

Tooth Brush: an Defeated Weapon



Medical Science

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ABSTRACT

Periodontitis is a destructive inflammatory disease of the supporting tissues of the teeth and is caused by specific microorganisms or group of specific microorganisms resulting in progressive destruction of periodontal ligament and alveolar bone with periodontal pocket formation, gingival recession or both. The link between periodontal disease and systemic diseases has been scientifically proven over last two decades. The key for optimal oral health that lead to better systemic health is achieved by regular daily oral hygiene in between the profession cleaning. The complex anatomy of the oral tissues makes it challenging for the toothbrush to completely remove the biofilm especially below the gum line and inter-proximally between the teeth. Retention and survival of microorganisms on toothbrushes represent a possible cause of contamination of the mouth. Dental air force home dental cleaning system is really a true alternative for traditional toothbrush and this innovative device will play vital role in maintaining the oral-systemic health.

INTRODUCTION

Mouth acts as a window to lot of systemic diseases and serves as a port of entry of the various infections that can alter and affect the immune status of the person. The oral cavity has the potential to harbor at least 600 different bacterial species, and in any given patient, more than 150 species may be present, surfaces of tooth can have as many as billion bacteria in its attached bacterial plaque and good oral hygiene is the fundamental for oral integrity as it greatly affects the quality of life. [1] Periodontitis is a destructive inflammatory disease of the supporting tissues of the teeth and is caused by specific microorganisms or group of specific microorganisms resulting in progressive destruction of periodontal ligament and alveolar bone with periodontal pocket formation, gingival recession or both. The host responds to the periodontal infections with an array of events involving both innate and adaptive immunity. [2] Periodontal diseases are recognized as infectious processes that require bacterial presence and a host response and are further affected and modified by other local, environmental, and genetic factors. The key organisms that cause periodontal disease were anaerobes including Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia, Tannerella forsythia, Fusobacterium nucleatum, Peptostreptococcus micros, and Campylobacter rectus. [3]

ORAL-SYSTEMIC RELATIONSHIP

The link between periodontal disease and systemic diseases has been scientifically proven over last two decades. [4] Association of periodontal infection with organ systems like cardiovascular system, endocrine system, reproductive system, and respiratory system etc. makes periodontal infection a complex multiphase disease. Inflamed periodontal tissues produce significant amounts of pro-inflammatory cytokines, mainly interleukin 1 beta (IL-1 β), IL-6, PGE₂, and tumor necrosis factor alpha (TNF- α), which may have systemic effects on the host. Periodontitis initiates systemic inflammation and can be monitored by inflammatory markers like C-reactive protein or fibrinogen levels. [5] This relationship is illustrated in detail in Figure A.

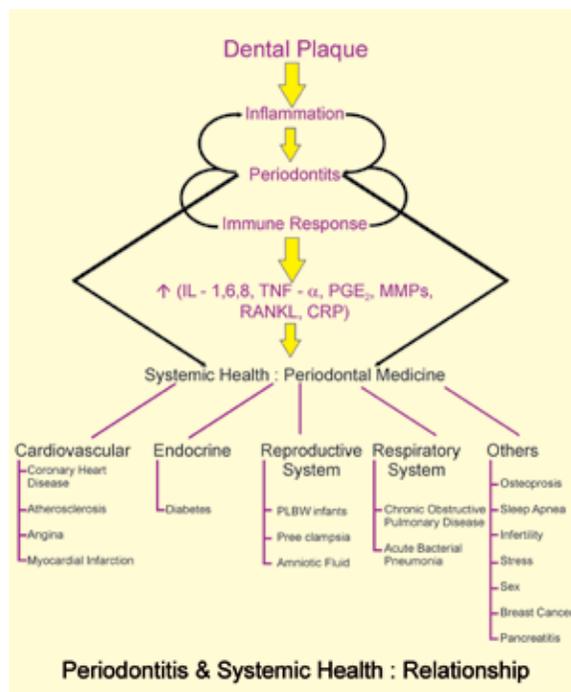


Fig A: Periodontal and Systemic Health Relationship

TOOTH BRUSH: OVERVIEW OF CHALLENGES

The key for optimal oral health that lead to better systemic health is achieved by regular daily oral hygiene in between the profession cleaning. The complex anatomy of the oral tissues makes it challenging for the toothbrush to completely remove the biofilm especially below the gum line and inter-proximally between the teeth. The other challenging aspect of tooth brushing is the technique sensitivity for its efficient use in different oral conditions, otherwise leads to teeth abrasions and sensitivity due to loss of enamel and exposure to dentinal tubules to oral environment. The other challenge is use of toothbrush on dental implant; injudicious use may lead to a cause for implant failure.

