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Extreme Makeovers & Minimum Intervention

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Tooth Conservation in the Age of Extreme Makeovers

Prevention & Minimum Intervention Treatments

By Robert Lee, BDS, MBA and Chiann Fan Gibson, DMD

As professionals, we have an obligation to promote whatever is in the best interest of the patient, and that includes taking the route of minimum intervention (MI) and educating those who are not aware of it. Ironically, MI dentistry is emerging at the same time maximum intervention—"extreme makeovers"—has captured the imagination and interest of the public. This environment only increases the need for the practice of conservative dentistry.

Online Extras

- MI Paste protocols

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Dental caries is 1 of the 2 most common oral diseases treated today.[1] For years, dentists have been more comfortable with drilling and filling than with preventing disease, in part because of their incomplete understanding of the caries process as well as advances in modern dentistry that allow for detection of the earliest signs of caries.[2] In recent years, there has been a new understanding of caries as an infectious disease.[2] This forms the basis of a paradigm shift: A shift to an MI approach to treating caries that incorporates detecting, diagnosing, intercepting, and treating caries on a microscopic level.[3]

Hypersensitivity is the other most common oral disease treated today.[1] Tooth bleaching is the most popular cosmetic procedure and hypersensitivity is the leading complaint among patients undergoing cosmetic bleaching.[4] Hypersensitivity usually occurs as a result of exposed dentin. Several theories exist about the mechanism involved. The most widely accepted is the hydrodynamic theory. Bleaching removes the plugs covering the dentinal tubules, and when teeth are exposed to external stimuli the fluid in the dentinal tubules move, resulting in hypersensitivity.[5] The process of bleaching involves introducing peroxide, which has an acidic pH, to the enamel surface. The result is a shift in pH. When the pH is less than 5.5, the subsurface enamel demineralizes.[2]

Cosmetic bleaching is not the only popular cosmetic treatment available today. Patients can now have crowns and bridges placed in 1 appointment too. It can be assumed that many patients having nonelective makeovers have "bad teeth," which can almost always be traced back to poor dental health and unchecked caries at an earlier age. Today, modern dentistry has the means to provide patients beautiful, white, and natural-looking smiles. But are dental professionals working on the symptom or the cause?

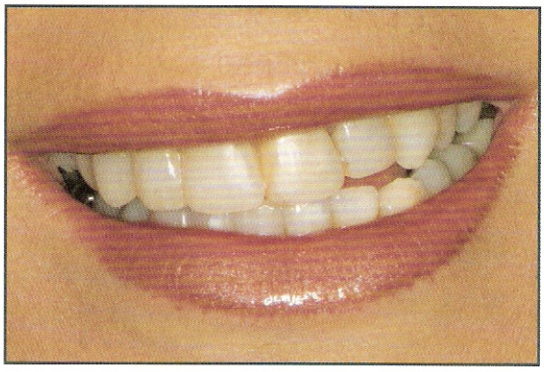
Case Presentation

The patient is a 25-year-old female kindergarten teacher, young, hardworking, and trying to build a career. Like many women in her age group, she is very conscious of looking good and putting her best face forward. In childhood, she was an avid consumer of soda and fast food. Her years of dental misfortune and neglect led to caries, and she underwent a cosmetic makeover, initially with composite veneers (Figures 1 and 2) and then 2 years ago, with bleaching and multiple crowns and bridges. Today, she is aware of the importance of diet and no longer consumes junk food as she once did. She works out routinely to maintain her physique and drinks a lot of sports drinks for the added energy. Already a successful model in addition to being a teacher, she is currently busy building her career in media and television. That means long hours and stress are part of the job. To support an active lifestyle, she takes supplements and is no stranger to over-the-counter (OTC) medication. In many ways, she is typical of women in the United States today.

