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Ultralight Composite Resin for Whitened Teeth: Case Reports

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The advent of nightguard vital bleaching has had a considerable impact on the restorative treatment of teeth.[1] At one time, B1 on the Vita® Shade Guide[a] was the lightest shade available for composite or porcelain restorations, and it generally was sufficient for the lightest tooth shade. However, with whitening treatment, some teeth have achieved lighter shades than B1.[2] Although this may make patients happy, it poses considerable problems for the restorative dentist when subsequent restorations are required. The purpose of this article is to demonstrate the use of composite restorations of shades lighter than B1 for restorations on teeth that have been whitened.

[a] Vita Zahnfabrik, distributed in the US by Vident™, Brea, CA 92621

Case 1

A 29-year-old man presented to the clinic for participation in a research project to have his tetracycline-stained teeth whitened in an extended treatment time evaluation (Figure 1A). The patient was given a nonscalloped, no-reservoir tray design that covered all of his teeth and an ADA-approved 10% carbamide peroxide material (Colgate Platinum®,[b]) to apply nightly. The patient was seen on monthly recall visits. After 4 months (approximately 720 hours of nightly application), the maxillary arch was complete (Figure 1B). At this time, the shade was determined to be lighter than B1 (Figure 1C). Treatment was terminated on the maxillary arch and initiated on the mandibular arch.

The patient was a heavy coffee drinker, and continued to drink coffee during treatment of the mandibular arch. At the 1-month recall, coffee staining was noted in the maxillary central incisor at the location of a preoperative tooth defect (Figure 1D). To clean the stain from the defect without requiring the use of a handpiece, maxillary whitening was reinitiated. After a few nights of whitening therapy and cessation of coffee drinking, the stain was removed. There was then a wait of more than 2 weeks to allow the shade to stabilize and the bond strength of the composite restoration to bear at its maximum.[3] After the waiting period, the patient returned to have the defect restored (Figure 1E). To determine the appropriate shade, samples of composite were cured on the

[b] Colgate Oral Pharmaceuticals, Canton, MA 02021

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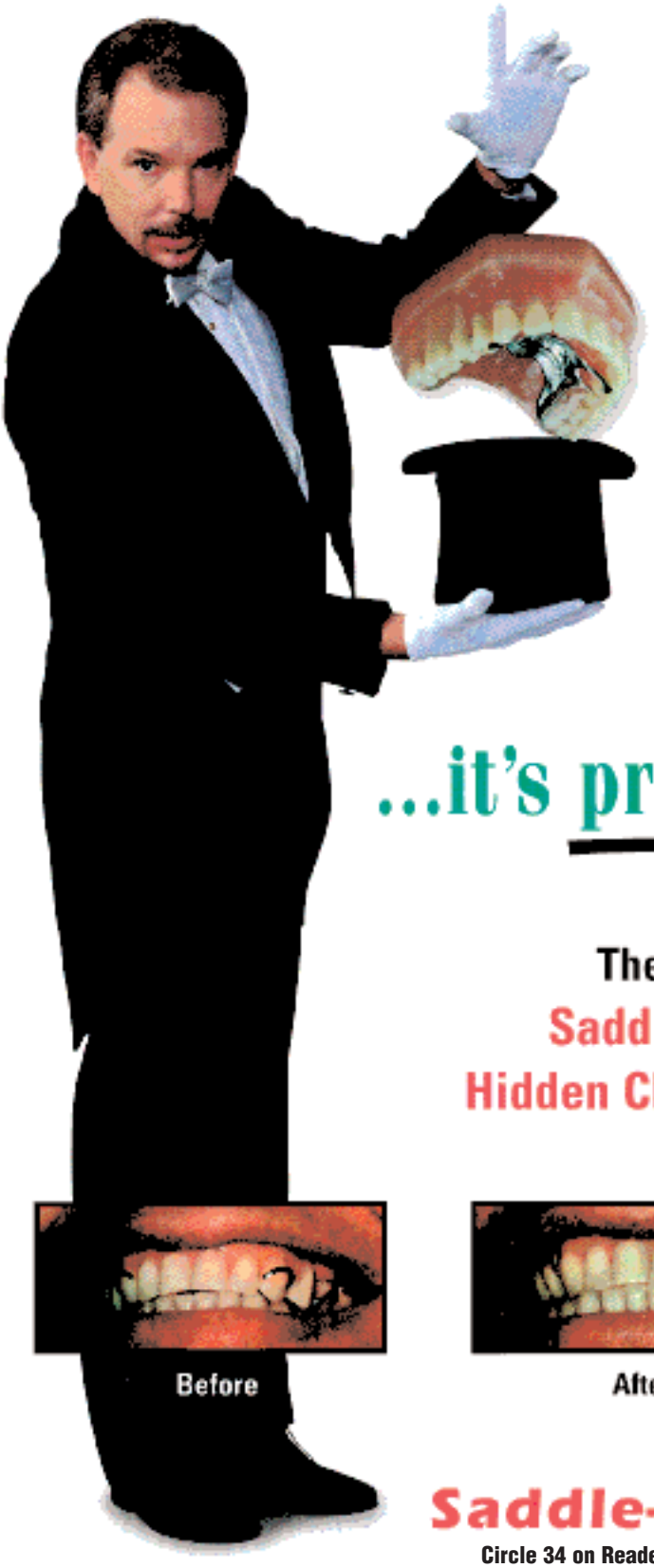

