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Microbial Profile of Peri- Implantitis – A Review

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Abstract:

Peri-implantitis has been defined as an inflammatory condition involving dental implants, sur- rounding mucosa and bone, which lose sup- porting bone. Bone, for a variety of reasons, is lost around the dental implant. Most patients are unaware that they have bone loss around the dental implant. Peri- implantits generally progresses in a painless fashion. The etiopathogenesis of peri- implantitis is complex and related to a variety of factors that affect the peri- implant environment. One such important factor is poor oral hygiene, smoking, alcohol consumption and drug abuse. Many microbes in the oral flora find attractive to the dental implants in the micro leakage points. So a review of microbial profile of peri- implantits is revised in the following article.

Keywords: Peri- implantits, implants, periodontitis, microbial profile

INTRODUCTION:

Dental implants have a wide range of invitations due to their increasing durability in situ is reflected by the stable long term results. Implant results have shown successful rates which came better year after year. On the other hand, there have been reports of hard and soft tissue problems resulting in inflammatory changes of the peri-implant mucosa with pocket formation and corresponding bacterial colonization leading to a condition called Peri-implantitis or peri- implant mucositits, where the former being more common. The higher the full-mouth clinical probing pocket depth and the greater the full-mouth attachment loss, the higher is the expected attachment loss around implants in the susceptible patient. In individuals with a history of chronic periodontitis, the incidence of peri-implantitis was 4–5 times higher than in individuals with no history of periodontitis [1]. Longitudinal bone loss around implants was correlated with previous experience of reduced periodontal bone support, periodontitis-susceptible subjects may show increased implant failure rate and marginal bone loss [2]. Successfully osseointegrated titanium implants usually harbor low amounts of plaque and minimal marginal inflammation [3,4].

RISK FACTORS OF PERI- IMPLANTITIS:

As we can see, currently periodontitis is a serious risk factor for the installation of any dental implant and that would be a malpractice. The state of the periodontium is important for a successful outcome. There have been studies stating that, history of perionditits affects the oral condition after implant placement.

1) Poor oral hygiene
2) Microorganisms
3) Mucositis
4) Smoking
5) Alcohol consumption
6) Diabetes mellitus
7) Genetic traits
8) Absence of keratinized mucosa
9) Position of implant in arch
10) Implant design
11) Implant surface
12) Residual cements

PERI- IMPLANT MUCOSA AND FIXTURE- ABUTMENT INTERFACE (FAI):

Peri- implant mucosa is composed of well-keratinized oral epithelium, sulcular epithelium and junctional epithelium, as well as the underlying connective tissues. Between the implant surface and the epithelial cells are the hemidesmosomes and the basal lamina [5]. The 2 mm long nonkeratinized junctional epithelium is only a few cell layers thick in the apical portion and is separated from alveolar bone by 1–2 mm of collagen rich connective tissue. This 3–4 mm ‘‘biological barrier,’’ formed irrespective of the original mucosal thickness, protects the zone of osseointegration from factors released from plaque and the oral cavity [6]. Early bacterial colonization around implants by microorganisms associated with periodontitis has been reported [7-9], and this colonization of implant surfaces and peri-implant tissues can occur within minutes after implant placement [10]. Hencewith microbial colonization occurs inside the microgap in between the titanium implant surfaces and the peri- implant tissues discussed above. This microgap is addressed as Fixture-abutment interface (FAI) microgap, leading to be a bacterial reservoir and causing peri- implantitis [10-12].

MICROBIOTA OF PERI- IMPLANTITIS:

The microbiological profiles were similar around teeth and dental implants of equal pocket depth, which may indicate that pockets around teeth can serve as a reservoir for putative periodontal pathogens. The microorganisms most commonly related to the failure of an implant are the Gram negative anaerobes, such as *Prevotella intermedia, Porphyromonas gingivalis, Aggregatibacter actinomycetemcomitans, Bacterioides forsythus, Treponema denticola, Prevotella nigrescens, Peptostreptococcus micros,* and *Fusobacterium nucleatum*, aenerobic spores and other bacterial species [13, 14]. Organisms those are less frequently associated with periodontitis, such as Staphylococcus spp, enterics, and Candida spp, have been found in cases of Peri- implant infection [15, 16]. High counts of T. forsythia, P. gingivalis and T. denticola have been observed in implants with peri-implantitis [14].

The colonization of microorganisms varies from dentulous patients to edentulous patients and patients with history of periodontitis [17].

In edentulous patients, *A. actinomycetemcomitans* and *P. gingivalis* were not frequently present due the full-mouth extraction [18].

In partially edentulous patients, the microbiota around the implant closely resembles to that of the remaining natural teeth present. Unlike the condition involved in the edentulous patients, *P. gingivalis and A. actinomycetemcomitans* provoke within 30 minutes after installation of the dental implants. In a study, small amounts of bacteria were collected from the preoperative swabs. On an average 86% of the microorganisms were identified morphologically as coccoid cells and over 80% of the cultivated bacteria were Gram-positive facultative cocci. The authors concluded that after implant installation, no significant changes in these proportions could be observed. Fusobacteria could only be detected in 13 of 104 samples. Black-pigmented *Bacteroides* were found infrequently and no trend of increase was apparent in any site over the 180 days of monitoring. Another study looking at microbiological features of implants placed in edentulous patients two years after implantation. These results indicated that 52% of organisms were facultative anaerobic cocci and 17% were facultative anaerobic rods, while Gram-negative anaerobic rods accounted for only 7.3% [17]. Samples from deep peri-implant pockets (≥4mm) in patients with chronic or refractory periodontitis showed significantly higher proportions of spirochetes and motile rods than those with comparable probing pocket depth in periodontally healthy patients [19].

For implants with peri-implantitis, putative periodontal pathogens, such as *Porphyromonas gingivalis, Prevotella intermedia*, *Prevotella nigrescens* and *Actinobacillus actinomycetemcomitans*, were found in 60% of the cases and microorganisms primarily not associated with periodontitis, such as *Staphylococcus* spp., enterics and *Candida* spp., were found in 55% of the peri-imaplant lesions [20]. In a study, the sites associated with failing implants were characterized by a complex microbiota with a large proportion of Gram-negative anaerobic rods. Black-pigmented *Bacteroides* and *Fusobacterium* spp. were regularly found. Spirochetes, fusiform bacteria as well as motile and curved rods were a common feature in the darkfield microscopic specimens of these sites [19, 21].

Collectively, many studies indicate that microorganisms colonizing implants in subjects with periodontitis are similar to that observed in the samples from periodontal pockets in the same individuals and harbor more anaerobic species than observed in fully or partially edentulous subjects with minimal or no periodontal diseases [20].

CONCLUSION:

The micro biome around implants does not exhibit greater biodiversity than teeth in the same individual. The microbial profile around implants and around normal tooth in both the cases of edentulous individuals and partially edentulous individuals were different [21]. Implants with signs of peri-implantitis do not always harbor typical periodontal pathogens. Treatment options pre- operatively and post- operatively should be analyzed completely before implant placements, thus treating the history of periodontitis, if present. Thus, the investigation of polymicrobial diseases such as periodontitis and peri-implantitis should, not only focus on the typical periodontopathic bacteria, but also consider highly diverse biofilms and interactions between the different members within.

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