Case Report

In-Office Vital Bleaching Using 40% Hydrogen Peroxide for Tobacco-induced Discoloration: A Case Report

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ABSTRACT

Tooth discoloration caused by extrinsic factors such as tobacco use is a common esthetic concern. In-office vital bleaching is a popular treatment modality that offers immediate results through the use of high-concentration hydrogen peroxide gels. This technique involves proper soft tissue protection, controlled application of the bleaching agent, and optional use of light activation. The procedure is safe, minimally invasive, and well-tolerated by patients. This article highlights the effectiveness of in-office vital bleaching using 40% hydrogen peroxide, emphasizing procedural steps, activation protocols, and post-treatment care. Significant whitening can be achieved in a single session, making it a preferred choice in modern esthetic dentistry.

Key words: Bleaching agent, Vital bleaching, Hydrogen peroxide, In-office bleaching

INTRODUCTION

In recent years, the demand for dental esthetic procedures has grown significantly, with tooth whitening being one of the most frequently requested treatments. Among the causes of discoloration, tobacco smoking remains a prominent extrinsic factor, resulting in persistent yellow–brown staining due to tar and nicotine deposits.[1]

Dental bleaching, particularly in-office vital bleaching, offers an effective and minimally invasive method for improving tooth color. High-concentration hydrogen peroxide gels are commonly employed, providing rapid results under clinical supervision.[2] In-office bleaching also allows for immediate monitoring of tissue response and better patient compliance, reducing the risk of adverse effects compared to at-home systems.[3]

This article presents a case of in-office vital bleaching performed using 40% hydrogen peroxide on a patient with tobacco-induced discoloration, highlighting the step-by-step protocol and outcome.

CASE REPORT

A 30-year-old male patient reported to the department of conservative dentistry and endodontics with a primary complaint of generalized tooth discoloration, which he described as progressively worsening over the past year. The patient admitted to a daily smoking habit of more than 1 year, which was determined to be the likely cause of the extrinsic staining. He expressed concern regarding the esthetic appearance of his smile and was highly motivated to undergo tooth whitening treatment. His medical history was non-contributory, and there were no signs of systemic illness or medication use.

On clinical examination, yellowish-brown extrinsic stains were observed on the labial surfaces of both maxillary and mandibular teeth, extending from premolar to premolar [Figure 1]. The patient's oral hygiene was fair, and no caries, restorations, or enamel defects were noted. Periodontal health was within normal limits with no bleeding on probing or gingival inflammation. Pulp vitality was confirmed through thermal and electric pulp testing, which yielded positive and normal responses. Shade matching was performed using the VITA Classical Shade Guide, and the initial shade was recorded as A3.

After discussing the various options for tooth whitening, an in-office vital bleaching procedure was planned using a chemically activated 40% hydrogen peroxide bleaching agent (Opalescence Boost, Ultradent Products Inc., USA) [Figure 2].

Written informed consent was obtained from the patient after explaining the risks, benefits, and expected outcomes. The treatment began with a thorough cleaning of the teeth using pumice to remove any surface debris or plaque. Retractors and cotton rolls were used for cheek and tongue retraction, ensuring a dry field for optimal bleaching agent performance. A green light-cured resin-

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based gingival barrier (OpalDam Green) was carefully applied along the gingival margins of the teeth to be treated, extending slightly onto the gingiva to prevent accidental contact with the soft tissues [Figure 3]. The barrier was then polymerized using an LED curing light for 20 s/quadrant.

Following tissue protection, the 40% hydrogen peroxide gel was mixed according to the manufacturer's instructions and applied in a uniform 1 mm-thick layer to the labial surfaces of the teeth, from premolar to premolar in both arches [Figure 4]. The gel was left undisturbed for 20 min, during which time it was activated using an LED curing unit to enhance the bleaching effect and accelerate peroxide breakdown. At the end of the first cycle, the gel was suctioned off using high-volume evacuation, and the teeth were gently rinsed with water and dried. A second application of the bleaching agent was performed following the same protocol and left for another 20 min. After completion of the second cycle, the gel was thoroughly removed, and the gingival barrier was peeled off using a dental explorer. Following the bleaching procedure, UltraEZ™ desensitizing gel (Ultradent), containing potassium nitrate and fluoride, was applied to the treated tooth surfaces and left for 5 min to reduce the risk of post-operative sensitivity. The gel was then rinsed off, and the teeth were dried.