Retention and survival of microorganisms on toothbrushes represent a possible cause of contamination of the mouth. Toothbrushes used regularly become contaminated with microorganisms, which colonize the oral cavity. The oral cavity is home to hundreds of different types of microorganisms and, therefore, it is not surprising that some of these microorganisms are transferred to the toothbrush during use. It is clear from the above facts that all of the presently available toothbrushes have the ability to be infected by a wide range of microorganisms, includ-

ing microbial flora that grow well on a toothbrush. Given the fact that very often people will traumatize themselves with their toothbrush, their trauma may become a potential portal entry for organisms. Thus, it is apparent that present toothbrushes that were basically designed years back need to be re-evaluated. The toothbrush may even have bacteria on them right out of the box; proper storage is a very important aspect in toothbrush care. [6]

DENTAL AIR FORCE HOME DENTAL CLEANING SYSTEM: THE FUTURE OF ORAL HYGIENE

Dental Air Force home dental cleaning system is approved by FDA Vide No K001493 as safety device for plaque removal in order to prevent gingivitis and as an alternative to tooth brushing. It is an electrical delivery device that uses a 1/8th HP oil-less electric air compressor air source with twin pistons connected to a handpiece by a pneumatic cord directed through a handpiece and tip where air at 40 psi through a .020 size orifice has the introduction of a slurry of dental cleaner. This produces a jet stream of wet abrasive whereby the user directs the cleaner components and air into the sites between the teeth and below the gum line. One normal application uses one teaspoon of dental cleaner. The cleaner ingredients include sodium bicarbonate, the most widely accepted and totally natural buffering agent that promotes a neutral environment. It also contains mint flavoring, Xylitol and Stevia as natural sweeteners. The formula is free of sodium laurel sulfate, the ingredient in most toothpaste that causes sensitivity and irritation. [7]

The clinical studies showed that subjects using Dental Air Force home dental cleaning system showed a highly significant reduction to all the parameters i.e. Clinical (plaque index, gingival index and clinical attachment loss), Laboratory (C-reactive protein levels and Glycated Hemoglobin) and Microbiological parameters as compared to subjects under groups using toothbrush. The regular use of Dental Air Force home dental cleaning system as oral hygiene device is most advantageous for suppressing both periodontal infection and associated markers like CRP, HbA1c for systemic diseases as compared to conventional tooth brushing. [8] The possible mechanism of greater efficiency as compared to toothbrush is that Dental Air Force home dental cleaning system uses air and a dental cleaner with water to break through the plaque barrier. The air oxygenates the spaces between teeth and along the gum line, making it difficult for the anaerobic plaque-causing bacteria to live. Sodium bicarbonate is a neutralizing agent that acts on the acids produced by the bacteria. It is an abrasive that breaks up the plaque's sticky film. It also removes the odor caused by the plaque. The water flushes away the bacteria and debris off the surfaces of the teeth.8 Dental Air Force home dental cleaning system with access to subgingival area lead to removal of biofilm and prevents further proliferation of periodontopathic microorganisms. [7, 8] More multi-centric longitudinal studies will be further needed for further understanding the scientific potentials of this innovative home dental cleaning system.

CONCLUSION

There is contrasting shift in the diagnosis and treatment modalities of oral health disease from last two decades. The various chair side biochemical-enzymatic diagnostics techniques, salivary and gingival Crevicular fluid analysis make the great impact on the effective-quick decision on the diagnosis of periodontal diseases. Similarly, there is a makeable advancement on the periodontal treatment pattern for both Non-surgical and Surgical treatment options with use of Lasers, probiotics, ozone therapy, bone regeneration, Guided Tissue Regeneration and dental implants. Since 1780 toothbrush was commercially introduced to the society and till date under gone with various modifications in terms of its design and materials, but still tooth brush alone is not competent enough to control the dental plaque in the oral cavity. Dental air force home dental cleaning system is really a true alternative for traditional toothbrush and this innovative device will play vital role in maintaining the oral-systemic health.

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