

Smile Enhancement with Professional Tooth Whitening System

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Abstract

Aim : To present two case reports in which smile enhancement was achieved using a professional tooth whitening system (*Colgate visible white* containing 9% H₂O₂).

Summary : Two female patients reported to the department of Conservative Dentistry & Endodontics with the same chief complaint of yellowish discoloration of teeth. They requested for whitening of teeth as they were not very happy with their smile. They were treated with a professional tooth whitening system (extracoronal office bleach) three times with a gap of two days between each appointment. The treatment resulted in significant tooth whitening & overall smile enhancement.

Key words : Tooth discoloration, Extracoronal bleach, Smile enhancement

Introduction

Tooth discoloration is a clinical problem in dental practice and can greatly affect the smile and psychological well being and confidence of an individual. It may be defined as "any change in the hue, color, or translucency of a tooth due to various causes such as food and beverages, tobacco, chromogenic microorganisms, restorative materials, aging, pulpal necrosis or haemorrhage, drugs, systemic diseases such as porphyria, erythroblastosis fetalis etc." The discoloration may be induced by intrinsic stains incorporated in tooth structure or extrinsic stains deposited on tooth surfaces. Tooth whitening / Bleaching is a treatment modality involving an oxidative chemical that alters the light absorbing and/or light-reflecting nature of a material structure, thereby increasing its perception of whiteness. The active ingredient in tooth bleaching materials is peroxide compounds; hydrogen peroxide and carbamide peroxide mainly used for extracoronal bleach, whereas sodium perborate mainly used for intracoronal bleach. H₂O₂ at high concentration is caustic and burns tissues on contact. Thus, these materials must be handled with care to avoid their contact with tissues during handling or bleaching procedure.¹

Bleaching techniques are preferred because tooth color can be restored without removing sound, healthy tooth structure. Proper case selection for any kind of bleaching procedure is very important to ensure success. Yellowing of teeth without any systemic or developmental cause (food, smoking, aging, staining), mild fluorosis staining, mild discoloration due to trauma and mild tetracycline staining are some examples of cases with good prognosis for tooth whitening. Vital tooth bleaching can also be used as an adjunct to esthetic bonding procedures. Lightening the tooth shade first with bleaching makes it easier to mask tooth discolorations when placing composite or porcelain veneers. It is important before any bonding procedure that bleaching be discontinued for at least one week to prevent interference with proper adhesion.²

Case Reports

Two female patients (mother and daughter) reported to the department of Conservative Dentistry and Endodontics

with the same chief complaint of generalized yellowish discoloration of teeth. The discoloration seemed to be intrinsic as there was no improvement after complete oral prophylaxis. The exact cause of the discoloration could not be identified. They requested for whitening of teeth as they were not very happy with their smile. (Figure 1 and 6) Alginate impressions were made and poured with dental stone to make the casts. The prepared casts were sent to the dental laboratory for fabrication of bleaching trays. (Figure 2) At the next appointment, patient's gingiva was protected by application of Vaseline to prevent any irritation / sensitivity due to the bleaching agent. The bleaching gel from the syringe was injected into the bleaching trays (Figure 3) and the trays were seated properly in the mouth. (Figure 4) The excess bleaching material at the tray margins was removed using cotton swab. The patient was then asked to close her mouth. She was asked to report any sensitivity by raising her hand. The trays were removed after half an hour (as directed by the manufacturer). The teeth were thoroughly washed with water spray to remove the bleaching agent. The same procedure was followed for both the patients and repeated at the next two appointments. They were prescribed fluoride mouthwash for 15 days and desensitizing toothpaste if there is any sensitivity. They were also asked to avoid taking excessive tea, coffee or other such colored beverages which are likely to cause staining of teeth. The results of the treatment were quite satisfying for both cases. (Figure 5, 7, 8, and 9)

