Case Report

Conservative Esthetic Rehabilitation of Discolored Vital Teeth Using In-Office Bleaching: A Case Report

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ABSTRACT

Anterior tooth discoloration is a frequent esthetic complaint that can affect an individual's confidence and quality of life. Conservative approaches such as vital bleaching offer an effective means of improving dental esthetics while maintaining the integrity of natural tooth structure. This case report describes the treatment of discoloration involving the maxillary and mandibular anterior teeth from canine to canine in a patient with vital teeth and no evidence of pulpal or periapical pathology. Following clinical and radiographic assessment, an in-office bleaching procedure using a hydrogen peroxide-based agent was carried out. Noticeable enhancement in tooth shade and smile appearance was achieved after treatment, with no adverse effects reported. The patient expressed satisfaction with the esthetic outcome. This case demonstrates that in-office vital bleaching is a predictable, minimally invasive, and effective option for the management of discoloration in vital anterior teeth.

Key words: Vital bleaching, tooth discoloration, esthetic dentistry, in-office bleaching, anterior teeth, smile enhancement.

INTRODUCTION

Dental discoloration is a common esthetic concern that can negatively affect an individual's confidence and social interactions. Tooth discoloration may be classified as extrinsic, intrinsic, or a combination of both depending on the etiological factors involved. Common causes include tobacco use, dietary chromogens, aging, fluorosis, trauma, and certain medications. Management of discolored teeth ranges from conservative bleaching procedures to invasive restorative approaches depending on the severity and etiology of discoloration.[1]

Vital tooth bleaching is considered a minimally invasive and conservative treatment modality for improving the color of vital teeth while preserving natural tooth structure. The whitening effect is achieved through oxidation-reduction reactions initiated by peroxide-based agents, which break down complex pigmented organic molecules into smaller and less chromogenic compounds.[2]

In-office bleaching systems commonly utilize high concentrations of hydrogen peroxide (25–40%) and provide rapid esthetic improvement under professional supervision. The use of 35% hydrogen peroxide has demonstrated predictable whitening outcomes with acceptable levels of tooth sensitivity and high patient satisfaction.[3] In addition, contemporary bleaching systems such as Whiteness HP Maxx (FGM) incorporate desensitizing protocols and gingival protection measures to enhance patient comfort and safety during treatment.[4]

This case report describes the successful management of generalized anterior tooth discoloration associated with smoking habits using an in-office vital bleaching procedure with 35% hydrogen peroxide, resulting in significant esthetic improvement and patient satisfaction.

CASE REPORT

A 26-year-old male patient presented with a chief complaint of yellowish discoloration of the upper and lower front teeth for six months. The patient reported a smoking habit of approximately 4–5 cigarettes per day for the previous two years. Medical and drug histories were non-contributory.

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Clinical examination revealed generalized yellowish discoloration involving the maxillary anterior teeth (13–23) and mandibular anterior teeth (33–43). No carious lesions, restorations, or structural defects were noted. Cold vitality testing demonstrated normal pulpal responses in all affected teeth. Based on clinical findings, a diagnosis of extrinsic discoloration associated with smoking was established.

After obtaining informed consent, in-office vital bleaching was planned. Preoperative clinical photograph was revealed (Fig. 1). Oral prophylaxis was performed, followed by gingival isolation using Top Dam light-cured gingival barrier (Fig. 2). A desensitizing agent was applied for 15 minutes before the bleaching procedure (Fig. 3).

Fig 1: Pre operative photograph

Fig 2: Application of gingival barrier

Fig 3: Application of desensitizing agent

Whiteness HP Maxx (FGM), containing 35% hydrogen peroxide, was selected as the bleaching agent. The peroxide phase and thickener phase were mixed in a 3:1 ratio according to the manufacturer's instructions. The bleaching gel was applied uniformly over the labial surfaces of the affected teeth with a thickness of approximately 0.5–1 mm (Fig. 4). The gel was periodically agitated to eliminate oxygen bubbles and maintain adequate contact with the enamel surface. The bleaching agent remained in contact with the teeth for 15 minutes and was activated using a Flexi LED whitening system (Fig. 5).

Fig 4: Application of bleaching gel

Fig 5: Bleaching gel was activated by Flexi LED light

Following completion of the procedure, the gel was removed by suction and thorough rinsing. The gingival barrier was carefully removed, and a neutralizing agent was reapplied for 10 minutes. Final polishing was performed, and postoperative instructions were provided, including avoidance of smoking and staining foods for 48 hours.