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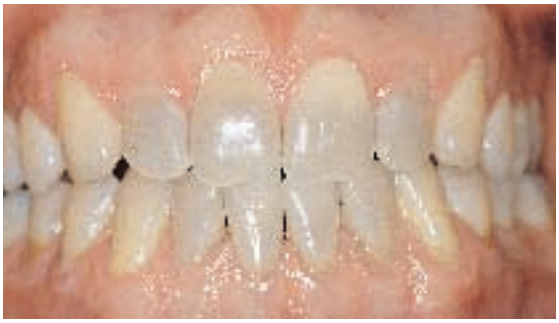

Figure 1A—Preoperative tooth discoloration indicative of moderate tetracycline staining.

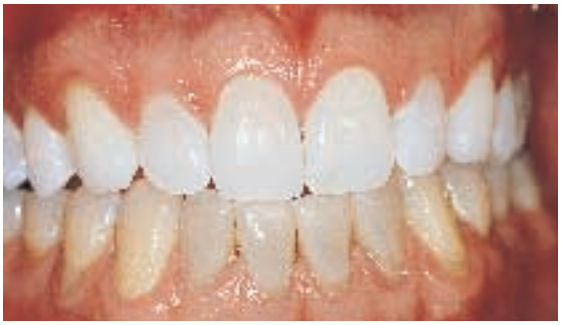

Figure 1B—Maxillary arch has been whitened nightly for 4 months with 10% carbamide peroxide in a nonscalloped, no-reservoir tray design.

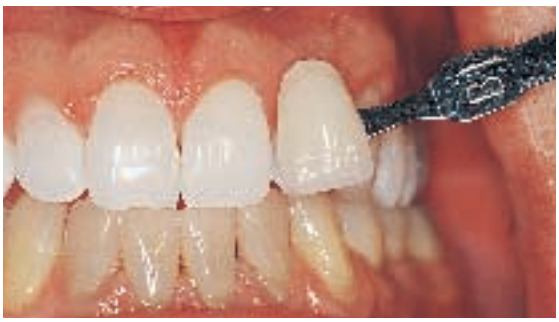

Figure 1C—Vita® shade B1 is now darker than the final shade of the whitened teeth.

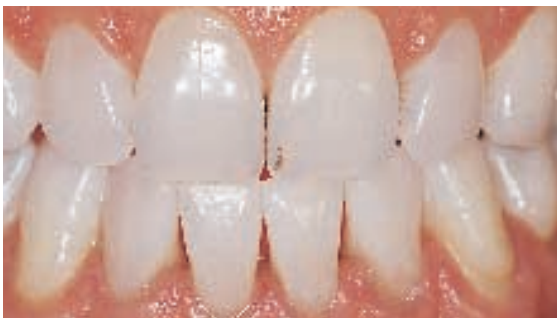

Figure 1D—After termination of maxillary whitening treatment, a previous tooth defect becomes stained from coffee.

Figure 1E—Additional whitening with 10% carbamide peroxide in the tray removes the stain from the defect with no need for tooth structure removal.

