

MICROBIOLOGICAL ASPECTS OF INFLAMMATORY COMPLICATIONS IN FIXED PROSTHODONTICS ON DENTAL IMPLANTS

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Abstract

Currently, the restoration of dentition defects using dental implants, which guarantee a long service life, holds a leading position in dentistry. According to the latest global statistics, up to 2 million dental implants are placed annually. This study examines one of the main inflammatory complications associated with the use of dental implants, namely, peri-implantitis.

Keywords

implants, osseointegration, peri-implantitis, anaerobic infection

Peri-implantitis, or K10.2 according to ICD-10, is characterized by inflammation of the tissues surrounding the implant, accompanied by horizontal or vertical bone resorption. According to current data, peri-implantitis occurs in 28%-56% of patients examined. Let's consider some of the causes of peri-implantitis. One of the main risk factors for its development is smoking. According to S.I. Zhadko and F.I. Gerasimenko, tissue healing after implantation in smoking patients proceeds significantly more slowly than in non-smoking patients. Since people with a smoking habit have an increased risk of dental plaque, this means that the risk of developing gingivitis and periodontitis, as well as the appearance of pronounced bone structure resorption, subsequently prevails.

Data Analysis: The pathology of peri-implantitis is more complex, primarily due to the structural features of the peri-implant zone. Canullo L, Penarrocha-Oltra D, et al. suggested that the absence of a periodontal ligament around an implant makes the tissues of the peri-implant zone mobile. This, in turn, leads to greater trauma, thereby increasing the adhesive capabilities of microorganisms, which facilitates the contamination of peri-implant zones and the rapid progression of peri-implantitis [Canullo et al., 2015].

The surface oxide layer of an implant requires a specific physicochemical state to ensure its biocompatibility with the surrounding tissues. The peri-implant zone is a favorable habitat for anaerobes. Periodontitis, which is often the cause of tooth loss, contributes to the onset or progression of inflammation in the tissues

surrounding the implant. This anaerobic infection creates an acidic environment around the implant, posing a physicochemical threat to the stability of the implant's oxide layer. This can disrupt the connection between the implant and the gum and bone, leading to the subsequent loss of surrounding and supporting tissues.

For these reasons, knowledge of the microbiological profile associated with peri-implantitis is a key factor for the prevention and successful treatment of this condition, especially in individuals with a history of periodontitis.

There are clear differences in the results of subgingival biofilm studies between patients with peri-implantitis who have a healthy periodontium and those with periodontitis. Studying the subgingival biofilm microbiome allows for the identification of non-culturable bacteria that colonize implants in cases of peri-implantitis. Both healthy implants and those affected by peri-implantitis are colonized by periodontopathogenic microorganisms. However, peri-implantitis, compared to periodontitis, is a more complex heterogeneous infection, caused mainly by non-culturable gram-negative bacterial species.

According to research by scientists at El Bosque University (Colombia), the PCR detection frequency of oral periodontopathogens in patients with typical forms of peri-implantitis can be presented as follows: *A. actinomycetemcomitans* in 52.3%; *P. intermedia* in 42.8%; *P. gingivalis* in 33.3%; and *T. forsythia* in 23.8% of cases [Lafaurie et al., 2017].

Conclusion: *P. aeruginosa*, *S. aureus*, and *C. albicans* were detected more frequently in peri-implantitis than in periodontitis. Meanwhile, *P. micra*, *P. intermedia*, and *F. nucleatum* were found in higher proportions in the consortia associated with peri-implantitis compared to healthy implants.

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