Discussion

The exact mechanism behind tooth bleaching remains unclear at present; however, it is generally believed that free radicals produced by H₂O₂ may be responsible for bleaching effects, similar to that in textile and paper bleaching. H₂O₂ diffuses through the enamel and dentin, producing free radicals that react with pigment molecules breaking their double bonds. The change in pigment molecule configuration and/or size may result in changes in their optical properties, and consequently, the perception of a lighter color by human eyes. In addition to the chemical effect, other possible mechanisms include cleansing of tooth surface, temporary dehydration of enamel during the bleaching process, and change of enamel surface. A number of factors, relating to both the patient (e.g. age, gender, and initial tooth color), the bleaching material used (e.g. type of peroxide compound, peroxide concentration, other ingredients), and application method (e.g. contact time, application frequency, enamel prophylaxis prior to bleaching treatment), may contribute to the bleaching efficacy and the subsequent stability of the bleaching achieved. Among these factors, the contact time of the bleaching material to the enamel surface appears to be more influential than the others.³

Extracoronal bleaching may be used for whitening vital or nonvital teeth as well as a single tooth or whole arch. It has experienced a dramatic advancement in materials as well as techniques after at-home extracoronal bleaching was first introduced. Research efforts and clinical advancements have also revolutionized the in-office

extracoronary bleaching technology. Various materials and clinical procedures are available for in-office extracoronary bleaching, also called chair-side bleaching or power bleaching. Current commercial in-office bleaching materials are almost exclusively in the form of a gel, with 25% - 38% H₂O₂. It is not advisable to directly use high concentrations of aqueous H₂O₂ solutions for tooth bleaching. Besides a higher risk of tissue contact due to its lack of proper viscosity, high concentrations of aqueous H₂O₂ solutions are thermodynamically unstable and may explode unless properly stored in a dark container and kept refrigerated.¹

In-office extracoronary bleaching may be performed using a bleaching gel alone or a gel with a light. The use of custom-made bleaching trays helps in more intimate and uniform contact of the bleaching gel with the teeth. They also reduce the amount of gel needed for the whitening efficacy and minimize gel contact with oral soft tissues. The light exposure is intended to enhance the bleaching efficacy by activating the bleaching gel, either through a specific catalyst or heat, to promote the decomposition process of H₂O₂. So far, however, the research on the efficacy of using the light for in-office bleaching has been limited, and the results have been controversial.^{4,5}

Extracoronary tooth bleaching can provide lighter tooth shade that may be retained up to 10 years after the initial professional tray bleaching treatment. However, there has been some safety concerns mainly associated with potential toxicological effects of free radicals produced by the peroxides used in the bleaching materials. Free radicals are known to be capable of reacting with proteins, lipids, and nucleic acids, consequently causing cellular damage. Mild to moderate, transient tooth sensitivity often occurs during the early stages of treatment and usually persists for 2-3 days.^{6,7} It has been suggested as an indication of possible pulpal inflammation. Topical fluoride application and desensitizing toothpastes or mouthwashes may be prescribed to alleviate the symptoms. Extracoronary bleaching should not be performed on teeth with caries, exposed dentin, or in close proximity to pulp horns. Mild to moderate gingival irritation is also a commonly observed clinical side effect which occurs in 2-3 days of using the bleaching gel and then dissipates.⁸ A properly trimmed tray

and application of protective creams such as Vaseline or cocoa butter can prevent most of these complications. The bleaching gels can also cause slight erosion of enamel and mercury release from amalgam restorations.¹

Conclusion

Vital Tooth Bleaching is an effective treatment modality that can significantly change the appearance of teeth and enhance the smile. Based on the clinical results reported with professional vital tooth bleaching, it is a viable, esthetic treatment for discolored dentin. Its conservative nature and little, if any, risk makes it an important part of the esthetic dentistry treatment plan.

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Legends

- Fig. 1 Preoperative photograph (Case 1)
- Fig. 2 Stone casts and Bleaching trays
- Fig. 3 Bleaching agent injected into bleaching tray
- Fig. 4 Bleaching trays seated in the mouth
- Fig. 5 Postoperative photograph (Case 1)
- Fig. 6 Preoperative photograph (Case 2)
- Fig. 7 Postoperative photograph (Case 2)
- Fig. 8 Comparison of preoperative and postoperative photograph (Case 1)
- Fig. 9 Comparison of preoperative and postoperative photograph (Case 2)

