

Nightguard vital bleaching beneath existing porcelain veneers: A case report

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Dentist-prescribed, at-home bleaching with 10% carbamide peroxide was used to lighten the apparent color of teeth with preexisting porcelain veneers. Veneers had been placed over unprepared, tetracycline-stained teeth; the translucency of the veneers over the discolored teeth resulted in a graying of the veneers. A custom-fitted tray with no reservoirs and no gingival scalloping was fabricated. A 10% carbamide peroxide material was applied nightly for 9 months to achieve the maximum change in the underlying tooth color. The patient was pleased with the apparent color change. Tooth sensitivity during treatment was minimal (lasting 4 days total); the patient treated sensitivity by brushing with a potassium nitrate-containing toothpaste or applying fluoride in the tray. (Quintessence Int 1999;30:743-747)

Key words: at-home bleaching, carbamide peroxide, nightguard vital bleaching, porcelain veneer, tetracycline-stained teeth, tooth bleaching

Although porcelain veneers date back to the Hollywood days of Dr Charles Pincus,¹ the etched bonded porcelain veneer only became available to the profession in the early 1980s.² Since then, improvements in preparation design, cements, and porcelain materials have made the porcelain veneer one of the finest restorations available today.^{3,4} However, in the early days of veneers, there was some doubt about the longevity and durability of the restoration, so the teeth were often left unprepared. Minimal preparation necessitated thin veneers.

Another problem was that, to mask dark discolorations, the veneer had to be made from a very opaque porcelain. This opacity could mask the discoloration but resulted in a lifeless tooth. The more translucent the veneer, the better the esthetic outcome, but, conversely, the poorer the masking ability.⁵ Often the dentist was unaware of the lack of adequate masking until after the restoration was permanently bonded in place. The dentist and patient were faced with the dilemma of accepting a less than desirable color or removing the restorations.

The advent of nightguard vital bleaching or dentist-prescribed at-home bleaching techniques has had considerable impact on the use of porcelain veneers.⁶ In some instances, where the tooth color is the only con-

cern, the color change that results from bleaching eliminates the need for porcelain veneers. In other situations, bleaching prior to veneer placement is an adjunct to a successful veneer outcome.⁷ In still other cases, the cemented porcelain veneers may not provide a satisfactory color shift because they inadequately mask markedly discolored teeth. The purpose of this case report is to demonstrate the use of nightguard vital bleaching to improve the apparent color of teeth with porcelain veneers by lightening the underlying tooth structure.

CASE REPORT

A 39-year-old woman presented with porcelain veneers that had been placed on her maxillary anterior tetracycline-stained teeth (canine to canine) approximately 15 years previously (Fig 1). Her chief complaint was that the veneers looked gray. Although the veneers represented an improvement from the original tooth color, the original color problem was not totally eliminated, possibly because of the severity of the tooth discoloration, the absence of preparation of the teeth, and the translucency of the veneers. The patient was seeking treatment options to improve the color without having to replace the veneers.

The veneers had been placed because the teeth were discolored by tetracycline, which is evident from the lingual view of the teeth (Fig 2). These restorations were placed prior to the advent of 10% carbamide peroxide bleaching. The teeth had been prepared minimally or not at all prior to veneer placement. The baseline shade taken of the current veneers was C5 on a Vita Lumen value-oriented shade guide (Vita Zahnfabrik) (Fig 3).

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Fig 1 Porcelain veneers placed over tetracycline-stained teeth appear gray.

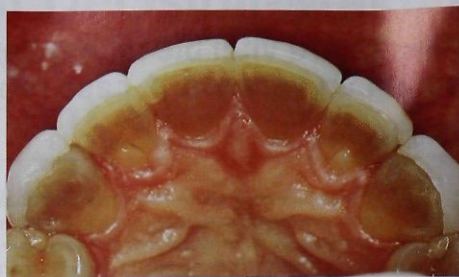


Fig 2 The extent of the tetracycline staining is visible on the lingual view of the teeth.



Fig 3 Because of the tetracycline staining, the shade of the veneers is approximately C3, although shade guides do not provide a good color match for tetracycline-stained teeth.

The mandibular teeth had received no treatment and served as a control to establish the original shade and to allow comparison for maxillary color changes.

