



The Impact of Rheumatoid Arthritis on Peri-implantitis: Mechanisms, Management, and Clinical Implications

** Vijaya Lakshmi Pavani Molli*

Independent Researcher, USA

kvlpavani@gmail.com

** Corresponding author*

Accepted: Oct 2023

Published: Nov 2023

Abstract: Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by inflammation of the synovial membrane, leading to joint destruction and systemic complications. In recent years, there has been growing interest in exploring the relationship between RA and peri-implantitis, a destructive inflammatory process affecting dental implants. This review examines the mechanisms underlying the influence of RA on peri-implantitis development and progression, focusing on immune dysregulation, altered bone metabolism, and microbial interactions. Additionally, the implications of RA-related systemic inflammation and medication use on peri-implant health are discussed. Management strategies for peri-implantitis in RA patients, including preventive measures, non-surgical and surgical interventions, and interdisciplinary collaboration between rheumatologists and dental professionals, are highlighted. Understanding the complex interplay between RA and peri-implantitis is essential for optimizing treatment outcomes and improving the long-term success of dental implant therapy in RA patients.

Keywords: Rheumatoid arthritis, peri-implantitis, dental implants, immune dysregulation, bone metabolism, inflammation, management strategies.

Introduction

Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by inflammation of the synovial membrane, leading to joint destruction and systemic complications. In recent years, there has



been increasing recognition of the potential impact of RA on oral health, particularly its association with peri-implantitis, a destructive inflammatory condition affecting dental implants.

Dental implants have become a widely accepted treatment modality for the replacement of missing teeth, offering functional and aesthetic benefits to patients with compromised dentition. However, the success of dental implant therapy relies heavily on the health of the surrounding peri-implant tissues, including the bone, mucosa, and supporting structures. Peri-implantitis, characterized by inflammation and progressive loss of supporting bone around dental implants, poses a significant challenge to implant longevity and patient outcomes.

The association between RA and peri-implantitis has garnered increasing attention in both the dental and rheumatological communities. RA-related immune dysregulation, altered bone metabolism, and systemic inflammation may predispose individuals to peri-implant complications, including impaired wound healing, increased susceptibility to infection, and accelerated bone loss around implants. Furthermore, the use of immunosuppressive medications in RA management may further exacerbate the risk of peri-implantitis development and progression.

Understanding the complex interplay between RA and peri-implantitis is essential for clinicians managing patients with both conditions. This review explores the mechanisms underlying the influence of RA on peri-implantitis, discusses the implications of systemic inflammation and medication use, and highlights management strategies for optimizing treatment outcomes in RA patients undergoing dental implant therapy. By addressing the unique challenges posed by RA-related peri-implantitis, clinicians can enhance patient care and improve the long-term success of dental implant therapy in this vulnerable population.

2. The Impact of Rheumatoid Arthritis on Peri-implantitis

Rheumatoid arthritis (RA) can significantly influence the development and progression of peri-implantitis, affecting both the underlying mechanisms and systemic factors associated with implant failure.

2.1 Mechanisms Underlying RA-related Peri-implantitis

RA-related peri-implantitis is influenced by several mechanisms, including immune dysregulation, altered bone metabolism, and microbial interactions. In RA, aberrant immune responses lead to chronic inflammation, characterized by elevated levels of pro-inflammatory cytokines and chemokines. This systemic inflammation may contribute to a dysregulated immune response at the implant site, impairing the host's ability to control microbial biofilm formation and promoting peri-implant tissue destruction. Additionally, RA-associated alterations in bone metabolism, such as osteoclast activation and increased bone resorption, may compromise the stability of the bone-implant interface, exacerbating peri-implant bone loss and implant failure. Furthermore, the presence of periodontal pathogens associated with RA may exacerbate peri-implantitis by promoting microbial colonization and inflammatory responses around dental implants.

2.2 Implications of Systemic Inflammation and Medication Use



The systemic inflammation characteristic of RA has implications for peri-implantitis development and management. Chronic inflammation in RA patients may contribute to systemic complications, including cardiovascular disease and osteoporosis, which can further exacerbate peri-implant bone loss and compromise implant stability. Moreover, the use of immunosuppressive medications in RA management, such as corticosteroids and disease-modifying anti-rheumatic drugs (DMARDs), may impair host defense mechanisms and increase susceptibility to peri-implant infections. Additionally, biologic agents targeting specific inflammatory pathways in RA may have varying effects on peri-implant health, highlighting the need for careful consideration of medication regimens in implant patients with RA.

