

an essential
adjunct to
modern
esthetic
dentistry

vital
bleaching

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Nightguard or tray vital bleaching has been used since 1989 for tooth whitening as an adjunct for esthetic dentistry.¹ Current materials used for vital bleaching are hydrogen peroxide and carbamide peroxide. Both peroxides generate free radicals, reactive oxygen molecules and hydrogen peroxide anions. These reactive elements diffuse into tooth enamel and dentin and react with long-chained chromophores splitting them into smaller less colored and more diffusible molecules.²

Vital bleaching can be done in-office or as a take-home technique. High concentrations of bleaching agents (30-38%) should be only used by dentists in-office^{3,4} while concentrations of 7-20% are used for home administered bleaching using custom trays in night or day-time treatment regimes.⁵ The take home protocol is used for the same indications as in-office treatment with the added benefit of fewer and less severe adverse effects such as tooth sensitivity.⁶ At-home vital bleaching is safe⁷ and represents a predictable and patient pleasing tooth whitening procedure that is readily accepted due to the relatively non-invasive nature of the treatment.² The efficacy has been shown in a meta analysis where a significant mean change of 6.4 Vitapan shade guide units was observed with tray bleaching using lower concentration gels.⁵

Over-the-counter products, employing generic strips applied at home have been also popularized for tooth whitening. While effective at generating shade changes, recent investigations have shown that tray-based bleaching systems produced a faster and better whitening effect regardless of product or concentration.⁸ Newer developments in take-home tray systems have targeted developing systems requiring shorter treatment times. 10% carbamide peroxide formulas demonstrated desirable whitening effects with over-night treatment protocols. Gels with a concentration of 15-20 % and more were developed to facilitate effective tooth whitening with 1-4 hours of daytime use. It has been hypothesized that these daytime systems may actually generate less tooth sensitivity due to the reduced contact time of

the bleaching gel with mineralized tooth structure. However this has not been clinically validated. What is known is that the end results of lower concentration bleaching materials is the same as the higher concentration materials if contact times are increased to the desired endpoint.⁹

Meeting patient preferences for tooth whitening often requires a multi-step approach. Research has shown that patients often prefer white and shiny teeth instead of a more natural appearance and that the speed of the results is of high importance.¹⁰ This has driven the development of high concentration formulas for in-office use. While effective these preparations may not penetrate as deeply into enamel as lower concentration agents used for a longer period of time.¹¹ Thus the higher concentrations of carbamide peroxide or hydrogen peroxide may not fully compensate for the reduced contact time between the bleaching agent and the tooth tissues. These higher concentrations may also generate more tooth sensitivity^{12,13} and can potentially cause mucosal irritation if the bleaching agent is not isolated from the oral soft tissues.¹⁴ However the immediate whitening effect after a 1 hour treatment regimen has made these high concentration in-office protocols popular for certain patients desiring instant results. Most clinicians employ the in-office protocol with some kind of take-home tray regime to achieve the best whitening results.

Part of the immediate whitening effect for all bleaching protocol is related to a dehydration effect in the tooth enamel.¹⁵ Dehydration can increase the opacity of enamel and can lead to an exaggerated whitening effect. The so-called shade rebound was reported to be on average 2 Vita shade units after a lightening of 8 shade units.¹⁶ In another evaluation, after 10 years 43% of patients perceived their tooth shade as 'stable'.¹⁷ Including a short duration "re-bleach" regimen may be important following the initial bleaching to meet patient demands for whitening. The following case reports illustrate the predictable and patient satisfying tooth whitening that can be accomplished using both in-office and take-home protocols.

Clinical Cases

Case 1- In-office whitening with Pola Office+

A 35 year old patient presented for a recall and inquired about bleaching at this recall appointment. The dental hygienist reviewed with him the options and details involved with bleaching. At the conclusion the patient felt that in-office bleaching would meet his needs. In-office bleaching has gained a lot of popularity in the general public. Many patients are now aware that in-office bleaching is a procedure that many dentists offer and is a great way to get a fast and immediate change in the color of their teeth. In today's world of immediate gratification, in-office bleaching is one of the most requested procedures in many dental offices.

