

REVIEW ARTICLE

Volume 16 Supp 1 2021

DOI: 10.21315/aos2021.16.s1.1

ARTICLE INFO

Submitted: 02/03/2021

Accepted: 27/05/2021

Online: 22/09/2021

Peri-Implant Diseases and Gastrointestinal Diseases

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To cite this article: Arma U, Salsabila N (2021). Peri-implant diseases and gastrointestinal diseases. *Arch Orofac Sci*, 16(Supp.1): 1–4. <https://doi.org/10.21315/aos2021.16.s1.1>

To link to this article: <https://doi.org/10.21315/aos2021.16.s1.1>

ABSTRACT

Peri-implant diseases are serious problems that plagues today's dentistry, both in terms of therapy and epidemiology. With the expansion of implantology practice and the increasing number of implants placed annually, the frequency of peri-implant diseases has greatly expanded. The clinical manifestations, in the absence of a globally established classification, are peri-implant mucositis and peri-implantitis, the counterparts of gingivitis and periodontitis, respectively. However, many doubts remain about their features. Official diagnostic criteria, globally recognised by the dental community, have not yet been introduced. The review presented possible association between gastrointestinal diseases and peri-implant diseases. Previous studies had revealed the association with significantly higher levels of bacteria in patient's gastrointestinal disease at either gingivitis or in periodontitis site. Additionally, pathogenesis of the periodontitis is similar to peri-implant diseases.

Keywords: *Gastrointestinal diseases; mucositis; peri-implant diseases; peri-implantitis*

INTRODUCTION

High life expectancy and wide spread in implant dentistry are all factors that play a role in increasing the number of dental implants in elderly patients (Lasserre *et al.*, 2018). Replacing missing teeth with titanium dental implants is a common procedure nowadays. The high defence value with a range from 95% to 98% over the 10-year period is one of the considerations (Valente & Andreana, 2016). Some risk factors are poor oral hygiene, history of periodontitis, diabetes and smoking. Peri-implant diseases have the same aetiology and risk factors as chronic periodontitis (Schwarz *et al.*, 2015). Peri-implant diseases are classified into two categories: peri-implant mucositis and peri-implantitis. Peri-implant mucositis is an inflammatory reaction that is reversible

in the mucosa around the dental implant. On the other hand, peri-implantitis is an inflammatory reaction associated with deterioration of function in the supporting bone around dental implants (Nogueira-Filho *et al.*, 2011). Several studies have found similarities in the pathogenesis of periodontitis and peri-implantitis, showing intraoral changes in periodontal pathogens from teeth undergoing chronic periodontitis to reaching the peri-implant and causes bone loss in the supporting teeth or implants (Salvi *et al.*, 2017). Analysis of the risk factors that cause peri-implant diseases gives clear understanding of a number of important pathological conditions. Various studies with accurate stratification of samples and strict control of various confounding factors are important in analysing the causative factors of these diseases. The pathogenesis was

similar to periodontitis which begins with the accumulation of plaque microbes on the surface of the teeth or dental implants. Systemic disease can damage the host and immune defence against periodontal pathogens which produce destructive periodontal disease and peri-implantitis (Papi *et al.*, 2018).

Microbes Related to Peri-Implant Diseases

By examining the peri-implant microbiota, one will find high incidence of *Prevotellaceae* (*P. intermedia*, *P. buccae*, *P. oralis*, *P. melaninogenica*, *P. denticola*, *P. nigrescens*), *Porphyromonas gingivalis*, *Fusobacterium nucleatum*, *Tannerella forsythia* and *Treponema denticola* in implant diseases, as well as gram-positive cells that thrive on healthy implants. The qualitative content of biofilm microflora in peri-implantitis is similar to periodontitis, which explains why patients with active periodontal disease have a higher risk of peri-implantitis (Ramesh & Jayaprakash, 2015). Dental implants are susceptible to infections that are also caused by morphology of the peri-implant tissue. The process of forming on the surface of the implant is comparable to the formation of biofilms in healthy teeth. Although, the role of surface material in biofilm formation is still being observed; a rough surface can cause plaque to build up in the supra and subgingival parts as compared to a smooth surface (Mengel *et al.*, 2017).

RISK FACTORS

The indication from several studies states that the risk factors are related to tissue damage and peri-implant disease despite the absence of plaque (Yeh *et al.*, 2019). Patients with periodontal tissue problems have a high increased risk of plaque index and are susceptible to bone loss (Monje *et al.*, 2019). In a previous study population, no association was found between smoking and peri-implant disease (Koldslund *et al.*, 2011).

PERI-IMPLANT DISEASES RELATED TO GASTROINTESTINAL DISEASES

Oral hygiene practices that cause alterations in the flora of the oral mucosa, consequently causes imbalance in the gut microbiome (dysbiosis), and thereby contributes to the pathogenesis of inflammatory bowel disease (Jakobi *et al.*, 2015; Saulacic & Schaller, 2019). Multiple-comparison analysis showed that the groups, ulcerative colitis (UC) versus Crohn's disease (CD), differed in bacterial counts for *Bacteroides ureolyticus*, *Campylobacter gracilis*, *Parvimonas micra*, *P. melaninogenica*, *Peptostreptococcus anaerobius*, *Staphylococcus aureus*, *Streptococcus anginosus*, *Streptococcus intermedius*, *Streptococcus mitis*, *Streptococcus mutans* and *Treponema denticola* (Pokrowiecki *et al.*, 2017). CD was associated with significantly higher levels of these bacteria than UC patients at either gingivitis or in periodontitis sites. CD patients had higher levels of *P. melaninogenica*, *S. aureus*, *S. anginosus*, and *S. mutans* compared with controls at gingivitis and at periodontitis sites. Whereby, UC patients harboured higher levels of *S. aureus* and *P. anaerobius* than controls only in gingivitis sites. *Helicobacter pylori* belongs to the subdivision of Proteobacteria, order Campylobacter, of the family *Helicobacter* and 20 species have been recognised. *H. pylori* has the properties of being microaerophilic and of being catalase, oxidase, and urease positive in most cases (Dursun & Tözüm, 2016). They are known to be organ-specific as gastric *Helicobacter* do not have the capacity to colonise elsewhere such as intestine and liver. Studies have shown that the presence of *H. pylori* in the oral cavity came from patients who were known to have some periodontal complication, which led the American Dental Association to develop the Periodontal Screening and Recording (PSR) index to improve the detection of periodontal disease (Stacchi *et al.*, 2016). Presence of this bacterium in the oral cavity has been postulated as an important potential source of reinfection after it has been eradicated from stomach.

CONCLUSION

Peri-implant diseases are serious problems that plague dentistry and with the expansion of implantology practice, the frequency of peri-implant diseases has greatly expanded. Previous studies had revealed the association of significantly higher levels of bacteria in patient's gastrointestinal disease at either gingivitis or in periodontitis site. Additionally, pathogenesis of the periodontitis is similar to peri-implant diseases.

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