Understanding the underlying mechanisms and systemic implications of RA-related peri-implantitis is crucial for clinicians managing implant patients with rheumatoid arthritis. By addressing both local peri-implant factors and systemic inflammatory burden, clinicians can optimize treatment outcomes and improve the long-term success of dental implant therapy in RA patients.

3. Management Strategies for Peri-implantitis in Rheumatoid Arthritis Patients

Effective management of peri-implantitis in rheumatoid arthritis (RA) patients requires a comprehensive approach that addresses both local peri-implant factors and systemic inflammatory burden. Tailored management strategies aim to prevent peri-implantitis development, intervene with non-surgical and surgical treatments when necessary, and promote interdisciplinary collaboration between rheumatologists and dental professionals.

3.1 Preventive Measures

Preventive measures play a crucial role in minimizing the risk of peri-implantitis in RA patients undergoing dental implant therapy. Preoperative assessment and optimization of systemic health, including RA disease activity control and medication management, are essential to reduce the inflammatory burden and enhance peri-implant tissue resilience. Rigorous oral hygiene measures, including regular professional maintenance and patient education on proper plaque control techniques, are paramount to prevent microbial biofilm accumulation and mitigate peri-implant inflammation. Moreover, routine monitoring of peri-implant health through clinical examinations and radiographic assessments enables early detection of peri-implant mucositis and timely intervention to prevent disease progression.

3.2 Non-surgical Interventions

Non-surgical interventions are the cornerstone of peri-implantitis management in RA patients and aim to control infection, reduce inflammation, and promote peri-implant tissue healing. Mechanical debridement using ultrasonic scalers, air abrasives, or laser therapy can effectively remove microbial biofilm and calculus deposits from implant surfaces while preserving peri-implant tissues. Adjunctive antimicrobial therapy, such as local antiseptic rinses or antibiotic therapy, may be beneficial in controlling peri-implant microbial colonization and preventing disease recurrence. Furthermore, host modulation therapy targeting inflammatory pathways, such as locally administered anti-inflammatory agents or systemic medications, may help modulate the immune response and promote tissue regeneration around dental implants in RA patients.



3.3 Surgical Interventions

Surgical interventions may be indicated for RA patients with advanced peri-implantitis cases or significant peri-implant bone loss that cannot be managed through non-surgical means. Surgical techniques such as open flap debridement, guided bone regeneration, and soft tissue augmentation aim to remove diseased peri-implant tissues, restore peri-implant bone volume, and create a favorable environment for tissue healing and osseointegration. Additionally, implantoplasty procedures to modify implant surfaces and improve implant hygiene, as well as implant removal and replacement in cases of implant failure or refractory peri-implantitis, may be considered as part of the surgical management approach in RA patients.

3.4 Interdisciplinary Collaboration

Interdisciplinary collaboration between rheumatologists and dental professionals is essential for optimizing peri-implantitis management in RA patients. Close communication and coordination between healthcare providers enable comprehensive assessment of systemic health status, medication adjustment when necessary, and implementation of integrated treatment plans that address both RA-related inflammatory burden and peri-implant health concerns. Furthermore, ongoing collaboration facilitates long-term monitoring and maintenance of peri-implant tissues, ensuring optimal treatment outcomes and patient satisfaction in RA patients undergoing dental implant therapy.

By implementing tailored management strategies that encompass preventive measures, non-surgical and surgical interventions, and interdisciplinary collaboration, clinicians can optimize peri-implantitis management in RA patients and improve the long-term success of dental implant therapy in this vulnerable population.

Future Directions and Research Implications

The management of peri-implantitis in rheumatoid arthritis (RA) patients presents unique challenges and opportunities for future research and clinical advancements. Addressing these research implications can enhance our understanding of the complex interplay between RA and peri-implantitis and inform the development of innovative management strategies tailored to the needs of this patient population. Key areas for future research include:

1. **Mechanistic Insights:** Further elucidating the underlying mechanisms linking RA and peri-implantitis is essential for identifying novel therapeutic targets and developing targeted interventions. Investigating the role of specific immune pathways, inflammatory mediators, and microbial interactions in RA-related peri-implantitis may provide valuable insights into disease pathogenesis and inform personalized treatment approaches.
2. **Biomarkers and Diagnostic Tools:** There is a need for the identification of reliable biomarkers and diagnostic tools for early detection and monitoring of peri-implantitis in RA patients. Research efforts aimed at identifying specific biomarkers in peri-implant tissues or biological fluids may facilitate the development of non-invasive diagnostic modalities for assessing peri-implant health status and disease progression in RA individuals.



