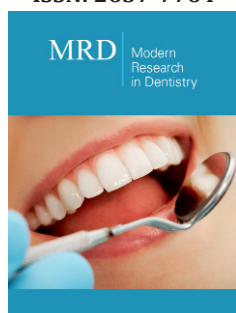


Periodontal Disease Past, Present and Future

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Opinion

The concept of bacteria being responsible for a disease was the accepted view for bacterial etiology regarding disease for almost 100 years after Robert Koch's presented his findings on Bacillus anthrax, published in 1890. Koch's Postulate was challenged by JW Costerton in 1978 when he warned that chronic infections were caused by bacteria growing in a biofilm and the bacteria within biofilms resist antibiotic therapies and immune host responses [1].

Challenging the precept of cause necessitates a new awareness of treatment as it relates to biofilm formation and biofilm effects on the host. Biofilms are adaptive to changes in their microenvironment and can overcome conventional periodontal treatments, such as scaling and root planning. Sharing of genetic material through processes like horizontal gene transfer, conjugation, transduction, and other means further facilitates biofilm adaptation to overcome conventional periodontal treatments. These factors help explain why periodontal disease has not been adequately managed in the past [2].

Periodontal disease is a chronic wound and is not adequately treated by acute wound therapies. An acute wound treatment is removing a splinter. If the splinter is completely removed, the acute wound has an opportunity to heal [3-6]. If, however, the tip of the splinter is broken off under the skin, the wound does not heal as it becomes a chronic situation. Leaving part of the cause to fester into a chronic wound is part of the reason conventional periodontal treatments fail. Scaling and root planning do not remove the entirety of the biofilm, but part of the biofilm remains. After a thorough cleaning to remove dental biofilm on the tooth surface it only takes about 24 hours for dental biofilm to form again [7,8].

This remnant continues to plague the host as a chronic infection. The biofilm contributes to disease by a shift in the contents of the oral microflora. This shift from a less virulent to more virulent biofilm causes destructive host immunologic inflammatory adaptations. The increased incidence of periodontal disease may have systemic ramifications. While the direct causality remains unknown, several associations have been found between periodontitis and systemic conditions. Periodontal disease is associated with several health conditions including heart disease, type 2 diabetes, pregnancy complications, and other systemic inflammatory responses [9,10].

Adaptations in periodontal therapy as reported in published refereed journals demonstrates an improved ability to manage the biofilm [11]. The most significant change was the incorporation of a direct medication delivery system that enabled the patient under the dentist's guidance to deliver medications into the subgingival periodontal sulci. These medications were maintained in place long enough to modify the microenvironment from a region that was conducive to disease to one that is conducive to health and healing [12].

A chronic infected periodontal pocket is an anaerobic chronic wound that consists of a microenvironment conducive to the growth of gram- negative obligate anaerobes, which are recognized as the more virulent components of the subgingival biofilm. Direct medication delivery (Perio Tray™) of a 1,7% hydrogen peroxide gel (Perio Gel™) changes the anaerobic

periodontal microenvironment to an oxygen rich environment which negatively affects the large numbers of obligate anaerobes while fostering the growth and development of a lesser number of more commensal bacteria.

Direct medication delivery of hydrogen peroxide gel and or antioxidants can manage chronic wounds in accordance with the chronic wound guidelines that require that the biofilm cause of disease be addressed before mechanical debridement. Chronic wounds exist in an inflammatory phase which negates healing. Direct medication delivery using custom form medical devices (Perio Protect Trays™) enables the delivery of hydrogen peroxide and/or antioxidants to decrease inflammation and promote long-term healing. The use of the device enables the patient to better manage the cause of disease thereby decreasing the host inflammation, so recurrence of periodontal disease does not occur.

Professional refereed evidence clearly demonstrates that the bacteria associated with periodontal disease are associated with systemic diseases, such as cardiovascular disease, stroke, pregnancy complications, Alzheimer's disease, type II diabetes, joint dysfunctions and other health implications. Since these links are now established and generally recognized, it makes sense to go the next step and show a method that can treat periodontal disease that can have positive effects in helping manage systemic disease.

Treating patients' periodontal conditions with the Perio Protect Method (PPM) and evaluating systemic Lp-PLA-2 levels, before, during and after periodontal treatment, demonstrates that treating the patient's periodontal conditions resulted in decreasing the periodontal markers and lowering the Lp-PLA2 levels over 30 % and these findings may be important as an adjunct of cardiovascular treatment.

Kumar et al. [13] demonstrate treating periodontal disease lowers patient's c-reactive protein levels. The Perio Protect Method™ manages obligate anaerobes, accelerates tissue recovery, healing, and repair, establishes a microenvironment reversing dysbiosis, and improves systemic Lp-PLA-2 and hs-CRP levels. The numbers of virulent facultative and obligatory anaerobes decrease and are replaced with fewer aerobic bacteria found in healthy tissues. Anti-inflammatory medications neutralize the host inflammatory response, decrease tissue damage, and augment osteogenic improvements [14,15].

The American Diabetes Association, in their journal *Diabetes Spectrum* November 2011, present an article about diabetes and periodontal disease as an update for health care providers. The authors conclude there is evidence to support improvements in metabolic control in patients with diabetes after treating their periodontal disease. Additional information shows the Perio Protect Method™ enables the patients to manage their periodontal disease and help decrease their daily blood glucose and HbA1c

levels. This article demonstrates ways diabetic patients are assisted in maintaining their periodontal health and in lowering their systemic diabetic markers. This may have implications for other systemic inflammatory relationships, but this will require a more detailed investigation to determine these associations [16].

Conclusion

Managing oral disease is important for periodontal control as well as modifying patients' oral systemic interrelated associations. A direct medication delivery system like the Perio Protect Method is shown to improve conventional periodontal methods and manage the oral biofilm. Oral biofilm management is also shown to improve patients' systemic inflammatory markers. This appears to be the future of periodontal treatment in the decades to come.

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