PROFILE

Dr. Van B. Haywood

Current Occupation

Full-time academics (professor) Department of Oral Rehabilitation, School of Dentistry, MCG

Education

Medical College of Georgia School of Dentistry (MCG), DMD

Professional Memberships

Academy of Operative Dentistry

American Academy of Restorative Dentistry

American Dental Association/Georgia Dental Association/Eastern District Dental Association

American Associate for Dental Research

Positions Held

Editorial board, *Journal of Esthetic and Restorative Dentistry*

Editorial board, *Contemporary Esthetics and Restorative Practice*

Editorial board, *Journal of Operative Dentistry*

Faculty sponsor, Christian Dental Fellowship, MCG and University of North Carolina (UNC)

Membership chair, Omicron Kappa Upsilon honor society, MCG and UNC

Honors/Awards

MCG Distinguished Alumnus, MCG Dental Alumni Association

Fellow, American College of Dentists

Richard F. Hunt Memorial Award for Teaching Excellence, UNC

Omicron Kappa Upsilon member since 1974

Leaders in Continuing Education 2001–2002

Publications

Over 70 publications on bleaching since 1989, five textbook chapters, and associate editor of Goldstein's textbook on Esthetics, Vol II.

Co-introduced at-home bleaching in 1989.

Personal Interests

Musical family: wife and 3 children

Masters of Esthetic Dentistry

NEW BLEACHING CONSIDERATIONS COMPARED WITH AT-HOME BLEACHING

Van B. Haywood, DMD

When our first article appeared in 1989 introducing night-guard vital bleaching (at-home bleaching) in a tray using 10% carbamide peroxide to the world,[1] we never imagined the impact this simple procedure would have on the profession and the public. As this technique became accepted as safe and effective, other frontiers were explored. Companies introduced higher concentrations of carbamide peroxide or concentrations of hydrogen peroxide for the tray system.[2] A number of over-the-counter (OTC) products were introduced in stores and on television that copied the dentist-prescribed home-applied technique but often made outlandish claims as to their safety and efficacy.[3] Also there was a resurgence in the 100-year-old in-office bleaching technique using 35% hydrogen peroxide, with or without light. Various types of lights and lasers were claimed to simplify and shorten the bleaching technique, although the research to date has shown the contrary[4,5] as companies sought to find a marketing angle for their product. Although some of the earlier OTC products and light-activation products have gone by the wayside and their manufacturers faded from the forefront, recently some major companies in the dental world have entered the OTC arena with some innovative technology. First introduced was the strip technology, which has 6 to 6.5% hydrogen peroxide on a clear strip of tape, which is applied to the teeth for 30 minutes twice a day for 14 to 21 days.[6] Now there is a paint-on 18% carbamide peroxide gel, which is applied twice a day from a brush applicator, much like fingernail polish, and dissolves from the tooth in 30 minutes. Whereas some of the earlier OTC products came from unknown companies with no history of quality of product or service to the patient, both of these recent products have come from companies that have been major players in dentistry for a long time and have made outstanding contributions to the profession. These companies would have a lot more to lose than to gain should these products not live up to their claims in some reasonable manner. So what should be the profession's response to these products?

First let me say I firmly believe that the tooth-whitening procedure that is the safest and most cost-effective and provides the least risk for the greatest benefit is still 10% carbamide peroxide applied in a custom-fitted tray after a proper examination and diagnosis by a

dentist.[7] Treatment time is 1 to 6 weeks for teeth with "normal" stains, 1 to 3 months for nicotine-stained teeth, and 2 to 6 months or longer of nightly application for tetracycline-stained teeth.[8,9] Attempts to shorten these times by using higher concentrations or in-office boosters have either not made a significant difference in the outcome while incurring additional sensitivity and greater rebound after termination of treatment[10] or have incurred a significant cost to the patient that often is not justifiable given the final outcome.[11] Although bleaching is relatively safe, there are enough concerns and cautions that a dentist is the best person to diagnose and prescribe the proper treatment for the patient. This diagnosis is based on an examination that includes taking a screening periapical radiograph of the anterior teeth and periapical radiographs of any single dark teeth if previous radiographs are not available. Pulp testing may be appropriate, especially for single dark teeth. The dentist identifies existing restorations in the esthetic zone and informs the patient that those restorations will not change color. This information prepares the patient for the additional financial burden of replacing composites (class III, IV, and V), veneers, or crowns should these restorations not blend with the new tooth color after the bleaching.[12] The dentist also identifies older amalgam restorations on teeth in the esthetic zone (often the lingual surfaces of maxillary incisors and the occlusal surfaces of premolars) that may need replacement prior to bleaching to avoid any "greening" or discoloration of the tooth around the restoration from the bleaching or from the resultant translucency of the tooth.[13] Using the radiographs, the dentist evaluates the teeth for any internal resorption or periapical radiolucencies that may require endodontic therapy, as well as caries or calcific metamorphosis, which may require additional restorative treatment or extended bleaching treatments. The dentist prescribes the estimated treatment time to achieve the desired result and counsels the patient on expectations, side effects, and any additional patient concerns.[14] The dentist evaluates the patient's level of sensitivity and plans for treatment if necessary.[15] A custom-fitted tray is then provided by the dentist, who offers follow-up of the treatment, as well as touch-up options. The dentist can counsel the patient on reasonable expectations (whiten until the color of the teeth matches the whites of the eyes) and whether additional treatment is needed to meet the patient's esthetic demands.