A maxillary impression was made and a resultant stone cast was generated. The cast was trimmed in a horseshoe shape to eliminate the vestibule and palate, as previously described.⁸ A soft bleaching tray material (Sof-tray, Ultradent) was used to fabricate a bleaching tray that extended approximately 2 to 3 mm onto the gingivae in a horseshoe shape. No spacers (reservoirs) were placed on the facial or the lingual aspect of the cast.

An American Dental Association–approved 10% carbamide peroxide material was used (Platinum, Colgate Oral Pharmaceuticals). The patient applied the whitening material at night for the duration of sleep. The patient was given instructions to load a tiny bead of the white material on the lingual surface of each tooth and then insert the tray. Excess material was removed with the wipe of a finger wipe or a toothbrush. The patient kept a log form of the amount of time she wore the appliance as well as any side effects or observations.

The patient was reexamined at 2-month intervals to evaluate progress clinically and with photographs. Treatment was to continue until there was no apparent change in the color of the teeth, as viewed from the lingual aspect. Midway through treatment, the whitening material was switched from Platinum to Platinum Overnight.

At the first recall, the patient reported only 3 days' sensitivity during the first 2 months; she experienced tooth sensitivity on days 7 and 8 and gingival irritation on day 15. The tooth sensitivity was treated by the use of a potassium nitrate-containing toothpaste (Sensodyne, Block Drug); use of the toothpaste was continued through the remainder of the bleaching process. The gingival irritation resolved without treatment or alteration of the tray.

At the second recall, the patient was prescribed a new product, Colgate Platinum Overnight. Continued use of the desensitizing toothpaste resolved any minor tooth sensitivity, except on days 44 and 49. Tooth sensitivity on these 2 days was treated by application of a fluoride gel (Gel Kam, Colgate Oral Pharmaceuticals) in the tray for 30 minutes. The sensitivity was resolved, and no further treatment was needed for the duration of the bleaching.

Treatment was considered completed when no further change in shade could be detected by the dentist or the patient (Fig 4). Total treatment time over a 9-month period was 2,064 hours of nighttime wear. Approximately 1 tube or syringe of whitening material provided 3 nightly applications; approximately 86 tubes of material were used.

The lingual surfaces of the teeth (Fig 5) and the unveneered premolars (Fig 6) were evaluated for color change. The initial color change was noted on day 18 on the premolars, and on day 28 on the anterior teeth. The maximum shade change had occurred after 9 months of nightly treatment. The final shade went from C3 (Fig 7) to between D2 and C1 (Figs 8a and 8b).



Fig 4 The shade change in the veneers is apparent after 9 months of nightly bleaching with a 10% carbamide peroxide in a nonscalloped, nonreservoired custom-fitted tray.



Fig 5 The postbleaching lingual view demonstrates the amount of whitening of the anterior teeth compared to the fixed color of the veneers.



Fig 6 The premolars, which were not as badly discolored as the veneered teeth, exhibit a significant color change. Some discoloration remains in the anterior teeth.



Fig 7 Comparison of the veneers to the baseline C3 shade tab and the mandibular teeth reveals the lightening of the value of the veneers.



Figs 8a and 8b The final apparent color of the veneers is between a D2 (left) and a C1 (right) shade tab. It is difficult to measure incremental color changes in tetracycline-stained teeth because the shade guide does not contain those colors. From baseline (C3), this represents an 8- to 10-increment shade shift.

This apparent color shift represented an 8- to 10-increment change in shade on a value-oriented shade guide.

The patient was pleased with the treatment and excited about the possibilities of mandibular treatment. A mandibular impression was made, and treatment was initiated on the mandibular arch.

DISCUSSION

Bleaching does not have an effect on the color of porcelain,⁹ so the apparent change in the color of the veneers was the result of the change in the underlying tooth color. Some authors have suggested that the dentist must make the choice either to bleach the teeth or to place veneers but must not do both because the tooth color may relapse.¹⁰ Other authors have supported the use of initial bleaching to minimize the amount of masking necessary by veneers.^{7,11} The present case demonstrates that it is possible to bleach teeth from the lingual aspect when facial veneers are in place, eliminating the concern about the possibility of color relapse after veneers are cemented. Combination treatment, bleaching followed by placement of veneers, seems to be a reasonable treatment option.