During the recall exam he was evaluated to ensure that he was indeed a good candidate for in-office bleaching. During the

exam the key clinical parameters that are focused on are good periodontal health, no or minimal gingival recession and the absence of decay. Additionally, questions about any history of tooth sensitivity are asked. The importance of this is that patients with a history of tooth sensitivity occasionally experience mild to moderate tooth sensitivity for 24 hours after in-office bleaching. Patients that have a positive history of tooth sensitivity are often better candidates for take home bleaching. In the case of this patient he had no history of any tooth sensitivity.

The patient returned the following week for a one hour appointment for in-office bleaching. The dental assistant seats the patient and prepares to begin the procedure. Pre-operative photos are taken. The patient's initial shade is an A3 (Fig 1-2), which is verified by a digital shade taking device (EasyShade, Vita)



Fig. 1-2

For in-office bleaching proper and effective isolation is very important. Great care must be taken to protect the soft tissue. Figure 3 shows the use of retractors and a gingival barrier material to provide the required protection.



Fig. 3

For this patient Pola Office+ was chosen. This material contains 37.5% hydrogen peroxide, which facilitates a significant whitening procedure with a start to finish time of less than an hour. The shorter treatment time and the inclusion of potassium nitrate in the composition, provides patients with less treatment and/or post-operative sensitivity than other in-office systems.

Light activation of in-office bleaching materials has been a controversial subject. The Pola Office+ is just as effective with or without exposure to a light source. In this case a bleaching adapter to the Radii Plus LED curing light (Fig 4) was used and this is a cost effective and easy to use light source for augmenting the in-office procedure.

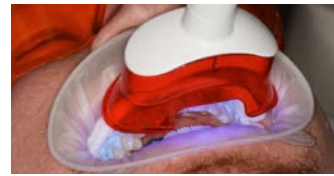


Fig. 4

Three to four applications were used to complete the in-office procedure. The patient was asked to return in 10 days to evaluate the results. Using standard visual examination and confirmation with a digital shade analyzer a noticeable shade change has occurred (Fig 5-6). The preoperative shade is now an A1. The patient noticed a marked improvement and was very pleased with the final outcome.



Fig. 5-6

Case 2- Take Home Tray Bleaching with Pola Day

One of the most predictable and demanded procedures in general dental offices is tray bleaching for tooth whitening. The affordable price and the high demand of take home bleaching make it an easy procedure for patients to accept.

A 24 year old male presented as a new patient. One of his chief complaints was that he would like his teeth to be whiter. During the course of this appointment the dental hygienist explained the difference between take home bleaching and in-office bleaching. Reasonable expectations of bleaching procedures as well as costs associated with bleaching were clearly described to the patient. Once the patient was fully informed about bleaching he requested to proceed with take home bleaching.

The patient is transferred to the consultation operatory and the dental assistant takes upper and lower impressions using an alginate substitute polyvinyl siloxane impression material (Status Blue, DMG America). The impressions are immediately poured in a fast setting dental stone (SnapStone, WhipMix). This stone will reach its final set within 10 minutes. The assistant then trims the models and fabricates the bleaching trays.

While the stone is setting the assistant returns to the operatory and reviews with the patient the instructions for use of the bleaching material. She will also take the preoperative photos and record the patients existing shade using a digital shade guide (EasyShade, Vident).



Fig. 1

The preoperative photos of the patient's teeth demonstrate his existing shade (Fig 1). Using the digital shade analyzer we found his preoperative shade to be an A2 (Vita Classic). This patient reported no history of tooth sensitivity and a medium strength solution of bleaching material was chosen. After discussion about whether he'd prefer to bleach during the day or evening, the patient felt that day time bleaching would fit best into his lifestyle. Therefore a two week treatment of bleaching using Pola Day (SDI) was prescribed. The 7.5% hydrogen peroxide option of Pola Day was selected for the patient. The protocol included once or twice a day of bleaching for a minimum of one hour each application. Our experience with this product is excellent with minimal reports of tooth sensitivity. Fluoride is contained in the bleaching material as well and may provide added sensitivity protection.



Fig. 2

The patient returned 17 days later. He reported good compliance to our instructions. His final results demonstrate a significant improvement in the shade of his teeth (Fig. 2)



Fig. 3

The digital shade analyzer and using conventional shade matching techniques show an improvement from an A2 to a B1 shade (Fig. 3).

For this patient the Pola Day 7.5 % material provided results in a fast and effective manner that met our expectations which the patient found very pleasing.

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