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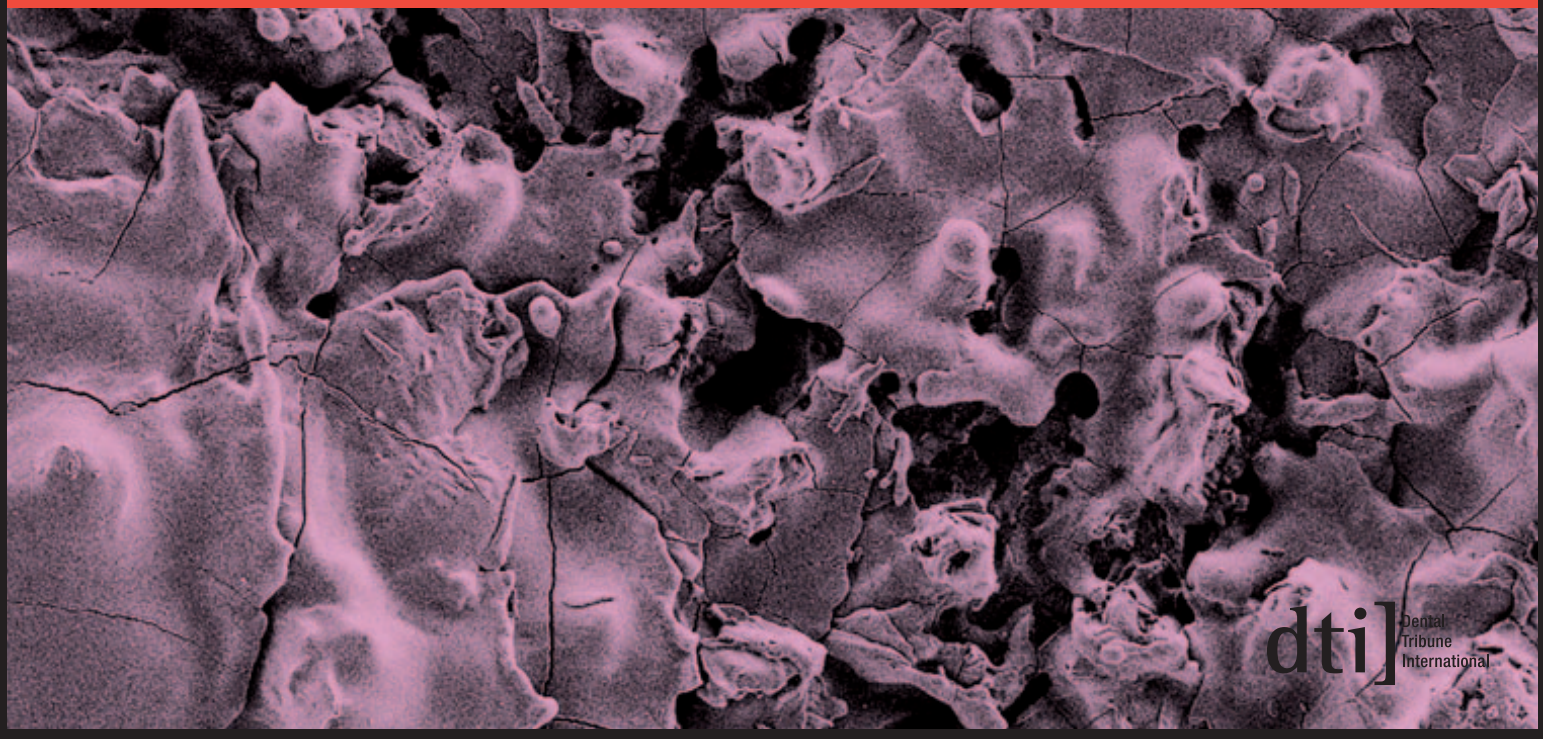

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The two twin souls of research

In an ideal world, research in general, and dental research in particular, would answer all of the questions a clinician would formulate in order to better treat the final beneficiary of the research itself, the patient. Our journal has been designed from the very beginning to consider foremost the patient. In order to achieve this, several groups of researchers were invited to form part of the journal board, each group being represented by a clinician, whom I would call the "clinical soul" of the group.

However, clinical protocols alone can be interpreted in many different ways, even incorrectly, if not approached with the requisite background knowledge. In order to be able to yield a scientifically meaningful answer, clinical protocols must be validated under the supervision of highly trained researchers. For this reason, all of the groups that joined the journal constitute also an "analytic soul," in order to establish the methodology, lead the clinical study and interpret the results.

The two components of research, which I would call the two "souls of research," are linked to one another. Underestimating the importance of one of these two components, one of these two souls, or leaving one of them out would lead to an impoverishment of the value and benefit of any research results and therefore to the established goal remaining unfulfilled.

Dr. Luigi Canullo
Associate Editor

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The *Journal of Oral Science & Rehabilitation* publishes original and high-quality research and clinical papers in the fields of periodontology, implant dentistry, prosthodontics and maxillofacial surgery. Priority is given to papers focusing on clinical techniques and with a direct impact on clinical decision-making and outcomes in the above-mentioned fields. Furthermore, book reviews, summaries and abstracts of scientific meetings are published in the journal.