Tetracycline-stained teeth are particularly difficult to bleach, and lightening can require 4 to 12 months of nightly treatment.¹²⁻¹⁵ The process may be slower when the facial surface is covered. However, the easy passage of the carbamide peroxide through the tooth will lighten areas remote from the ingress of the material.¹⁶⁻¹⁸

It is difficult to select both the original and final shades of the teeth, because tetracycline-stained teeth do not match natural tooth shade guides well. Shade guide increments are not a precise measure of color change, because the incremental changes between shade tabs are not uniform and linear. Patient satisfaction is a major indicator of success in this situation, as is the comparison of the veneer-covered teeth to the untreated mandibular teeth.

The tray that was used had a nonscalloped design to maintain the material in close contact with the gingival area of the tooth.¹² A nonscalloped tray allows less ingress of saliva and is less irritating to the tongue and lips. No reservoirs were placed because of the potential for occlusal interference. However, reservoirs are not needed for bleaching, especially with the material used in this treatment (Platinum).^{19,20} Gingival irritation was minimal (1 day of 258 days) even though the tray extended 1 to 2 mm onto the tissue. This lack of sensitivity may be related to the water solubility of the material and the tendency of Platinum not to adhere to gingival tissue.

Originally, Platinum was dispensed in tubes and recommended for 1 to 2 hours' wear, twice a day. This patient used the original Platinum during the night, because research has shown it to be effective for at least 4 hours,^{21,22} and patient compliance for extended treatment is greater when nightly applications are used. Later, Platinum Overnight was made available; it is a stickier white material dispensed in a syringe format and designed for overnight use. Both materials worked well for overnight use.

The number of tubes and syringes used by this patient supports the approach of having patients "pay as they go" in a fee-for-service practice. Because the amount of treatment time the color change would require was unknown at the outset of treatment, establishment of a fee would have been difficult. One suggestion is that treatment be initiated as in a normal bleaching situation for the normal fee. Then the number of syringes used monthly (in this case, about 10) would be determined, and a recall fee would be established, to include the cost of additional materials and the office visit. Treatment would continue as needed, depending on the rate of color change. This plan protects the patient and the dentist from establishment of an initial fee that is too high or too low for the service.

Consideration of bleaching in conjunction with placement of porcelain veneers or bonding is an important part of modern sequential treatment planning.^{23,24} Bleaching may resolve the discoloration sufficiently to eliminate the need for bonding or porcelain veneers. Furthermore, bleaching may make a lighter tooth on which to place a veneer. In this way, less masking is required of the porcelain veneer, so the preparation for and translucency of the veneer can give a more natural appearance. Finally, even if the bleaching is unsuccessful, by offering the patient the bleaching option first, the dentist has demonstrated that he or she is interested in the best and most conservative method for treatment, even if there is less financial reward. Any time placement of an anterior restoration is anticipated, prerestoration bleaching to establish the baseline color shade should be considered.

Patient compliance and the treatment of any side effects that occur over the course of treatment are major factors in the success of extended treatment. The dentist should describe the bleaching of severely discolored teeth as a long-term commitment by the patient, similar to a weight-loss program or exercise program. Results are gradual but can be very rewarding if the patient's expectations about treatment time and outcome are realistic.

Sensitivity can be treated in several ways. Both fluoride and potassium nitrate have been reported as successful desensitizing materials, although their mechanisms of action are very different.²⁵ Fluoride is

considered a tubular blocker and reduces the flow of materials to the pulp. It can be applied in the bleaching tray in place of the bleaching material. Potassium nitrate goes to the pulp and has a calming effect on the nerve.²⁶ Brushing with potassium nitrate often takes a number of weeks to be effective,²⁷ although 2 days were sufficient in this patient.

A more deliberate technique to treat sensitivity is to apply the potassium nitrate in the bleaching tray, which has been reported to work with any sensitivity.²⁸ The dental office can also use special preparations of 3% to 5% potassium nitrate and fluoride supplied by manufacturers for tray application to treat tooth sensitivity.

CONCLUSION

Although bleaching does not change the color of porcelain, bleaching of teeth that are covered by porcelain veneers can change the apparent color of the veneers. Use of a 10% carbamide peroxide in a custom-fitted tray can change the color of the underlying tooth structure. This color change may sufficiently improve the apparent color of the veneers to the patient's and dentist's satisfaction and eliminate the need for replacement of the veneers for color correction.

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