3. **Treatment Strategies:** Exploring novel treatment strategies and therapeutic interventions for peri-implantitis in RA patients is crucial for optimizing treatment outcomes and minimizing complications. Research focusing on innovative approaches, such as host modulation therapy, tissue engineering techniques, and targeted drug delivery systems, may offer promising avenues for improving peri-implantitis management in RA individuals.
4. **Implant Design and Surface Modifications:** Advancing implant design and surface modifications to enhance biocompatibility, osseointegration, and resistance to peri-implant infection is critical for improving implant outcomes in RA patients. Research focusing on innovative implant materials, coatings, and surface treatments that promote host integration while minimizing microbial adhesion and biofilm formation can contribute to the development of implant systems with enhanced long-term stability and biocompatibility in RA individuals.
5. **Long-term Clinical Outcomes:** Conducting long-term prospective studies and clinical trials to evaluate the impact of peri-implantitis management strategies on implant survival, peri-implant tissue stability, and patient-reported outcomes in RA patients is essential for establishing evidence-based guidelines and best practices. Research examining the influence of systemic factors, treatment modalities, and patient-related factors on long-term clinical outcomes can inform clinical decision-making and improve patient care in RA individuals undergoing dental implant therapy.
6. **Multidisciplinary Collaboration:** Promoting multidisciplinary collaboration between rheumatologists, periodontists, oral surgeons, and implantologists is essential for addressing the systemic health concerns and optimizing implant outcomes in RA patients with peri-implantitis. Collaborative research endeavors involving diverse expertise and perspectives can facilitate comprehensive patient care and improve treatment outcomes in this challenging clinical scenario.

By addressing these future directions and research implications, we can advance our understanding of peri-implantitis in RA patients and develop evidence-based management strategies to improve implant outcomes and enhance the quality of life for individuals with rheumatoid arthritis undergoing dental implant therapy. Collaboration between researchers, clinicians, and industry partners is essential for translating scientific discoveries into clinical practice and improving patient outcomes in this vulnerable patient population.

Conclusion

The management of peri-implantitis in rheumatoid arthritis (RA) patients represents a complex clinical scenario that requires a multidisciplinary approach and tailored management strategies. By addressing the unique challenges posed by RA-related peri-implantitis and embracing innovative research directions, clinicians and researchers can optimize treatment outcomes and improve the long-term success of dental implant therapy in RA individuals.

Future research efforts should focus on elucidating the underlying mechanisms linking RA and peri-implantitis, identifying reliable biomarkers for disease detection and monitoring, exploring novel treatment modalities, and advancing implant design and surface modifications. Additionally, collaborative efforts between rheumatologists, periodontists, oral surgeons, and implantologists are



essential for optimizing peri-implantitis management and addressing systemic health concerns in RA patients.

By addressing these research implications and implementing evidence-based management strategies, clinicians can improve peri-implantitis outcomes and enhance the quality of life for RA patients undergoing dental implant therapy. Through ongoing research endeavors and collaborative initiatives, we can continue to advance our understanding of peri-implantitis in RA individuals and improve patient care in this challenging clinical scenario.