Although the national average fee for at-home bleaching per arch is approximately $200.00 (US), there are newer tray systems that allow the dentist to minimize chair time by directly fabricating trays in the mouth (rather than with the usual alginate impression, stone cast, vacuum-forming machine protocol),[16] reducing costs to the patient. I am also an advocate of single-arch treatment, which allows patients to try bleaching at a lower entry fee and which suits patients who do not choose to bleach the mandibular arch.

What the dentist has to offer is a proper examination, diagnosis, custom tray, and ongoing treatment. However, it is estimated that roughly 50% of the US population do not see a dentist and that only 2% have had bleaching performed, so it is easy to see why other avenues are being offered. The two current manufacturers have invested considerable research and study into developing their products and have demonstrated that there is some whitening experienced with some of the products. So what is a dentist to do? Reject the OTC products? Embrace them? I think the proper approach is to educate patients as to their options and to prescribe to patients what is in their best interest with regard to risk-benefit and cost-benefit ratios. If the dentist examines a patient, and there are no contraindications to bleaching other than the cost (especially when the patient has a discoloration that may need only slight lightening), perhaps the first step is to acknowledge that some of these OTC products may be sufficient. Arch or tooth shape, occlusion or temporomandibular joint status, delivery mechanism, patient manual dexterity, lack of compliance, difficult discolorations, and higher expectations may thwart OTC efforts, but at least the patient is not told that the products do not work at all.

By the same token, the dentist cannot make the claim that a single in-office bleaching is the best option and only offer that to the patient because in-office treatment incurs a greater cost to the patient and generally takes three visits to reach the maximum whiteness.[17–19] In-office bleaching also only whitens the six or eight anterior teeth, and when there is relapse, the patient has to repeat the entire procedure and cost. Use of a light does not alter the final outcome and may give an illusion of whitening owing to dehydration.[20]

The proper course for the dentist after the examination is to present the various options—from toothpaste or OTC products to at-home tray or in-office bleaching—and expectations along with the fees for those provided by the dental office. The patient can then choose the option that best suits lifestyle and pocketbook. Some patients prefer to have the dentist "do it all" in the office regardless of cost and number of visits, whereas for others that is not desirable or financially reasonable. Some patients need extended treatment for difficult staining[21] or have other problems that require special attention (eg, occlusion, sensitivity).[22] Others just want a slight whitening for which undergoing the dental options is not warranted.

There are two groups of persons for whom dentists must be prepared to respond to questions concerning bleaching. The first group is their own family of patients. For them, the dentist should advise truthfully of the various options mentioned above: toothpaste may lighten a tooth slightly (mostly of extrinsic stains), reputable OTC products may work much better, nightguard vital bleaching has a long history of excellent clinical success in whitening and ease of use for a variety of discolorations (even primary teeth darkened by trauma,[23] or mixed dentition), and in-office bleaching may work but often requires multiple visits or adjunctive treatment. The dentist can then advise or offer treatments based on the best risk-benefit and cost-benefit ratios for the patient's situation.

The second group of people interested in bleaching is the 50% of the population that do visit the dentist. This, of course, is the primary market at which OTC products are aimed, and there may be a great side benefit to the profession. These people may successfully lighten their teeth and become more esthetically conscious about other dental problems, inspiring them to inquire about treatments to enhance their appearance. Conversely, they may be unsuccessful with the whitening or not achieve the desired result and subsequently visit the dentist for consultation and examination. In either case the dentist should be ready to receive them and answer their questions in a manner that welcomes them to the practice. If a new patient's previous attempts have been unsuccessful, the dentist needs to be understanding without condemnation and be ready to offer the next level of treatment (usually at-home bleaching in a tray). Because these failures are sometimes owing to improper choices by the patient (ie, bleaching was used when decay was present, old restorations needed replacement, or there were nonvital teeth), the dentist should be ready to provide proper explanation of the various procedures that may be necessary to save or restore the teeth.

Will OTC products eliminate bleaching by the dentist? No more than at-home bleaching upon its introduction reduced some of the indications for porcelain veneers. Just as some of the tooth discolorations that used to be treated with crowns or veneers are now better treated with bleaching, so minor discolorations originally bleached by the dentist may be effectively treated with certain OTC products.

