Superior Management of Plaque and Gingivitis Through the Use of a Triclosan/Copolymer Dentifrice

Sebastian Ciancio, DDS
Distinguished Service Professor and Chair
Department of Periodontics and Endodontics
School of Dental Medicine, University at Buffalo, SUNY
Buffalo, NY, USA

Fotinos S. Panagakos, DMD, PhD
Director, Clinical Research Relations and Strategy
Colgate-Palmolive Technology Center
Piscataway, NJ, USA

Periodontal disease is a continuum of oral diseases of polymicrobial origin, characterized by a bacterial plaque (biofilm)-induced gingival inflammation which, if left untreated, may lead to chronic infection and loss of attachment. The continuum of disease begins with gingivitis, which is inflammation of the gingiva in response to the bacterial biofilm on adjacent teeth. Clinically, the gingival tissue can be characterized by erythema, edema, and fibrous enlargement, and may bleed upon gentle probing. This early stage of periodontal disease, while quite prevalent in the general population, can be treated and prevented with appropriate home and supportive professional care. However, even with professional care and reinforcement of daily oral hygiene procedures, many patients continue to develop gingivitis. These patients are, therefore, at greater risk of developing more severe forms of periodontal disease. Topical antisepsics incorporated into dentifrices and mouthrinses may be of special value to these patients.

The importance of bacterial plaque to the onset and progression of periodontal diseases is well-accepted. While more than 500 species of bacteria have been detected in the oral cavity, only a minority of pathogenic species, such as the gram anaerobes Veillonella species, Fusobacteria species, and Porphyromonas gingivalis produce products that can adversely affect the adjacent gingival tissues. Microbial products can either directly or indirectly trigger a host soft tissue response by stimulating inflammatory mediator production, increasing the levels of inflammatory mediators within the gingival tissues, resulting in the presentation of clinical inflammation. Without intervention or treatment, supporting tissues may be destroyed, clinical pockets may form, bone resorption may occur, and ultimately, the tooth may be lost. Potentially more serious than tooth loss is the possibility that this local oral inflammatory process may negatively impact the rest of the body’s immune response, and ultimately may affect overall health.

Given the complexity of periodontal diseases and the importance of oral health, one of the critical questions is how to best prevent and treat periodontal infection. Professional procedures such as dental prophylaxis and scaling/root planing provide clinically proven and accepted benefits. Effective daily home oral care can help maintain a healthy oral environment and decrease the occurrence of oral disease. However, dental professionals accept the fact that not all patients will consistently perform home oral care procedures at an acceptable level. Therefore, the dental profession will often recommend adjuncts to routine home oral care, such as the use of a product which has clinically proven antiplaque and antigingivitis properties, which may provide a unique and beneficial approach to the prevention and treatment of periodontal diseases via daily oral care procedures.

The delivery of an active ingredient with antiplaque and antigingivitis benefits can be through a dentifrice or a mouthrinse. The incorporation of such an ingredient into a dentifrice is a particularly attractive option to augment mechanical cleaning procedures, as dentifrices are typically used along with a toothbrush for routine oral hygiene. A unique dentifrice, Colgate® Total® (Colgate-Palmolive Co., New York, NY, USA), has been developed and clinically proven to provide antiplaque and antigingivitis benefits when compared to a conventional fluoride dentifrice. This dentifrice contains a broad-spectrum antibacterial agent, triclosan, and a polyvinylmethyl ether/maleic acid (PVM/MA) copolymer to ensure uptake and retention of triclosan on the oral hard and soft tissues. Effective levels of triclosan are retained in the oral cavity 12 hours after brushing the teeth, allowing prolonged control of the oral bacteria that form plaque, and can cause gingivitis, calculus, and oral malodor.

Colgate Total also contains sodium fluoride at the maximum regulated level (1000–1450 ppm) to deliver cavity protection. This triclosan/copolymer/fluoride dentifrice has been proven to deliver statistically significant and clinically relevant benefits in the prevention of caries, the reduction of dental calculus buildup and oral malodor, as well as the control of dental plaque and the treatment of gingivitis. Independent reviews of the literature have established that Colgate Total is effective in reducing the formation of supragingival plaque, and for reducing the incidence of gingivitis when compared to a conventional fluoride toothpaste.

Colgate Total was the first, and remains the only toothpaste to be approved by the US Food and Drug Administration (under a new drug application process) and accepted by the American Dental Association (ADA) to fight plaque and gingivitis. Perhaps for this reason, Colgate Total is the toothpaste most often recommended and used by dentists and dental hygienists in the US.
Similarly, it has been approved by regulatory authorities and accepted by dental associations all around the world.

The scientific literature shows that dentifrices containing 0.454% stannous fluoride provide a benefit in reducing supragingival plaque formation and the incidence of gingivitis. In 2006, a dentifrice was introduced into the US marketplace claiming antibacterial efficacy. The dentifrice, Crest Pro-Health (Procter & Gamble Co., Cincinnati, OH, USA) toothpaste, contains 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate. Stannous fluoride, like sodium fluoride, is an active ingredient used in dentifrices to reduce caries.