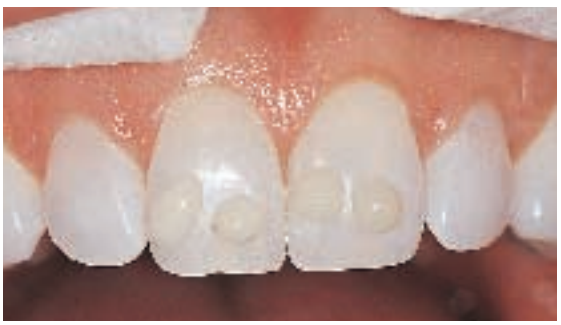

Figure 1F—Shades B.2, B.5, B.7, and B1 (left to right) composite cured on the tooth to select the shade. Shade B1 is too yellow.

unetched tooth. The B1 shade proved to be too dark. The final material chosen was an ultralight shade of hybrid composite, shade B.2 (Amelogen® UltraLite[c]) (Figure 1F). The tooth defect was etched with 37% phosphoric acid, enamel bond was applied, followed by light-curing of the appropriate shade composite, which provided a successful restoration of the defect (Figure 1G).

Case 2

A 16-year-old girl was interested in lightening her teeth, as well as closing the spaces between the central incisors and improving her smile (Figure 2A). She was fitted with a non-scalloped, no-reservoir soft tray (Sof-Tray®,[c]), and given an ADA-approved 10% carbamide peroxide to apply nightly (Colgate Platinum®). After approximately 4 weeks of nightly whitening, the teeth had achieved a shade lighter than B1 (Figure 2B). In test-curing the composite resin to determine the proper shade, an Amelogen® UltraLite shade of composite, B.7, was chosen (Figure 2C). To relate tooth contours properly to the soft tissue, no rubber dam was used. The teeth were etched with 37% phosphoric acid and rinsed. Enamel bonding agent was then applied, cured, and followed by the selected composite material. The orange composite shield was used to prevent premature setting of the composite (Figure 2D). The

[c] Ultradent Products, Inc, South Jordan, UT 84095

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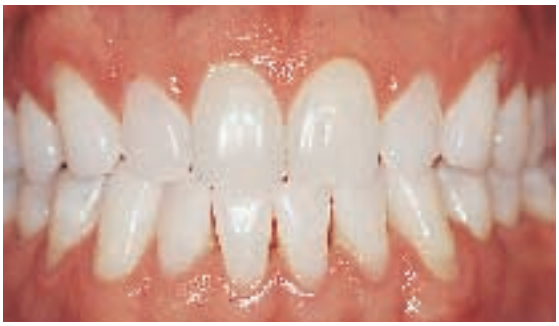

Figure 1G—The whitened tooth is restored with B.2 shade of composite resin.

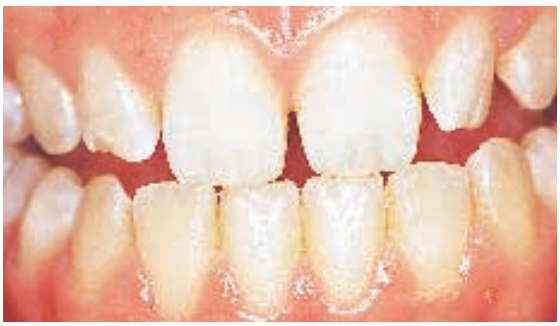

Figure 2A—The patient is concerned about yellow teeth, white striations, spaces, and an irregular smile.

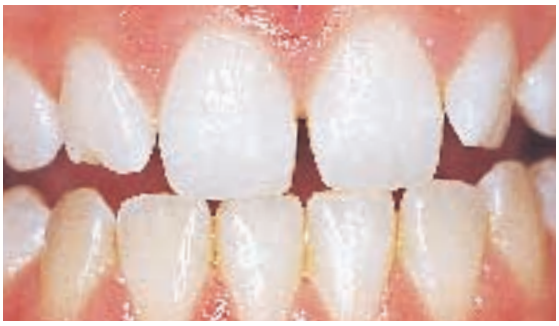

Figure 2B—The teeth are whitened with 10% carbamide peroxide in a nonscalloped, no-reservoir tray design for approximately 4 weeks.

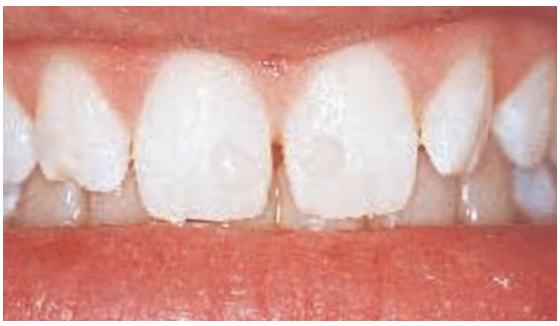

Figure 2C—Composite cured on the unetched tooth is used to select the shade. Shade B1 is too yellow (right), but B.7 is appropriate.