In summary, the dentist is the person from whom current and potential patients may seek advice and counsel, whether it be in the dental office or outside the dental setting. The dentist needs to be knowledgeable about all the options and ready to advise on the indications, contraindications, and potential

concerns of the various systems. For OTC bleaching options as well as bleaching treatments offered at the dental office, we will look to published research in recognized journals as the standard for advice to the public. For those products not applied by the dentist, the responsibility is on the manufacturers to produce good-quality independent research that is published in peer-reviewed journals to support their efficacy claims and to bear the burden for safety when bleaching is performed without a proper dental examination and supervision. Only time will tell whether any other bleaching option will rival the success, safety, and efficacy of at-home bleaching with 10% carbamide peroxide in a custom-fitted tray as prescribed by a dentist.

REFERENCES

1. Haywood VB, Heymann HO. Nightguard vital bleaching. Quintessence Int 1989; 20:173–176.
2. Mokhlis GR, Matis BA, Cochran MA, Eckert GJ. A clinical evaluation of carbamide peroxide and hydrogen peroxide whitening agents during daytime use. J Am Dent Assoc 2000; 131:1269–1277.
3. Pelehach L. Little white lies? Set patients straight on bleaching. Dent Pract Finance 1999; Jan/Feb:31–35.
4. Jones AH, Diaz-Arnold AM, Vargas MA, Cobb DS. Colorimetric assessment of laser and home bleaching techniques. J Esthet Dent 1999; 11:87–94.
5. Why curing lights don't increase tooth whitening. CRA News (Serial online) 2000; August. www.cranews.com.
6. Crest White Strips. Compendium 2002: 23(Spec Issue 1A).
7. Haywood VB. Supervised at-home bleaching is safest, most effective. Dent Products Rep 2000; May:82–91.
8. Haywood VB. Tooth whitening in your practice: treatment time and fee schedules. Contemp Esthet Restorative Pract 2000; 4(11):12–15.
9. Leonard RH, Haywood VB, Eagle JC, et al. Nightguard vital bleaching of tetracycline-stained teeth: 54 months post treatment. J Esthet Dent 1999; 11:265–277.
10. Matis BA, Mousa HN, Cochran MA, Eckert GJ. Clinical evaluation of bleaching agents of different concentrations. Quintessence Int 2000; 31:303–310.
11. Haywood VB. A comparison of at-home and in-office bleaching. Dent Today 2000; 19(4):44–53.
12. Haywood VB. Ultralight composite resin for whitened teeth: case reports. Compendium 2000; 21:340–346.
13. Haywood VB. Greening of the tooth-amalgam interface during extended 10% carbamide peroxide bleaching of tetracycline-stained teeth: a case report. J Esthet Restor Dent 2002; 14:12–17.
14. Haywood VB. Current status and recommendations for dentist-prescribed, at-home tooth whitening. Contemp Esthet Restorative Pract 1999; 3(1):2–9.
15. Haywood VB, Caughman WF, Frazier KB, Myers ML. Tray delivery of potassium nitrate-fluoride to reduce bleaching sensitivity. Quintessence Int 2001; 32:105–109.
16. Haywood VB, Caughman WF, Frazier KB, Myers ML. Fabrication of immediate thermoplastic whitening trays. Contemp Esthet Restorative Pract 2001; 5(9):84–86.
17. Goldstein R. Whitening options: how to choose. Contemp Esthet Restorative Pract 2002; 6(7):12–17. (Interview)
18. Blankenau R, Goldstein RE, Haywood VB. The current status of vital tooth whitening techniques. Compendium 1999; 20:781–796.
19. Yamaguchi R, Katoh Y. A photocolorimetric study of vital bleaching with Shofu Hi-Lite. J Dent Res 2002; 81:308. (Abstr)
20. Papathanasiou A, Kastali S, Perry R, Kugel G. Clinical evaluation of a 35% hydrogen peroxide in-office whitening system. Compendium 2002; 23:335–346.
21. Haywood VB, Caughman WF. At-home whitening and selective bonding of tetracycline-stained teeth. Contemp Esthet Restorative Pract 2001; 5(10):20–26.
22. Robinson FG, Haywood VB. Bleaching and temporomandibular disorder using a half tray design: a clinical report. J Prosthet Dent 2000; 83:501–503.
23. Brantley DH, Barnes KP, Haywood VB. Bleaching primary teeth with 10% carbamide peroxide. Pediatr Dent 2001; 23:514–516.

Reprint requests: Van B. Haywood, DMD, AD3144 Department of Oral Rehabilitation, Medical College of Georgia, School of Dentistry, Augusta, GA, USA 30912; e-mail: vhaywood@mail.mcg.edu