The five articles which follow this Introduction present a series of laboratory and patient-based studies that compare the efficacy of a dentifrice containing 0.3% triclosan, 2.0% PVM/MA copolymer, and 0.243% sodium fluoride (Colgate Total) to a dentifrice containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate (Crest Pro-Health) for the control of established supragingival plaque and gingivitis. A brief review of each of the five articles is provided, starting with a laboratory-based investigation entitled “Evaluation of Antibacterial Activity of Dentifrices on Human Oral Bacteria.”

In vitro testing of antibacterial agents is an important tool in the evaluation hierarchy, and may provide interesting insights into their potential clinical efficacy. Agents with demonstrable in vitro antibacterial activity may be effective against the same microorganisms in vivo, whereas agents without demonstrable in vitro antibacterial activity are unlikely to exhibit in vivo antibacterial activity. In addition, these methods may also be useful in screening antibacterial agents in product formulations because such agents with both in vitro and in vivo activity may have reduced antibacterial effects when formulated into a dentifrice.

Accordingly, the first study in this Special Issue examined the in vitro and ex vivo antimicrobial activity of dentifrices containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate, or 0.3% triclosan, 2.0% PVM/MA copolymer, and 0.243% sodium fluoride. The results of these studies indicate that via different in vitro and ex vivo analyses, the dentifrice with 0.3% triclosan, 2.0% PVM/MA copolymer, and 0.243% sodium fluoride has significant antibacterial activity on oral bacteria, including species causing dental caries, periodontitis, and oral halitosis, and provides superior efficacy compared to the 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate dentifrice.

The second article, titled “Comparison of the Short-Term Antiplaque/Antibacterial Efficacy of Two Commercial Dentifrices,” provides a summary of three separate short-term clinical studies which compared Colgate Total to Crest Pro-Health on the formation of dental plaque over a 24-hour period of time. These studies utilized the Modified Gingival Margin Plaque Index (MGMPI), a validated and reliable clinical method for assessing the efficacy of products in reducing plaque build up. In all three clinical trials, Colgate Total significantly reduced plaque regrowth over a 24-hour time period compared to Crest Pro-Health, and demonstrated that Colgate Total delivers a superior antiplaque benefit over Crest Pro-Health after a single brushing.

The next two articles, titled “A Clinical Investigation of the Efficacy of Three Commercially Available Dentifrices for Controlling Established Gingivitis and Supragingival Plaque,” and “A Comparison of the Efficacy of a Triclosan/Copolymer/Sodium Fluoride Dentifrice, a Stannous Fluoride/Sodium Hexametaphosphate/Zinc Lactate Dentifrice, and a Sodium Fluoride Dentifrice for the Control of Established Supragingival Plaque and Gingivitis: A Six-Week Clinical Study” provide the results from two separate six-week clinical studies.

The results from these two studies support the conclusion that a dentifrice containing 0.3% triclosan/2.0% PVM/MA copolymer/0.243% sodium fluoride is efficacious for the control of established gingivitis and supragingival plaque as compared to a conventional fluoride dentifrice, and that it provides a greater level of efficacy for the control of gingivitis and supragingival plaque than does a dentifrice containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate.

The final paper is titled “Comparative Investigation of the Efficacy of Triclosan/Copolymer/Sodium Fluoride and Stannous Fluoride/Sodium Hexametaphosphate/Zinc Lactate Dentifrices for the Control of Established Supragingival Plaque and Gingivitis in a Six-Month Clinical Study.”

The results of this study confirmed the outcomes demonstrated in the two six-week clinical studies, that a dentifrice containing 0.3% triclosan, 2.0% PVM/MA copolymer, and 0.243% sodium fluoride provides a significant reduction in established supragingival plaque and gingivitis compared to a dentifrice containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate when used over a period of six months.

In 2007, the ADA advised consumers that “use of an ADA-Accepted antimicrobial mouthrinse or toothpaste helps prevent and reduce plaque and gingivitis.” Based on this statement, it is critical for dental professionals to know what products exist that meet this advice, and to know which products are proven most efficacious in reducing dental plaque and associated gingivitis, so that the public can receive the most beneficial effects from daily brushing.

To meet this need, the oral healthcare profession needs evidence to support a recommendation to their patients for the daily use of a fluoride dentifrice that is supplemented by an antimicrobial/antibacterial agent for the prevention of dental caries and gingivitis. The studies reported in this Special Issue demonstrate evidence, using valid and robust in vitro, ex vivo, and in vivo methods, that a dentifrice containing 0.3% triclosan, 2.0% PVM/MA copolymer, and 0.243% sodium fluoride (Colgate Total) provides superior plaque and gingivitis reduction versus a dentifrice containing 0.454% stannous fluoride, sodium hexametaphosphate, and zinc lactate (Crest Pro-Health). Based on these studies, as well as previous research, it is evident that Colgate Total will help provide patients with the best protection against plaque and gingivitis when used as part of a daily oral hygiene regimen.

Acknowledgment: Publication of this review was supported by the Colgate-Palmolive Company.

For further correspondence with the authors of this paper, contact Dr. Fotinos Panagakos–Foti_Panagakos@colpal.com.

References