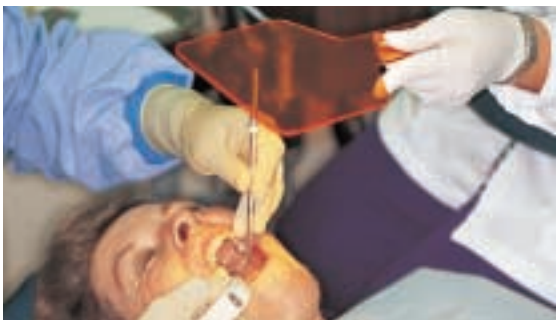

Figure 2D—Curing shield is positioned above the field of dental vision, but shielding the composite from the effects of the operatory light to allow unlimited working time.

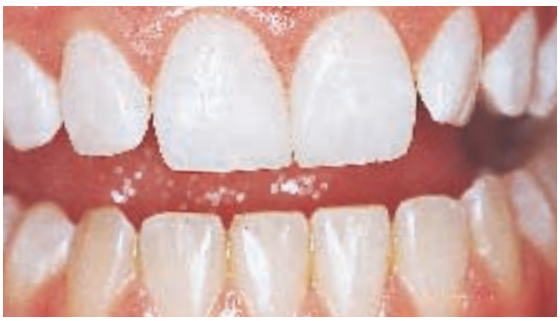

Figure 2E—Diastema closed with composite resin shade B.7, which is lighter than shade B1.

diastema between the maxillary central incisors was closed, as well as a defect on the incisal of the left lateral incisor (Figure 2E).

Discussion

The lighter tooth shades that are achievable from whitening has created the need for lighter shades of composite and porcelain. Several manufacturers, including Cosmedent, Ivoclar, and Ultradent, have met this need by producing a single lighter shade or multiple lighter shades of composite. Ultradent has three shades that are lighter than B1—B.2, B.5, and B.7.[4] In these case reports, having multiple shades was important because these two patients did not whiten to the same final shade. The ultralight material that was used is a hybrid composite from Ultradent's successful line of composite resin, which has a proven track record in clinical use.

One clinical problem encountered when shaping the large composite addition is that the operatory light will cause the material to set prematurely (as in Case 2). However, if the operatory light is not used, the clinician has difficulty viewing and shaping the lingual contours. When the correct shade has been chosen, a solution to that problem is to have the dental assistant hold the orange composite curing shield over the operating field while still using the operatory light. The shield is held so that the dentist is not looking through the shield, but the light is shining through the shield. The operating field is bathed in an

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OVERVIEW: The field of Restorative Dentistry is rapidly evolving as we move into the 21st century. Traditional techniques are being questioned by authoritative sources with scientific evidence that suggests changes in philosophies and practice are long overdue. Evidence-based approaches to patient-centered treatment are encouraged over historical "technique" approaches to improving oral health. The integration of basic sciences with clinical sciences has brought new concepts into the management of patients. Risk assessment has become a vital element of proposed treatment options. Systemic conditions of patients are influencing treatment more than ever before. Factors previously far removed from traditional dental practice have now become integrated into patient management. The "total patient" concept is becoming more common with the aim of providing more comprehensive oral health care directed at individual patients rather than populations. This conference will address many of the issues related to this evolving practice of Restorative Dentistry. Evidence-based clinical recommendations and treatment options will be emphasized.

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FORMAT: The conference will consist of five panels of presentations by invited speakers. Each presentation will last 30 minutes with a discussion period following each panel.

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Thursday, June 8, 2000
Session #1, Theme: *"Population Demographics and Patient Restorative Decision-Making"*

- **Dr. E. Steven Duke**: A Change in the Order of Things (Indiana University)
- **Dr. Stephen C. Bayne**: Clinical Decisions Using the Scientific Method (University of North Carolina)
- **Dr. John P. Brown**: The Changing Population of Need (University of Texas HSC at San Antonio)
- **Dr. Ivar A. Mjör**: Reasons for Restorative Failures (University of Florida)
- **Dr. Dorothy McComb**: Aging and Restorative Treatment (University of Toronto)

Session #2, Theme: *"Risk Assessment and Patient Factors that Influence Restorative Outcomes"*