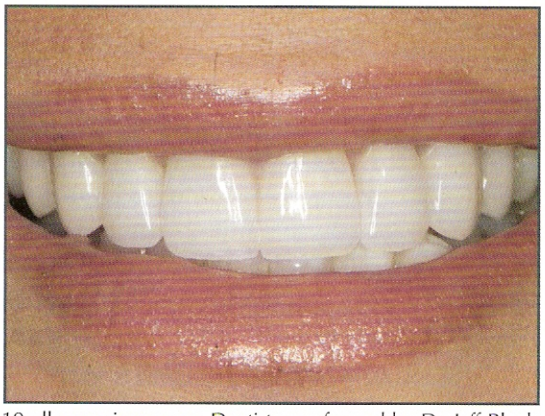
The patient's lifestyle and what it does to her oral environment mirrors many patients that hygienists see daily. If you read the above bio again, as an oral health care provider, her story would probably sound more like this:

> The patient is a 25-year-old teacher...an avid consumer of soda and fast food **(sugars and acid = demineralization)**...led to caries **(demineralization)** and she underwent a cosmetic makeover **(maximum intervention)** with bleaching **(hypersensitivity)**...drinks a lot of sports drinks **(sugars and acid = demineralization)**... long hours and stress **(low salivary flow = caries prone)**...OTC medication **(dry mouth = caries prone)**.

In this case, the patient was treated cosmetically before the causes of her symptoms were discovered. Had MI dentistry been practiced on her during her teens, the makeover could have been easily avoided. Her caries most likely could have been prevented or her early lesions reversed. Today, her dentition looks perfect after a thorough makeover involving all-ceramic crowns on 10 upper teeth (Figures 3 and 4). Despite the appearance of dental perfection, her current lifestyle could easily lend to a recurrence of caries and the longevity of her makeover could be easily compromised. Following her makeover, she began an at-home remineralization regimen, involving a twice-daily application of MI Paste (GC America, Inc, Alsip, Ill, www.gcamerica.com). Each application involves smearing the MI Paste over the enamel and leaving it for a minimum of 3 minutes. Since then, the patient has not had any new or recurrent caries, and she reported that



Figures 1 and 2—Preoperative views showing the patient's initial composite veneer restorations. Image courtesy of Dr. Jeff Blank.



Figures 3 and 4—Postoperative views showing the patient with 10 all-ceramic crowns. Dentistry performed by Dr. Jeff Blank, South Carolina. Image 3 courtesy of Luc Delisle. Image 4 courtesy of Dr. Joel Baileau.

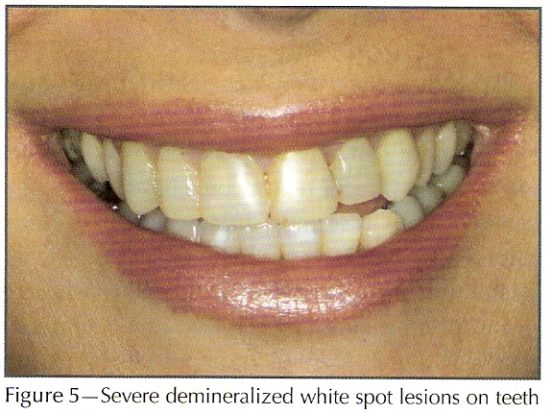


Figure 5—Severe demineralized white spot lesions on teeth Nos. 23 through 25. Image courtesy of Dr. Jeff Blank.

Figure 6—Teeth Nos. 23 through 25 after a 6-month protocol of MI Paste. Note the improvement of the white spot lesions as a result of remineralizaiton. Image courtesy of Dr. Joel Baileau.

her mouth no longer feels dry (Figures 5 and 6).The patient's saliva was tested with Saliva Check Buffer (GC America, Inc) 3 months after she incorporated MI Paste into her daily routine. The result was normal (ie, pH of more than 5.5). A table detailing MI Paste protocols for bleaching, patients with high to moderate risk for caries, orthodontic treatment, gingival recession, pregnancy, excessive tooth erosion, xerostomia, radiation and chemotherapy, meth mouth, and Mountain Dew mouth can be viewed at www.contemporaryoralhygieneonline.com.

The Role of Saliva

All this patient's symptoms have a common

What happens when saliva is compromised to the extent that it is incapable of self-buffering capacity? A change in diet and lifestyle can certainly help. So can fluoride therapy. Fluoride is well documented and accepted as an important remineralizing agent and has been the main focus of modern caries management.[1] Although topical fluoride has contributed to a decrease in caries, some patients still experience high caries rates despite exposure to a variety of fluoride sources.[9] Replenishing the enamel with F is only putting back 1 of the 3 minerals needed to form hydroxyfluoropatite, the building blocks of enamel.[2] Ca and PO_4 are the other 2 essential minerals needed. Today, adjunctive therapies are available, in addition to F, to remineralize the enamel with Ca and PO_4.