Post-treatment shade matching revealed a significant improvement in tooth color, with the final shade recorded as A1 [Figure 5]. The patient reported no discomfort or sensitivity during or after the procedure. He was instructed to refrain from consuming staining agents such as coffee, tea, red wine, tomato-based foods, and tobacco products for at least 48 h following treatment. He was also advised to maintain meticulous oral hygiene and use a desensitizing toothpaste if needed.At the 1-week follow-up appointment, the treated teeth retained their lighter shade, and the patient reported no sensitivity or soft tissue irritation [Figure 6]. He expressed high satisfaction with the outcome, noting a considerable improvement in the brightness and appearance of his smile. The success of the procedure reaffirmed the effectiveness of in-office bleaching in managing tobacco-induced extrinsic stains. It highlighted the importance of patient selection, proper isolation, and post-treatment care for long-term results.

Figure 1: Initial pre-operative view

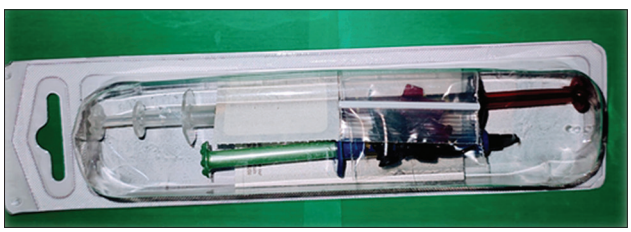

Figure 2: Opalescence Boost, Ultradent Products Inc., USA

DISCUSSION

Tooth discoloration from extrinsic factors like smoking remains a prevalent esthetic concern, largely due to the deposition of tar and nicotine on enamel surfaces.[4] In-office vital bleaching using high-concentration hydrogen peroxide offers an effective, conservative solution to manage such stains. Unlike at-home techniques, in-office bleaching allows for professional control, immediate results, and reduced risks.[5]

In this case, a 40% hydrogen peroxide gel (Opalescence Boost) was used, with proper gingival protection provided by a resin barrier. Although the product is chemically activated and does not require light, a plasma arc curing unit was employed to enhance peroxide activation. This aligns with findings from Gürkan *et*

Figure 3: Gingival isolation

Figure 4: Application of the bleaching gel

Figure 5: Post-treatment results

Figure 6: Results after 1 week of follow-up

al. (2023),[1] who demonstrated effective results using similar protocols. While light activation remains debated, it may improve bleaching efficiency when used judiciously.[6-8]

No adverse effects, including sensitivity or soft tissue irritation, were reported in this case. The absence of sensitivity may be attributed to controlled peroxide exposure and careful isolation, consistent with reports by Mehta *et al*. and Tay *et al*., emphasizing the importance of technique and patient-specific factors.[4,5]

Post-operative instructions, particularly avoiding tobacco and chromogenic substances, played a crucial role in maintaining outcomes. Studies have shown that freshly bleached enamel is more susceptible to restaining; thus, patient compliance is key to long-term success.[9]

Beyond clinical improvement, bleaching positively impacts self-confidence and quality of life. As McGrath *et al*. noted, esthetic dental treatments enhance psychological well-being, making in-office bleaching a valuable addition to comprehensive care.[3]

Overall, this case supports the use of 40% hydrogen peroxide in-office bleaching as a safe, predictable, and patient-friendly method for addressing tobacco-related discoloration. Success depends on proper technique, patient selection, and adherence to post-treatment care. Future studies may further evaluate long-term outcomes and comparative effectiveness of light versus chemical activation systems.[10]

CONCLUSION

In-office vital bleaching using 40% hydrogen peroxide proved to be a safe, effective, and minimally invasive approach for managing tobacco-induced extrinsic tooth discoloration. The procedure demonstrated excellent esthetic results in a single clinical session, with no reported post-operative sensitivity or soft tissue complications. The use of a gingival barrier ensured adequate protection, and the optional activation with a plasma arc curing unit may have enhanced the bleaching effect. Patient satisfaction was high, and color stability was maintained at follow-up. This case highlights the reliability and efficiency of professionally administered bleaching procedures when performed with proper technique and patient compliance. In-office vital bleaching remains an essential component of esthetic dentistry, offering immediate, predictable results with conservative intervention.

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