- **Dr. Michael W. Dodds**: Caries Risk Assessment and Restorative Treatment (University of Texas HSC at San Antonio)
- **Dr. Domenick T. Zero**: Oral Factors to Consider that Influence Restorative Treatments (Indiana University)
- **Dr. Carl W. Haveman**: Systemic Conditions that Influence Restorative Treatments (University of Texas HSC at San Antonio)
- **Dr. Serkis Isikbay**: Occlusion and Restorative Treatment (Indiana University)
- **Dr. Connie Mobley**: Dietary Analysis in a Restorative Practice (University of Texas HSC at San Antonio)

Friday, June 9
Session #3, Theme: *"Biocompatability and Restorative Treatments"*

- **Dr. Cornelis H. Pameijer**: Pulpal Responses to Restorative Treatments (University of Connecticut)
- **Dr. Donald H. Newell**: Gingival Tissues and Restorative Treatment (Indiana University)
- **Dr. Maud Bergman**: Material Selection and Biocompatability (University of Umea, Sweden)
- **Dr. Kenneth J. Anusavice**: Less Abrasive Ceramic Esthetic Materials (University of Florida)
- **Dr. Thomas J. Hilton**: Bases and Liners and Restorative Treatment (Oregon Health Sciences Center)

Session #4, Theme: *"New Restorative Techniques and Materials"*

- **Dr. Nairn H. F. Wilson**: Reducing the Incidence of Recurrent Caries (University Dental Hospital, Manchester, England)
- **Dr. Felix Lutz**: Alternatives to Amalgam in Posterior Teeth (University of Zurich, Switzerland)
- **Dr. Jack L. Ferracane**: Polymeric Prosthodontic Materials (Oregon Health Sciences Center)
- **Dr. Marcos Vargas**: Advances in Adhesive Materials (University of Iowa)
- **Dr. Joseph B. Dennison**: The Restoration of Root Caries (University of Michigan)

Saturday, June 10
Session #5, Theme: *"Alternative Conservative Restorative Techniques"*

- **Dr. Bruce A. Matis**: Bleaching as a Conservative Restorative Option (Indiana University)
- **Dr. Junji Tagami**: Air Abrasion Tooth Preparation (Tokyo Medical & Dental University, Tokyo, Japan)
- **Dr. James B. Summitt**: Minimal Restorative Intervention Techniques (University of Texas HSC at San Antonio)
- **Dr. Hak-Kong Yip**: Caries Removal with Alternative Techniques (Prince Philip Hospital, Hong Kong, China)
- **Dr. Howard S. Landesman**: Future Directions & Restorative Trends (University of Colorado)

REGISTRATION: Advance registration is required, and conference attendance will be limited. Forms may be sent by mail or fax, and **must be received no later than May 5, 2000**. The required registration fee of $385 prior to May 5 and $435 after that date includes conference materials, continental breakfast, break service, and lunch. Optional choices for the conference include overnight hotel accommodations, NCAA dinner, and hard copy of conference proceedings. For University Place Hotel accommodations, the cost per person per day is $109.89 for a single room or $126.54 for a double room. Please mark hotel check-in and check-out dates in order for us to make your reservations. **Due to the limited attendance, early registration is strongly encouraged.** University Place Conference Center & Hotel* offers participants a convenient location for all conference activities as well as lodging. The facility, located on the Indiana University–Purdue University Indianapolis campus, is a five-minute walk from the IU School of Dentistry and a few blocks from the center of the city.

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orange glow, but visibility is good. This approach provides almost unlimited working time and adequate visibility.[5]

Whitening to remove a stain in a defect is a technique that may be beneficial with stained margins around older porcelain veneers. After whitening to clean, the margin can be resealed with new composite. In addition to composite resin that is lighter than B1, some manufacturers have introduced porcelain shades that are lighter than B1 (A0 and B0[d]). There are also newer composite resins that are applied in the same manner as a ceramist would layer different shades and translucencies of porcelain.[6,7] This material (Vitalescence™,[c]) and technique give the dentist the options of having greater translucency and a better blend with the natural tooth structure.[8]

Conclusion

Tooth whitening may produce tooth colors that are lighter than traditional shades of restorative materials. Today's restorative dentist needs to be aware of the lighter shades and newer composites, and have them available for the restorative needs of their patients with whitened teeth.

[d] Dentsply Ceramco, Burlington, NJ 08016

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