Remineralizing Technologies

There have been many attempts to create remineralizing agents with Ca and PO_4. Localizing the Ca and PO_4 on the tooth surface might have been the key, but it has proved to be difficult. Amorphous calcium phosphate (ACP) is created when dissolved Ca and PO_4 ions react to form a noncrystalline, insoluble salt.[4] ACP is unstable, but it is claimed that over time it undergoes further reaction to form a more stable form of $CaPO_4$. The precise path of its transformation is still not fully understood, but the final form has been shown to be hydroxyaptite $Ca_{10}(PO_4)_6(OH)_2$, the main mineral compound of enamel.[4] The ADA Foundation ACP can be found in several products that focus on desensitization, such as Nite White ACP and Day White ACP (Discus Dental, Culver City, Calif, www.discusdental.com).

A milk protein, discovered at the University of Melbourne, Australia, more than 10 years ago, has proven to be an effective delivery vehicle for ACP.[8,10] Casein phosphopeptide (CPP) is a naturally sticky protein that binds to Ca and PO_4 ions and stabilizes them in an amorphous state (ACP).[11] CPP-ACP becomes localized at the tooth surface by binding to dental plaque, enamel, and dentin.[12] CPP-ACP provides bioavailable Ca and PO_4 for infusion into the enamel for remineralizing and strengthening.[10] CPP-ACP is marketed under the brand name Recaldent (Bonlac Foods Limited, Melbourne, Australia, www.recaldent.com). The only professional product containing Recaldent (CPP-ACP) is MI Paste (GC, America Inc), which contains 10% professional strength CPP-ACP. There have been more than 100 documented studies on Recaldent technology to date. According to the manufacturer, MI Paste is indicated for any patient where there is a shift in oral pH balance (eg, hypersensitivity, acid challenge, white spots, and xerostomia). The standard protocol for MI Paste is to apply it twice a day (with a custom tray or a clean finger), each time leaving it for a minimum of 3 minutes. Trident White chewing gums (Cadbury Adams USA, LLC, Parsippany, NJ, www.tridentgum.com) also contain CPP-ACP, but at 0.6 % strength. It should be noted that CPP is a milk protein; therefore, anyone with known milk allergies should not be given products containing CPP-ACP. Because CPP-ACP does not contain lactose, it would not affect patients with lactose intolerance.

The demineralization process starts with plaque bacteria feasting on the sugars in food.

Another method of stabilizing Ca and PO_4 ions is with bioactive glasses. NovaMin is a calcium sodium phosphosilicate glass that releases Ca and PO_4 ions in water and/or saliva.[13] Products that contain NovaMin are designed to treat hypersensitivity, including SootheRx (Omnii Preventive Care, A 3M ESPE Company, West Palm Beach, Fla, www.omniipharma.com), NuCare prophy paste (Sunstar Americas, Inc, Chicago, Ill, www.sunstarbutler.com), and DenShield (DenShield, Alachua, Fla, www.denshield.com). Clinical protocols are still evolving for the use of NovaMin products.[1] Table 1 details how each technology works and its clinical uses.[1]

Conclusion

Caries is a reflection of adverse changes occurring in the oral environment over time. Effective treatment only will be achieved by making long-term, sustainable changes to the oral environment.[10] Miles Markley summarized the role of the dental professional in the modern approach to the treatment of caries: The loss of even a part of a human tooth should be considered a serious injury,

and dentistry's goal should be to preserve healthy, natural tooth structure.[2] The new technologies in remineralization represent an exciting paradigm shift in caries management. This case presentation is a good example of how deceiving caries can be—that a healthy, active individual who takes great care of herself was unknowingly vulnerable to the caries process. Cosmetic treatments and makeovers are here to stay, but it is our duty as dental professionals to educate patients about the benefits of MI dentistry...that less is more. **COH**

Disclosure

Dr. Lee is the director of marketing for GC America, Inc.

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