Papers submitted to the *Journal of Oral Science & Rehabilitation* are subject to rigorous double-blind peer review. Papers are initially screened for relevance to the scope of the journal, as well as for scientific content and quality. Once accepted, the manuscript is sent to the relevant associate editors and reviewers of the journal for peer review. It is then returned to the author for revision and thereafter submitted for copy editing. The decision of the editor-in-chief is made after the review process and is considered final.

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Identification of *Staphylococcus aureus* at the internal and external implant surfaces in individuals with periimplant disease: A cross-sectional study

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Abstract

Objective

The objective of this study was to investigate the prevalence of *Staphylococcus aureus* (*S. aureus*) at internal and external dental implant surfaces in patients with periimplant disease.

Materials and methods

Samples for microbiological analysis were obtained from four types of sites in the following order: (1) the periimplant sulcular fluid (PISF) of each implant; (2) the gingival sulcus (GS) of the adjacent teeth; (3) the implant–abutment connection and abutment inner portions (IIP) of each implant; and (4) the oropharyngeal complex (OF)—oral, tongue and pharynx swabs were also collected.

Quantitative real-time polymerase chain reaction assays were carried out for total bacterial counts. The Kruskal–Wallis test was used to compare the *S. aureus* levels at the various sites.

Results

Mean bacterial counts of *S. aureus* were as follows: GS = 5.02×10^2; PISF = 0, IIP = 0 and OF = 0. A positive value was found for one out of the 35 sites for each group, but under the limit of quantification. For GS, one out of the 35 sites presented with a total bacterial count of 2.11×10^4. No statistically significant differences were found among groups regarding site location ($p = 0.40$).

Conclusion

Within the limits of this study, *S. aureus* could not be quantified in the PISF and inside the IIP affected by periimplantitis.

Keywords

Periimplantitis, periimplant disease, microbiological analysis, opportunistic pathogens, implant connection, *S. aureus*.

Introduction

Dental implantology is a central part of modern dentistry concerned with the replacement of missing teeth in various clinical situations. In the past 30 years, the materials and methods of implant dentistry have undergone a substantial process of development and evolution. Implant surface, macrodesign and type of implant–abutment connection have been found to be of major relevance to initial healing and long-term stability.[1–3] Since the number of implants placed has increased in the last ten years, optimal maintenance has become increasingly important.[4, 5] While in many cases, it has been reported that dental implants are a safe and predictable treatment method with high survival rates, they are not immune from biological and iatrogenic complications associated with improper treatment planning, surgical and prosthetic execution, or material failure, as well as maintenance problems.[5] Also, the biological complications of periimplant mucositis and periimplantitis, which may result in soft- and hard-tissue defects, have been suggested to be relevant for later marginal bone loss.[6]

Several approaches have been followed in seeking to understand the pathomechanism of periimplantitis. According to a consensus conference of the American Academy of Periodontology, bacterial colonization of the implant surface and the occurrence of bone loss indicate the point of no return in periimplantitis.[7] Periimplantitis is characterized by an inflammatory process around an implant that includes both soft-tissue inflammation and progressive loss of periimplant supporting bone. Periimplantitis occurs primarily as a result of overwhelming periodontal insult and subsequent immune response.[7] The connection to periodontitis as an infectious disease with comparable symptoms and outcomes suggests that investigating the associated local bacteria is fundamental to establishing the pathomechanism of periimplantitis.

The implant surface may be colonized with different pathogens other than periodontal bacteria.[8] According to Albertini et al., opportunistic pathogens such as *Pseudomonas aeruginosa*, *Staphylococcus aureus* (*S. aureus*) and *Candida albicans* may be associated with implant failure.[9]

As suggested in an American Academy of Periodontology report, secondary diagnostic measures, that is, bacterial culturing, inflammatory markers and genetic factors, may be useful in the diagnosis of periimplant disease.[7] According to Canullo et al., bacterial agglomerates around dental implants and their prosthodontic adjacent structures have been identified.[10] These results suggested that all of the connections were contaminated after five years of functional loading; thus, the implant–abutment connection design might influence bacterial activity levels qualitatively and quantitatively, especially inside the implant connection.[10] Furthermore, Cosyn et al. found that intracoronal compartments of screw-retained fixed restorations were heavily contaminated.[11] Further investigations have shown that the restorative margin is the principal pathway for bacterial leakage and contamination of abutment screws, and bacteria most likely pass from the periimplant sulcus through the implant–abutment and abutment–prosthesis interfaces.[10]

With the aim of identifying the pathogens that contribute toward the development of periimplantitis defects, different working groups have reported a cluster of bacteria, including *Treponema forsythia* and *S. aureus*, associated with periimplant disease.[12]

The presence of *S. aureus* as an opportunistic pathogen in the early stage of active periimplantitis in patients has also been confirmed by Mombelli and Décaillet.[13] In addition, Salvi et al. reported that detection or lack of *S. aureus* at implant sites at 12 weeks resulted in the highest positive (i.e., 80%) and negative (i.e., 90%) predictive values for the incidence of periimplantitis, respectively.[14] Moreover, Canullo et al. showed that *S. aureus* is present on the external and internal abutment surfaces if these are not cleaned before screwing.[15]

The aim of the present study is to investigate the prevalence of *S. aureus* in the oral cavity of patients with active periimplantitis. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.[16]

Materials & methods

Study design

This cross-sectional study evaluated data collected from 51 consecutive, partially edentulous patients of both sexes, aged 18 or older (mean age of 54.2), who had been treated with a single implant-supported, cemented or screw-retained restoration functionally loaded for at least 12