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Methods for Preventing Observations After Dental Implantation

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Abstract. The article presents data on risk factors after dental implantation surgical complications. It has been established that the effectiveness of dental prosthetics depends not only on the functional mechanical loads applied to implants but also on biological factors related to the processes developing in the oral cavity tissues and on the surface of the implant.

Keywords: detailed implantation, postoperative complication, reimplantation, soft tissue inflammation

Introduction

Dental implantation is one of the most common methods for restoring lost teeth, ensuring high functionality and aesthetic results. Despite the method's success, postoperative complications remain a serious problem affecting the long-term prognosis of treatment. Among the most common complications, peri-implant mucositis and peri-implantitis, osteointegration disorders, and bone tissue loss around the implant are distinguished, which often leads to its partial or complete rejection [1].

At the same time, the main task of any implant system is to restore missing teeth while maximizing the preservation of surrounding proper tissues [2].

Despite the fact that in the absolute majority of cases, dental prosthesis implantation is successful, in a number of cases, complications develop. Thus, according to the authors, the frequency of successful implantations was 91.6% of cases, however, further 10-year observation showed that 7% of patients develop periimplantitis, and other authors report that the frequency of complications ranges from 10 to 15%[3].

Dental implantation in modern dentistry is considered one of the most effective and clinically predictable methods of orthopedic rehabilitation for patients with partial or complete tooth loss. High survival rates of dental implants, according to long-term clinical observations, do not preclude the possibility of postoperative complications, the frequency of which, according to various data, varies from 5 to 20%.

In this regard, the problem of preventing postoperative complications is particularly relevant, as it is precisely preventive measures that largely determine the stability of osteointegration and the long-term prognosis of implant treatment [4]. Modern scientific publications emphasize that complications after dental implantation are multifactorial in nature and are formed under the influence of both systemic and local risk factors, which requires a comprehensive and multi-stage approach to their prevention [5].

Analysis of literature data indicates that the patient's general somatic condition and the presence of concomitant diseases play a significant role in the development of postoperative complications. It has been established that uncontrolled diabetes mellitus, osteoporosis, immunodeficiency conditions, and smoking significantly increase the risk of osteointegration disorders and the development of inflammatory diseases of peri-implant tissue [6]. In this regard, most authors emphasize the need for thorough preoperative diagnostics, including assessing the patient's general condition, analyzing risk factors, and mandatory oral sanitation. The presence of active inflammatory diseases of the periodontium is considered one of the leading predictors of peri-implantitis development, which is confirmed by the results of clinical and epidemiological studies [10].

Significant attention in the prevention of postoperative complications is paid to the surgical stage of implantation. According to systematic reviews, adherence to the principles of atraumatic surgery, adequate bone cooling, and strict adherence to sterilization protocols significantly reduce the risk of early complications and ensure optimal conditions for osteointegration [7]. In recent years, digital methods of implantation planning using conical-beam computed tomography and navigation templates have been actively implemented, which contributes to improving implant placement accuracy and reducing the likelihood of iatrogenic injuries [8]. The selection of implants with a modified surface, which contributes to the accelerated formation of bone-implant contact and reduces bacterial adhesion, is also of significant importance [9].

The study of literature sources showed that, unfortunately, the issues of oral hygiene care in patients with implants, both individual and professional, have not been sufficiently developed. Therefore, doctors supervising such patients are not sufficiently oriented in the measures that need to be planned and implemented for them to ensure and maintain a satisfactory level of hygiene care. Information on the influence of various hygiene products on the microbial coating of the implant is extremely scarce. A number of studies have confirmed the influence of dental hygiene level on the level of implant hygiene in patients with partial adentia. For example, the author concluded in their work that general hygienic care for teeth is largely interconnected and influences the hygienic state of suprastructures. There is a statistical correlation between the formation of a plaque, gingivitis, and the development of a pocket between the implant and the mucous membrane [10]. A number of studies have confirmed that irregular observation of plaque formation on the surface of implants can lead to increased destruction of bone tissue around the implant. Any structure installed in the oral cavity requires further observation and assessment of its condition by a specialist, as well as appropriate patient care [11].

In the postoperative period, the leading role in the prevention of complications is assigned to the control of the microbial factor. The formation of a bacterial film on the surface of the implant is considered a key pathogenetic mechanism for the development of peri-implant mucositis and peri-implantitis [12]. In this regard, most authors emphasize the need for regular professional oral hygiene and the formation of patient's sustainable individual implant care skills [2]. The use of special hygiene products, including dental papillae, irrigators, and antiseptic solutions, allows for a reduction in microbial load and a decrease in the severity of inflammatory reactions in the peri-implant zone [13].

According to Willson (2009), among patients with clinical or radiological signs of inflammation, cement remnants for fixing orthopedic structures in the peri-implant groove are observed in 81% of cases. After removal, clinical indicators normalized in 74% of cases. Iatrogenic factors occupy a special place in the

structure of postoperative complications. Errors at the diagnosis and planning stage of implantation, incorrect selection of implant size and position, insufficient bone tissue volume, and non-compliance with the principles of atraumatic surgery can lead to impaired primary stability and micro-mobility of the implant. In the pathogenesis of these complications, micro-mobility causes the formation of fibrous tissue in the bone contact zone of the implant instead of complete osseointegration, which significantly increases the risk of early implant loss [15]. An additional risk factor is premature or excessive functional stress, leading to bone tissue overload and accelerated resorption.

A discussion of the pharmacological prevention of postoperative complications occupies a special place in the literature. The use of antibacterial drugs in the early postoperative period is considered appropriate only in the presence of strict indications, since the unjustified prescription of antibiotics is associated with the risk of microorganism resistance formation [16]. As alternative approaches, methods of local antiseptic therapy, the use of probiotics and agents aimed at modulating the local immune response are being actively studied, which, according to several authors, contributes to improving reparative processes and reducing the frequency of inflammatory complications [11].

Modern concepts for the prevention of postoperative complications after dental implantation increasingly consider supportive peri-implant therapy as a mandatory component of long-term treatment. Regular control checkups, professional cleaning of implants, and monitoring of the condition of peri-implant tissues significantly reduce the risk of peri-implantitis development and slow the progression of bone resorption [9,10,12]. It is emphasized that the frequency of preventive visits should be determined individually, taking into account the degree of risk, which corresponds to the principles of personalized medicine.

Conclusions

Thus, the analysis of modern scientific literature shows that the prevention of postoperative complications after dental implantation should be comprehensive and cover all stages of treatment - from preoperative planning to lifelong supporting observation. The integration of clinical diagnostics, modern surgical technologies, microbial factor control, and patient active participation allows for a significant increase in the effectiveness of implant treatment and ensures the long-term stability of dental implants.

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