance for the development of the inflammatory process in the area of the integrated implant is the adhesion of bacteria and the formation of dental plaque on its protruding part, and the higher their concentration, the lower the degree of colonization of bacteria.

Many studies have shown that orthopedic elements that rely on implants last much longer if the patient takes care of them properly.

However, the patient's inability to properly care for the prostheses leads to a decrease in the service life and premature loss of the implant. All this determines the need to develop and implement additional means of individual oral hygiene, which allow for high-quality and effective care of prostheses on implants.

After prosthetics on implants, daily thorough individual oral hygiene is required throughout the entire period of operation of the prostheses. With poor hygiene in the area periimplantitis zone is formed dental plaque, which can lead to the development of mucositis and peri-implantitis in the future. Preventive examinations at least twice a year and professional hygiene procedures allow you to identify the initial manifestations of inflammation and eliminate them. Otherwise, the service life of implants is significantly reduced.

It should be noted that an important risk factor for dental implants is the presence of a patient's history of periodontitis. The literature describes a lot of evidence about the relationship of this disease with a predisposition to perimplantitis. Thus, in patients with chronic periodontitis, complications of dental implantation are more common. The development of peri-implantitis in individuals with inflammatory periodontal diseases in anamnesis is confirmed by the results of many scientific studies devoted to this problem.

The results of clinical studies have shown that the risk of developing periimplantitis in patients with periodontitis, both in active form and in remission, is five times higher than in patients with healthy periodontitis. There is reason to believe that the microorganisms that cause periodontitis and peri-implantitis are identical. Similar pathogenic microorganisms are found in the

periodontal pockets of the teeth and the area around the implants, but a number of authors deny the possibility of infection of the periimplant zone from pathological foci of infection in the periodontal tissues.

In addition, crowns and prostheses on implants differ in shape and structure from natural teeth in that they have undercuts that make it difficult to perform hygienic procedures. According to some authors, the microflora of the oral cavity after prosthetics on implants changes and the patient has a tendency to develop inflammatory processes, which negatively affects the functioning of prostheses and implants.

Conclusions:

Thus, there are a large number of problems in dental implantology, the leading place among which is occupied by the causes of mucositis and perimplantitis. Risk factors for the development of peri-implantitis are non-Smoking patient; iatrogenic causes; osteoporosis; availability of microscale between the dental implant and the overdenture; non-compliance with hygiene of the oral cavity; a history of periodontitis; no keratinization gums, providing stabilization of the gingival margin; systemic diseases (diabetes, thyroid disease, systemic lupus erythematosus, vasculitis, etc.); a history of rejection of one or more implants; immunodeficiency; infection of periimplant tissues with oral microorganisms. With a good objective analysis of the preimplantation situation and assessment of risk factors, good results can be achieved when placing a dental implant that ensures clinical stability and functioning of the implant for at least 10 years, without damaging the tissues attached to it, without developing negative symptoms and sensations that satisfy the patient both in functional and aesthetic aspects.

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