

UPDATE ON Patient Care

*Helping your patients maximize
between-visit oral health.*

Preventing Tooth Decay Rather Than Treating It

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The term *dentifrice* is derived from the Latin *dens* (tooth) and *fricare* (to rub), according to Webster.¹ An early dentifrice was baking soda. From the 1800s, it was widely used as a powder, straight from the box with water. In the 1930s the yellow box of ARM & HAMMER® Baking Soda (Church & Dwight Co, Inc, Princeton, NJ) was recognized by the American Dental Association and awarded the ADA Seal of Acceptance for its ability to clean teeth.

Today, dentifrices have evolved to offer more than cleaning. Most traditional toothpaste formulas remove plaque and deliver fluoride. Therapeutic toothpastes include ingredients to help reduce caries, gingivitis, calculus formation, and tooth sensitivity. Assisting patients to find the right at-home oral care regimen for their needs is important for both compliance and preventative care.

The five approaches to prevent tooth decay are: plaque control, sugar and acid intake, fluoride use, pit-and-fissure sealants, and patient education. This article will discuss each approach and assist the practitioner with information for patient care.

PLAQUE CONTROL

The matrix of dental plaque adheres to teeth and traps bacteria. This produces acids which contact the teeth and, if not removed, will cause tooth decay. Plaque is primarily found along the gingival margin, subgingivally, interproximally, and in the pits and fissures of occlusal surfaces of posterior teeth. These are also the places that are hard for most patients to reach without proper brushing technique. Patients who actively participate in an effective daily plaque-removal regimen reduce the need for professional care to treat decay and periodontal disease and for the removal of calculus.

Plaque can be removed mechanically with a toothbrush and patients can choose either a manual or power model. Proper technique is important to achieve results and to minimize abrasion. Plaque-removal evaluations showed that more gingival abrasion lesions were produced by brushing with manual toothbrushes compared to electric toothbrushes.² For power brushing, those with oscillating bristles have been proven to be clinically superior to a manual brush for overall plaque removal, at removing hard-to-reach plaque, and

helping to reduce gingivitis with continued use over time. They also are well liked and help patients to brush longer, especially children. Affordable replacement heads are available for many power toothbrushes and it is recommended that brush heads be replaced every 3 months or sooner if the bristles show wear.

Toothpastes contain cleaning agents that help to mechanically remove plaque when patients brush. Silicas are widely used and are highly effective cleaning agents but rely on heavy abrasion. Baking soda is one of the least abrasive cleaning ingredients and toothpastes with high concentrations of baking soda have been shown to offer excellent plaque removal while incorporating less silica than non-baking-soda toothpastes. Baking soda has also been shown to clean chemically by dissolving and penetrating to clean in hard-to-reach places, including along the gum line and interproximally.

SUGAR AND ACID INTAKE

Today's generation seems to have been raised on the 20-ounce soda. Soda is sweetened by adding sucrose or a high-fructose corn syrup. This amount is comparable to 10 to 12 teaspoons of sugar. Studies of dental erosion show that the caries prevalence rates in children is increasing.³ The acid in the soda damages and erodes enamel, reduces calcium content, and causes etching of the enamel surface. Intraorally, this is manifested initially as decalcification on the labial surfaces of the maxillary and mandibular teeth. It is also often seen interproximally and along the cervical areas.

A diet containing high levels of sucrose is generally very cariogenic, particularly diets containing citric acid. Candies with citric acid or fruity flavors have a 2.0 to 3.0 pH level. Loss of tooth enamel occurs at a pH level of 4.0. The consumption of these candies thus weakens enamel as the integrity of the enamel surface is prone to demineralization and cavitation. Chewing gum containing xylitol and mannitol after meals stimulates salivary flow and decreases plaque acids. Saliva contains calcium ions, proteins, enzymes, and bicarbonates that buffer the pH of acids. The bicarbonate ions and the enzyme carbonic anhydrase catalyze the hydrogen ions in low-pH foods to return the saliva pH to

more normal levels. Normal salivary pH is about 6.3.⁴

FLUORIDE USE

When enamel begins to break down from acid, the permeable surface of the enamel is intact but the subsurface is where incipient lesions form. As the subsurface continues to demineralize, a "white spot" forms. Clinically, the enamel seems sound, but in reality the subsurface lesion is an extensive lesion. Calcium and phosphate ions occur naturally in normal saliva and enhance fluoride uptake to promote remineralization and resist further demineralization. Dental decay can be greatly reduced through administering low concentrations of fluoride to teeth more often as fluoride enhances the remineralization of teeth. In addition, there are several calcium-phosphate technologies currently available in a number of professionally dispensed and at-home products. These include amorphous calcium phosphate (ACP), which is found in Enamel Pro® Prophy Paste (Premier Dental, Plymouth Meeting, PA) and ARM & HAMMER® Age Defying Toothpaste (Church & Dwight Co Inc), NovaMin® (NovaMin Technology, Inc, Alachua, FL), and Recaldent® (CPP-ACP) (Bonlac Bioscience International PTY LTD, Victoria, Australia), which is found in MI® Paste (GC America, Inc, Alsip, IL) and Trident® Xtra Care™ (Cadbury North America, Parsippany, NJ). The ACP provides several benefits. It replaces mineral lost from acidic beverage-eroded enamel and restrengthens it.⁵ Orthodontically induced white spots were reduced by brushing with ACP twice a day for 3 months,⁶ and it is significantly more effective than a conventional fluoride toothpaste in preventing root caries in head-and-neck radiated patients.⁷ ACP also binds to fluoride, thereby increasing fluoride uptake, even in patients with minimal or no salivary flow.⁸

PIT-AND-FISSURE SEALANTS

The dentist, hygienist, and the patient cannot completely and efficiently remove plaque in the occlusal surfaces of teeth because of the depth of the pit and fissure. The inability of the toothbrush bristle to eradicate plaque is a constant challenge. Occlusal surfaces are eight times as vulnerable as all the other smooth surfaces.⁹



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Pit-and-fissure sealants are placed as a thin layer of Bisphenol A-glycidyl methacrylate (Bis-GMA). If an incipient lesion presents itself on the occlusal surface, a sealant can be placed after the decay is removed. It can be done most of the time through prophylactic odontotomy without using anesthetic.

Sealants significantly reduce bacteria levels in cavitated lesions. When sealants are retained, and thus access to fermentable substrates is blocked, bacteria do not appear to be capable of exerting their cariogenic potential.¹⁰

PATIENT EDUCATION

A common vernacular phrase seen in our industry is, "Eat Candy and Support Your Local Dentist." Though this is meant to be humorous, it is alarming. We live in a consumer-driven society, and as clinicians we have the ability to educate our patients with current scientific data. Catchphrases such as, "Sip a day, get decay" to "Look mom, no cavities" have risen awareness of dental decay, though it is not enough. School cafeterias are beginning to ban soda. It is a start and moderation is the key.

CONCLUSION

Dental decay is an infectious disease. Identifying patients who are at risk of tooth decay and educating them into a lifestyle of proper oral hygiene, well-grounded dietary habits, and the use of available therapeutic products can contribute to the long-term desire of people retaining their natural dentition.

DISCLOSURE

Dr. Andrew Moffitt is a consultant for Church & Dwight Co, Inc).

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