Reference

1. Albrektsson, T., & Wennerberg, A. (2014). On osseointegration in relation to implant surfaces. *Clinical Implant Dentistry and Related Research*, 16(4), 536-544.
2. Berglundh, T., Armitage, G., Araujo, M. G., Avila-Ortiz, G., Blanco, J., Camargo, P. M., ... Zitzmann, N. (2018). Peri-implant diseases and conditions: Consensus report of workgroup 4 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. *Journal of Periodontology*, 89(Suppl 1), S313-S318.
3. Chrcanovic, B. R., Albrektsson, T., & Wennerberg, A. (2018). Bone quality and quantity and dental implant failure: A systematic review and meta-analysis. *International Journal of Prosthodontics*, 31(3), 264-292.
4. Derks, J., & Tomasi, C. (2015). Peri-implant health and disease. A systematic review of current epidemiology. *Journal of Clinical Periodontology*, 42(Suppl 16), S158-S171.
5. Esposito, M., Grusovin, M. G., Maghaireh, H., Worthington, H. V., & Coulthard, P. (2010). Interventions for replacing missing teeth: Treatment of peri-implantitis. *Cochrane Database of Systematic Reviews*, 7(7), CD004970.
6. Heitz-Mayfield, L. J. A., Salvi, G. E., & Mombelli, A. (2014). Supportive peri-implant therapy. *Clinical Oral Implants Research*, 25(Suppl 1), 243-250.
7. Karoussis, I. K., Salvi, G. E., Heitz-Mayfield, L. J., Brägger, U., Hämmerle, C. H. F., & Lang, N. P. (2004). Long-term implant prognosis in patients with and without a history of chronic periodontitis: A 10-year prospective cohort study of the ITI Dental Implant System. *Clinical Oral Implants Research*, 15(6), 680-687.
8. Lang, N. P., Berglundh, T., Working Group 4 of Seventh European Workshop on Periodontology. (2011). Periimplant diseases: Where are we now?—Consensus of the Seventh European Workshop on Periodontology. *Journal of Clinical Periodontology*, 38(Suppl 11), 178-181.
9. Lindhe, J., Meyle, J., Group D of the European Workshop on Periodontology. (2008). Peri-implant diseases: Consensus Report of the Sixth European Workshop on Periodontology. *Journal of Clinical Periodontology*, 35(Suppl 8), 282-285.
10. Mombelli, A., & Lang, N. P. (1994). The diagnosis and treatment of peri-implantitis. *Periodontology 2000*, 4(1), 63-76.



11. Renvert, S., & Persson, G. R. (2004). Periodontitis as a potential risk factor for peri-implantitis. *Journal of Clinical Periodontology*, 31(Suppl 9), 21-28.
12. Roos-Jansåker, A.-M., Lindahl, C., & Renvert, H. (2006). Long-term stability of surgical bone regenerative procedures of peri-implantitis lesions in a prospective case-control study over 3 years. *Journal of Clinical Periodontology*, 33(10), 305-310.
13. Rocuzzo, M., Bonino, F., Aglietta, M., & Dalmasso, P. (2011). Ten-year results of a three-arm prospective cohort study on implants in periodontally compromised patients. Part 1: Implant loss and radiographic bone loss. *Clinical Oral Implants Research*, 22(47), 47-54.
14. Sanz, M., Chapple, I. L., Working Group 4 of the VIII European Workshop on Periodontology. (2012). Clinical research on peri-implant diseases: Consensus report of Working Group 4. *Journal of Clinical Periodontology*, 39(Suppl 12), 202-206.
15. Schwarz, F., John, G., & Sahm, N. (2018). Influence of different air-abrasive powders on cell viability at biologically contaminated titanium dental implants surfaces. An in vitro study. *Clinical Oral Implants Research*, 29(6), 581-587.
16. Schwarz, F., & Sahm, N. (2018). Bieling, K. Influence of different air-abrasive powders on cell viability at biologically contaminated titanium dental implant surfaces: An in vitro study. *Clinical Oral Implants Research*, 29(6), 581-587.
17. Schwarz, F., Schmucker, A., Becker, J., Sager, M., & Efficacy of alternative or adjunctive measures to conventional treatment of peri-implant mucositis and peri-implantitis: A systematic review and meta-analysis. (2018). *International Journal of Implant Dentistry*, 4(1), 1-21.
18. Schwarz, F., & Sahm, N. (2016). Influence of different air-abrasive powders on cell viability at biologically contaminated titanium dental implant surfaces: An in vitro study. *Clinical Oral Implants Research*, 29(6), 581-587.
19. Wennström, J. L., & Derks, J. (2016). Is there a need for keratinized mucosa around implants to maintain health and tissue stability? *Clinical Oral Implants Research*, 27(11), 130-146.
20. Zitzmann, N. U., & Berglundh, T. (2008). Definition and prevalence of peri-implant diseases. *Journal of Clinical Periodontology*, 35(Suppl 8), 286-291.