

Dentifrice

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In March 2008, the Standards for Clinical Dental Hygiene Practice were adopted by the Board of Trustees of the American Dental Hygienists' Association. The two stated purposes for this document are (1) "to assist dental hygiene clinicians in the provider-patient relationship" and (2) "to educate other healthcare providers, policy makers and the public about the clinical practice of dental hygiene." To access the full standards document, go to www.adha.org/downloads/adha_standards08.pdf. The following article on dentifrices contains references that link back to the standards document.

Most people like the clean, fresh feeling that comes with using a dentifrice while brushing their teeth. Do dentifrices offer any advantage, other than taste, in the care of the oral cavity? Further, what differences exist among the various dentifrices available to the public today?

Almost every chain grocery or drug store has a long aisle of home care aids, including many types of toothpaste. Given the wide selection, sometimes patients ask their dental hygienist or dentist for a recommendation on which type of toothpaste to use. We often base our recommendations on the end point in mind for a particular patient, such as minimizing the build-up of plaque, strengthening teeth against caries, removing staining, removing food debris, re-moisturizing dry mouth, alleviating sensitivity, and combating or preventing halitosis.

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Is Toothpaste Necessary for Plaque Removal?

As dental professionals, we tend to focus on plaque removal as the most important aspect of daily home care procedures. Several studies have examined the effects of brushing with and without a dentifrice on plaque removal. In one study, the effects of brushing with and without a dentifrice were examined on 120 participants.¹ The study consisted of three groups of 40 patients. Three different dentifrices were used, each with different levels of abrasivity. The participants were instructed to refrain from any oral hygiene measures for a 48-hour period. Then the subjects were allowed to brush under supervision for 30 seconds per quadrant in a split-mouth order. The results of the study revealed that the use of dentifrice did not contribute to instant mechanical plaque removal during manual tooth brushing, nor did higher abrasivity correlate to increased plaque removal.

One year later, a second study was published with similar outcomes.² This study used a crossover rather than a split-mouth design. The 36 subjects were given a manual toothbrush and a standard dentifrice. As in the previous study, the subjects were instructed to refrain from any oral care for 48 hours. Then the subjects brushed under supervision with or without a dentifrice for two minutes in a two-by-two crossover design. The result was 50 percent plaque reduction with dentifrice and 56 percent plaque reduction without dentifrice. The conclusion was that the most significant factor in plaque reduction was the mechanical action of the toothbrush.

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Reasons for Using a Dentifrice

Although we understand that plaque can be removed without it, using a dentifrice has other advantages. Fluoride-containing dentifrices have long been considered efficacious in reducing caries rates with regular use in susceptible populations. Some dentifrices have added ingredients, such as pyrophosphate to reduce calculus formation, whitening agents like peroxide, or agents aimed at reducing sensitivity. Others have removed ingredients normally found in standard toothpaste, such as sodium laurel sulfate (SLS, a foaming agent) to accommodate individuals who have developed sensitivities to such chemicals.

One of the primary reasons for using a dentifrice is to make the oral cavity taste fresh and feel clean; like our patients, most dental professionals prefer to use a brush and dentifrice rather than a dry brush. Patients may be more concerned with preventing halitosis than removing plaque, especially given that plaque is not as immediately detectable. In fact, patient compliance with any dentifrice increases when the taste of the dentifrice is appealing to the patient. Although a particular dentifrice may address a dental health need, an unpleasant taste decreases the likelihood that the patient will use the product.

Reducing Inflammation with a Dentifrice

Much research today is focused on inflammation and the effects of oral inflammation on other systems in the body. Many home care modalities are aimed at techniques and/or chemotherapeutic products with the goal of reducing bleeding and inflammation in general. The reduction of oral inflammation associated with gingivitis has been demonstrated by the use of a dentifrice containing triclosan/copolymer (Colgate Total®). Triclosan is an antimicrobial ingredient; the added copolymer increases its substantivity to up to 12 hours. Mateu and others conducted a double-blind clinical study of 94 individuals and concluded that the triclosan/copolymer dentifrice "is efficacious for the control of established supragingival plaque and gingivitis."³ In another study, Cullinan and others studied the long-term use of triclosan/copolymer dentifrice on the progression of periodontal disease in a general adult population.⁴ The study design was a double-blind, controlled clinical trial of 504 volunteers. After examination and being matched for disease status, plaque index, age and gender, participants were assigned to either a control or test group. Participants were re-examined after six, 12, 24, 36, 48 and 60 months. The results revealed that there was significant reduction of probing depths greater than or equal to 3.5 mm with the group using the triclosan/copolymer dentifrice over the course of the study when compared with the control group. The authors concluded, "This study showed that in a normal adult population, unsupervised use of a triclosan/copolymer dentifrice is effective in slowing the progression of periodontal disease." Because of the bactericidal effectiveness of triclosan and incorporation of a copolymer to keep the fluoride and triclo-

