Journal of Dental Health: Current Research

Short Communication A SCITECHNOL JOURNAL

Anaerobic Microbial Communities and their Impact on Periodontal Health

Martrnhill Bernergast*

Department of Oral and Maxillofacial Medicine, University of Sheffield, Sheffield, United Kingdom

***Corresponding Author:** Martrnhill Bernergast, Department of Oral and Maxillofacial Medicine, University of Sheffield, Sheffield, United Kingdom; E-mail: martrnhillbe@gmail.com

Received date: 28 May, 2024, Manuscript No. DHCR-24-137152;

Editor assigned date: 30 May, 2024, Pre-QC No. DHCR-24-137152 (PQ);

Reviewed date: 14 June, 2024, QC No. DHCR-24-137152;

Revised date: 21 June, 2024, Manuscript No. DHCR-24-137152 (R);

Published date: 28 June, 2024, DOI: DOI: 10.4172/2470-0886.1000212

Description

Periodontal disease, a prevalent oral health condition, involves inflammation and infection of the structures supporting the teeth, including gums, periodontal ligaments, and alveolar bone. Anaerobic bacteria play a key role in the pathogenesis of periodontal disease, contributing to tissue destruction and disease progression. This article provides an in-depth exploration of periodontal disease, the role of anaerobic bacteria in its development, and current understanding of treatment approaches. Periodontal disease encompasses a spectrum of conditions ranging from gingivitis, characterized by inflammation of the gums, to more severe forms of periodontitis, which involve destruction of the supporting tissues around the teeth [1]. The primary cause of periodontal disease is the accumulation of dental plaque, a biofilm composed of bacteria, saliva, and food debris, on tooth surfaces and along the gum line.

Anaerobic bacteria thrive in environments devoid of oxygen and are prominent inhabitants of dental plaque. They play a pivotal role in the progression from gingivitis to periodontitis through several mechanisms. Anaerobic bacteria release toxins and enzymes that provoke an immune response, leading to chronic inflammation of the gums (gingiva) [2]. This inflammation can progress to periodontitis, causing destruction of periodontal ligaments and bone resorption. Anaerobic bacteria contribute to the formation and maturation of dental plaque biofilms. Within these biofilms, bacteria adhere to tooth surfaces and create a protective environment that enhances their survival and resistance to antimicrobial treatments. Anaerobic bacteria produce virulence factors such as Lipopolysaccharides (LPS), proteases, and collagenases, which directly contribute to tissue breakdown and degradation of periodontal tissues [3,4].

Several species of anaerobic bacteria have been implicated in periodontal disease *Porphyromonas gingivalis* known for its ability to evade the immune system and disrupt host defenses, *P. gingivalis* is strongly associated with periodontitis and plays a central role in disease progression. *Tannerella forsythia* this bacterium produces enzymes that degrade host tissues and contribute to the destruction of periodontal ligaments and bone. *Prevotella intermedia* involved in the production of inflammatory cytokines and enzymes that promote tissue destruction and progression of periodontal disease [5].

Fusobacterium nucleatum

Facilitates the colonization of other pathogens and contributes to the polymicrobial nature of periodontal infections.

Diagnosing periodontal disease and assessing the presence of anaerobic bacteria typically involves. Dentists evaluate the health of gums, measure periodontal pockets (spaces between the gums and teeth), and assess signs of inflammation and tissue damage. Microbial sampling of dental plaque or gingival crevicular fluid can identify specific bacteria present in periodontal infections, guiding targeted treatment approaches [6]. X-rays or Cone Beam Computed Tomography (CBCT) scans may be used to assess bone loss and structural changes associated with advanced periodontitis. Managing periodontal disease involves comprehensive treatment strategies aimed at controlling infection, reducing inflammation, and restoring periodontal health. Scaling and root planing (deep cleaning) remove plaque and tartar deposits from tooth surfaces and root surfaces, facilitating healing and reducing bacterial load. Local or systemic antibiotics may be prescribed to target specific anaerobic bacteria and reduce their population within periodontal pockets. In cases of severe periodontitis, surgical procedures such as flap surgery, bone grafting, or guided tissue regeneration may be necessary to restore periodontal tissues and support tooth stability [7,8].

Regular dental visits for professional cleanings and ongoing monitoring of periodontal health are essential to prevent disease recurrence and maintain optimal oral hygiene [9]. Ongoing research aims to deepen our understanding of the role of anaerobic bacteria in periodontal disease pathogenesis and explore novel treatment modalities, including: Investigating the use of beneficial bacteria to restore microbial balance and inhibit the growth of periodontal pathogens. Developing therapies that target host immune responses or promote tissue regeneration to enhance periodontal health and reduce disease severity [10].

Conclusion

In conclusion, anaerobic bacteria play a significant role in the development and progression of periodontal disease by contributing to inflammation, tissue destruction, and microbial dysbiosis within dental plaque biofilms. Effective management of periodontal disease involves early diagnosis, targeted antimicrobial therapies, and comprehensive periodontal care to restore and maintain oral health. Continued research into the microbial dynamics of periodontal infections and advancements in treatment approaches promise to further improve outcomes for individuals affected by this common oral health condition.

References

1. Williams RC (1990) Periodontal disease. N Engl J Med.322(6): 373-382.
2. Genco RJ, Borgnakke WS (2013) Risk factors for periodontal disease. Periodontol 2000.62(1):59-94.
3. Beck J, Garcia R, Heiss G, Vokonas PS, Offenbacher S (1996) Periodontal disease and cardiovascular disease. J Periodontol. 67:1123-1137.
4. Petersen PE, Ogawa H (2005) Strengthening the prevention of periodontal disease: The WHO approach. J Periodontol.76(12): 2187-2193.

All articles published in Journal of Dental Health: Current Research are the property of SciTechnol and is protected by copyright laws. Copyright © 2024, SciTechnol, All Rights Reserved.

5. Dye BA (2012) Global periodontal disease epidemiology. Periodontol 2000. 58(1):10-25.
6. Sabiston Jr CB, Gold WA (1974) Anaerobic bacteria in oral infections. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 38(2):187-192.
7. Baker PJ, Evans RT, Slots J, Genco RJ (1985) Susceptibility of human oral anaerobic bacteria to antibiotics suitable for topical use. J Clin Periodontol. 12(3):201-208.
8. Baker PJ, Evans RT, Slots J, Genco RJ (1985) Antibiotic susceptibility of anaerobic bacteria from the human oral cavity. J Dent Res.64(10):1233-1244.
9. Könönen E (1999) Oral colonization by anaerobic bacteria during childhood: Role in health and disease. Oral Dis. 5(4): 785.
10. Stîngu CS, Rodloff AC, Jentsch H, Schaumann R, Eschrich K (2008) Rapid identification of oral anaerobic bacteria cultivated from subgingival biofilm by MALDI-TOF-MS. Mol Oral Microbiol. 23(5):372-376.