A marked improvement in tooth shade was observed immediately after treatment (Fig. 6). The patient expressed high satisfaction with the esthetic outcome and reported no significant postoperative discomfort.

Fig 6: Post operative image

DISCUSSION

Tooth discoloration is a frequent esthetic complaint encountered in contemporary dental practice and may negatively affect an individual's self-esteem and social confidence. Discoloration can be classified as intrinsic, extrinsic, or a combination of both depending on the etiology. Extrinsic stains are commonly associated with tobacco use, dietary chromogens, and poor oral hygiene. In the present case, the patient's smoking habit was considered the major etiological factor responsible for the generalized yellowish discoloration of the anterior teeth. Tobacco contains tar, nicotine, and other chromogenic compounds that adhere to the enamel surface and gradually produce yellow-brown discoloration.[1]

Among the various treatment options available for managing tooth discoloration, vital bleaching remains the most conservative approach because it preserves natural tooth structure while providing significant esthetic improvement.[2] Compared with veneers and crowns, bleaching is less invasive, more economical, and often serves as the first-line treatment for discolored vital teeth.[3]

The mechanism of vital bleaching is based on oxidation-reduction reactions. Hydrogen peroxide diffuses through enamel and dentin and decomposes into reactive oxygen species that oxidize long-chain organic chromogens into smaller, less pigmented molecules. This chemical alteration results in an increase in tooth brightness and a reduction in discoloration.[4] The efficacy of bleaching depends on several factors, including peroxide concentration, application time, type of discoloration, and patient-related variables.[5]

In the present case, an in-office bleaching protocol using Whiteness HP Maxx (FGM) containing 35% hydrogen peroxide was selected. High-concentration hydrogen peroxide systems are capable of producing significant color changes within a relatively short treatment period. Previous studies have demonstrated that 35% hydrogen peroxide can effectively improve tooth shade while maintaining acceptable safety profiles when used under professional supervision.[6-8]

Soft-tissue protection is an essential component of in-office bleaching procedures. Direct contact of concentrated hydrogen peroxide with gingival tissues may result in transient irritation or chemical burns. Therefore, a light-cured gingival barrier was applied before bleaching to ensure patient safety. Similar protective measures have been recommended in clinical studies and systematic reviews evaluating in-office bleaching procedures.[9]

Tooth sensitivity is the most commonly reported adverse effect associated with vital bleaching. The diffusion of peroxide through enamel and dentin may induce reversible pulpal inflammation, leading to transient sensitivity.[10] The use of desensitizing agents before and after bleaching, as performed in this case, has been shown to reduce the incidence and severity of postoperative sensitivity without compromising bleaching effectiveness.[11] The absence of significant sensitivity in the present case may be attributed to the use of desensitizing agents and careful adherence to the manufacturer's protocol.

The role of light activation in bleaching procedures remains controversial. Earlier investigations suggested that light sources could accelerate peroxide degradation and improve bleaching efficacy.[12] However, more recent systematic reviews and meta-analyses have demonstrated that light activation provides little or no additional whitening benefit when high concentrations of hydrogen peroxide are used. Furthermore, light activation may increase intrapulpal temperature and the risk of postoperative sensitivity.[13-15] Therefore, the clinical success achieved in this case is likely attributable to the bleaching agent rather than the use of adjunctive light activation.

A significant improvement in tooth shade was observed immediately after treatment. Similar outcomes have been reported in studies evaluating in-office bleaching techniques.[16] Nevertheless, clinicians should be aware that initial whitening may be partially influenced by dehydration of dental tissues, and final shade stabilization generally occurs within two to six weeks after treatment.[17] Long-term maintenance of bleaching results depends on patient compliance with oral hygiene instructions and avoidance of staining habits such as smoking and excessive consumption of chromogenic beverages.[17]

The successful outcome observed in this case supports the growing body of evidence indicating that in-office bleaching with 35% hydrogen peroxide is a safe, effective, and minimally invasive treatment modality for managing smoking-induced anterior tooth discoloration. The procedure resulted in satisfactory esthetic improvement and high patient acceptance while preserving the integrity of natural tooth structure.

CONCLUSION

In-office vital bleaching with 35% hydrogen peroxide proved to be an effective and minimally invasive approach for the management of smoking-induced anterior tooth discoloration. The procedure resulted in significant shade improvement, enhanced smile esthetics, and high patient satisfaction while preserving natural tooth structure. Therefore, vital bleaching should be considered a first-line treatment option for appropriately selected cases of vital tooth discoloration.

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