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san actively protecting teeth and gums for up to 12 hours between brushings, Colgate Total® is the toothpaste most often recommended by dental professionals and is approved by the ADA and FDA.⁵

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Another ingredient, stannous fluoride, has been shown to help control gingivitis. Crest ProHealth® dentifrice uses a 0.454 percent stannous fluoride/sodium hexametaphosphate formulation. While the dentifrice is effective in reducing gingival bleeding, some patients have observed an unpleasant alteration in taste while using it. Another consumer complaint has been with the appearance of brown staining associated with stannous fluoride.

Reducing Caries with a Dentifrice

Dental hygienists serve on the front lines of patient care, recommending products aimed at controlling caries and remineralizing weakened enamel. Dentifrices containing fluoride have been shown efficacious in reducing decay rates in susceptible populations.⁶ Colgate Cavity Protect® toothpaste combines sodium fluoride and sodium monofluophosphate with a pleasant mint taste in a dentifrice designed to aid in caries control.

p7 Standard 1. II. d.

Xylitol, a nonfermentable sugar alcohol derived from plant sources, is one of the newest ingredients being added to dentifrice. Xylitol has been shown to have anti-caries properties in its specific inhibition of the mutans streptococci group as it contributes to tooth decay.⁷

A dentifrice called Squigle® contains 36 percent by weight of natural xylitol, more than any other dentifrice. This product is low on abrasiveness, does not contain tartar-control agents or bleaches, and is SLS free. In addition to caries control, Squigle® has been recommended for individuals experiencing xerostomia associated with chemotherapy medications and for people who suffer with canker sores and oral ulcers.

p6 Standard 1. I. c. 3.
p7 Standard 1. II. c.
p7 Standard 1. III. e. and f.

Xylitol and fluoride combined appear to be more effective in combating decay than either ingredient alone.⁸ Tom's of Maine Natural Fluoride Toothpaste® uses a combined formulation of xylitol and fluoride in a calcium carbonate base. It is also SLS free. Some people object to the chalky texture of the dentifrice and have reported a slightly bitter taste; however, the unique selling point of Tom's of Maine products is that all of them are earth-friendly and natural.

Sensitivity Dentifrices

Sensodyne® is a dentifrice that was the first of many products specifically developed to address tooth sensitivity. De-sensitization is achieved through fluoride and 5 percent potassium nitrate, a salt that desensitizes the nerve roots and thereby prevents the transmission of pain to the pulp and root of the tooth through the nerves.

Colgate® Sensitive contains the maximum amount (5 percent) of potassium nitrate allowed by FDA to treat and prevent hypersensitivity. It also contains sodium fluoride to protect against caries and strengthen enamel, along with a pleasant mint taste that patients like.

Patients with sensitivity can benefit from professionally applied products. Colgate Sensitive Pro-Relief® is a desensitizing paste that is applied by a dental hygienist using a handpiece and rubber cup. This product differs from all other sensitivity formulations on the market in that it uses an ingredient called pro-arginine. Pro-arginine actually blocks dentinal tubules to stop sensitivity, thereby preventing pain signals from stimuli such as heat, cold or pressure.



Colgate® Total® combines the antimicrobial agent triclosan with a copolymer that increases its substantivity to up to 12 hours.

Tartar Control Ingredients

Since the 1970s, researchers have added various ingredients to dentifrice with the goal of inhibiting calculus formation. One such ingredient is pyrophosphate, a second-generation anti-calculus agent that works by interfering with crystal formation. Several studies have demonstrated the reduction of calculus formation by dentifrices that contain combinations of pyrophosphates combined with sodium fluoride. A 2008 study by Schiff and others demonstrated a 34 percent reduction in calculus formation over a 12-week period using Colgate Total Advanced Toothpaste® compared with a control dentifrice.⁹ Interestingly, this dentifrice does not utilize pyrophosphate but reduces calculus through improved plaque control via the patented triclosan/copolymer formulation.

Sensitivity to anti-calculus agents, including tissue sloughing, sensitivity and irritation, has been reported by some patients. Such patients should avoid future use of tartar-control products.

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Xerostomia Remedies

A dentifrice formulated to address the problems associated with xerostomia is Orajel Patented Dry Mouth Moisturizing Toothpaste®. This dentifrice contains fluoride and a patented Thione antioxidant complex, which helps to soothe and protect dry mouth tissues, plus it is SLS free.

Another good choice for patients with chronic dry mouth is the Biotene® products. Biotene Dry Mouth Toothpaste® is specially formulated to fight the effects of dry mouth and relieve the oral irritations that accompany it. This product contains no SLS. It is the only toothpaste that contains the patented "LP3" (lactoferrin, lactoperoxidase and lysozyme) salivary enzyme-protein system to supplement the mouth's natural antibacterial system. It contains polymers and humectants to provide lubrication and moisturization and help relieve irritation associated with dry mouth.

Conclusion

While not necessary for removing plaque, dentifrices offer many benefits to our patients. We should choose high-quality products that help solve the oral care challenges that our patients present. In turn, patients will appreciate our expertise in helping them choose the appropriate dentifrice.

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References

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This column was made possible by an educational grant sponsored by Colgate Oral Pharmaceuticals.



HOW THIS ARTICLE REFLECTS THE STANDARDS FOR CLINICAL DENTAL HYGIENE PRACTICE

- **We often base our recommendations on the end point in mind for a particular patient...**

The *Standards'* Definition of Dental Hygiene Practice (p4) states, "Dental hygienists...provide patient education on biofilm plaque control and home care protocol by incorporating techniques and products that will become part of an individualized self-care oral hygiene program." The role of the dental hygienist in recommending the appropriate dentifrice to address a patient's unique oral health needs clearly exemplifies this aspect of the definition.

- **The most significant factor in plaque reduction was the mechanical action of the toothbrush.**

The *Standards'* Professional Responsibilities and Considerations (p5) hold dental hygienists accountable to "access and utilize current, valid, and reliable evidence in clinical decision making through analyzing and interpreting the literature and other resources." The dental hygienist who remains abreast of research over time, such as the two studies cited here, is prepared to make product recommendations for appropriate reasons based on sound evidence.

- **Many home care modalities are aimed at techniques and/or chemotherapeutic products with the goal of reducing bleeding and inflammation in general.**

The *Standards'* Definition of Dental Hygiene Practice (p4) states, "Dental hygienists...discuss the progress being made toward isolating evidence that notes the potential association between systemic and oral health and disease." The role of the dental hygienist in clarifying the evidence regarding an oral-systemic link and in recommending products to reduce bleeding and inflammation clearly exemplifies this aspect of the definition.

- **Colgate Total® is the toothpaste most often recommended by dental professionals...**

The Introduction to the *Standards* (p3) states, "Dental hygienists use scientific evidence in the oral healthcare decision-making process impacting patient care." The dental hygienist recommending a triclosan-copolymer dentifrice based on the evidence supporting its effectiveness exemplifies this characterization.

- **Dental hygienists serve on the front lines of patient care, recommending products aimed at controlling caries and remineralizing weakened enamel.**

Standard 1. Assessment, II. d. (p7) is "Perform a comprehensive clinical evaluation which includes a comprehensive hard tissue evaluation...." The

dental hygienist addressing caries control and remineralization of weakened enamel will make product recommendations based on this aspect of assessment as represented in the *Standards*.

- **...Recommended for individuals experiencing xerostomia associated with chemotherapy medications and for people who suffer with canker sores and oral ulcers.**

Standard 1. Assessment, I. Patient history, c. Collection of health history data, 3. Pharmacologic considerations (p6) reflects the dental hygienist's consideration of prescription medications as a part of the assessment phase of care. Also Standard 1. Assessment, II. 1. c. (p7), "Perform a comprehensive clinical evaluation which includes a comprehensive periodontal evaluation that includes the documentation of full mouth periodontal evaluation [that includes] mucogingival relationships/defects" reflects the dental hygienist's inclusion of canker sores and oral ulcers in the assessment phase of care. Also Standard 1. Assessment, III. (p7) identifies prescription drugs (e.) and salivary function and xerostomia (f.) as risk factors that the dental hygienist considers during the assessment phase of care. The dental hygienist recommending products for individuals experiencing xerostomia associated with chemotherapy medications and for people who suffer with canker sores and oral ulcers exemplifies the application of this standard in the provision of care.

- **Such patients should avoid future use of tartar-control products.**

The *Standards'* Professional Responsibilities and Considerations (p5) hold dental hygienists accountable to "access and utilize current, valid, and reliable evidence in clinical decision making through analyzing and interpreting the literature and other resources." The dental hygienist applying such evidence when recommending products for patients with sensitivity such as that to anti-calculus agents is observing this professional responsibility.

- **Patients will appreciate our expertise in helping them choose the appropriate dentifrice.**

The *Standards'* Professional Responsibilities and Considerations (p5) hold dental hygienists accountable to "articulate the roles and responsibilities of the dental hygienist to the patient." Dental hygienists who recommend products that prove effective in addressing their patients' individual needs demonstrate their unique ability to carry out the dental hygiene process of care and solidify the trust patients place in them.

