

Treatment of Discoloured Nonvital Tooth Using the Walking Bleach Technique: A Case Report

Discoloured
Nonvital Tooth
Using the
Walking Bleach
Technique

Muhammad Qasim Javed and Swati Srivastava

ABSTRACT

A discoloured non vital tooth (NVT) especially in the anterior region is a common aesthetic concern for many patients, significantly impacting their self-esteem, confidence, social interactions, and employability. Effectively managing NVT, often involves the use of bleaching agents such as sodium perborate and hydrogen peroxide. The careful selection of the bleach and the application of an appropriate bleaching technique are crucial for conservative and successful case management. Improper technique can lead to complications such as cervical resorption, ultimately resulting in tooth loss. This case report aims to elucidate the proper management of a discoloured anterior tooth following endodontic treatment for a patient who reported at the Endodontic department at college of dentistry, Riphah International University, Islamabad, Pakistan in May, 2018.

Key Words: Bleaching; sodium perborate; discolouration; hydrogen peroxide; non-vital bleaching; walking bleach.

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INTRODUCTION

Contemporary dentistry is based on the concept of minimal intervention, emphasizing the preservation of dental tissue. This philosophy is particularly relevant in the treatment of tooth discolouration of NVT. Bleaching teeth to restore their natural colour not only aids in saving dental tissue but also offers a substitute for crowns.¹

Dental dyschromia presents variations in its causes, location and intensity, stemming from external factors, internal factors or both. A thorough case study is imperative to achieve a correct diagnosis, as a successful treatment and the precision of outcomes are contingent upon it.² Teeth experiencing a traumatic event accompanied by intra-pulpal haemorrhage often undergo discolouration as the components of blood disseminate into the tubules of dentin. Alternatively, the breakdown of red blood cells releases iron, causing brown/red and black discolorations, especially after a traumatic event resulting in pulp necrosis.³ Various irrigants used during endodontic therapy, intra canal medications and root canal sealers can induce internal colour changes.

Department of Conservative Dental Sciences, College of Dentistry, Qassim University, Saudi Arabia

Correspondence: Muhammad Qasim Javed, Department of Conservative Dental Sciences, College of Dentistry, Qassim University, Buraidah, PO box 1162, Qassim 51452, Saudi Arabia.

Contact No: +966544788659

Email: m.anayat@qu.edu.sa

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Historically, invasive prosthetic restoration was the predominant approach to address this type of discolouration.⁴ Internal NVT bleaching stands out as an efficient, simple and minimal invasive technique.⁵ The outcome of the bleaching procedure hinges on the accurate identification of the etiology, proper diagnosis, and flawless execution of the bleaching technique. For the procedure to be successful, the tooth must have healthy surrounding periodontal tissues, a properly obturated canal, and, most importantly, a correctly positioned barrier to avert the bleaching agent from leaking into the periapical tissues.⁶

Oxidising agents are used in the coronal part of a NVT for the intra-coronal bleaching. Bleaching a NVT relies on permeability of dentin, enabling the oxidizing agent to directly infiltrate the pigment in dentinal tubules, effectively addressing or mitigating discolouration issues.⁷ The oxidizing agent functions by removing intrinsic stains by degradation of larger components of pigment to smaller components thereby assisting in lightening of shade in a NVT.² Carbamide peroxide and hydrogen peroxide are presently the most widely used bleaching agents for NVT. These agents are employed in high concentrations for NVT, although the mechanism of action is consistent.⁸

CASE REPORT

A 30-year-old male patient presented at the Endodontic department at college of dentistry, Riphah International University, Islamabad, Pakistan. The chief complaint of patient was greyish discolouration of right upper central incisor. He expressed a desire for a treatment that would result in an aesthetically pleasing smile. No systemic illness was found and the patient was not on any kind of medication which can cause discolouration.

Upon clinical examination of tooth #11, a defective post endodontic restoration with recurrent caries was identified. The percussion test was negative. The diagnosis of previously treated tooth with asymptomatic apical periodontitis was made for #11. There was no history of dental trauma.

The patient was explained about the need for endodontic retreatment (ER) and additional management options including bleaching, composite veneer, ceramic veneer and all ceramic crown, with their advantages and disadvantages. He was advised that the procedure of bleaching may or may not produce the anticipated outcome. However, he opted for bleaching considering the conservative nature of the treatment. A treatment plan of non-surgical retreatment followed by bleaching was made. Patient's signature on the informed consent was taken before treatment was initiated.



Figure No.1; (A) Preoperative radiograph of tooth #11 (B) Successful re-treatment of tooth #11. (C) Preoperative photograph of #11 with black discoloration in the cervical third area (D) Post walking bleaching treatment photograph of #11 depicting a harmonious colour shade.

At the first clinical session the photograph of the tooth #11 was taken. Subsequently, after rubber dam isolation, ER was performed on #11. During the second clinical session, a shade guide was used to evaluate the shade of #11 using a vita porcelain shade guide under normal daylight conditions. It showed severe discoloration in the cervical third area of #11. Thereafter, after rubber dam isolation 2 mm of gutta-

percha was removed from the coronal portion of the root below the CEJ using a round bur. The prepared coronal portion of the root was sealed with a glass ionomer cement (GIC) base having a thickness of 2 mm. It was packed over the gutta-percha. Thus, a barrier between the sealed canal and the bleaching material was made. Next, the pulp chamber was etched using 37% phosphoric acid, followed by thorough washing and drying. This etching process was performed to open the dentinal tubules, which, in turn, enhanced the penetration and effectiveness of the bleaching agent.

For the bleaching protocol, walking bleach technique was employed. The bleaching agent used was a combination of sodium perborate and 20% hydrogen peroxide (FGM Dental Products). The paste was packed in the pulp chamber using a plastic instrument and compacted with a wet cotton pellet. This was succeeded by cotton pellet placement in pulp chamber and access cavity sealing with GIC (Vitremer, 3M).

The patient was scheduled for a follow-up after 1 week. In the second clinical session, a desired lightening of tooth #11 was observed. The temporary filling was removed and the bleaching agent was washed from the pulp chamber. This was followed by the placement of calcium hydroxide dressing for 1 week within the pulp chamber and replacement of temporary filling (Cavit). Later, at third visit after 7 days the tooth was restored with composite resin restoration.

DISCUSSION

Tooth discolouration can vary in terms of causes, location and intensity.⁹ Accurately determining the cause of discolouration in NVT is crucial for a exact diagnosis and the implementation of an appropriate bleaching protocol. This case report was linked to the intrinsic discolouration of tooth #11 caused by pulpal remnants and possibly use of various materials during endodontic therapy. An unfavourable prognosis for the tooth bleaching treatment was anticipated in this case due to severity of discolouration and long time elapsed since endodontic treatment was done. This was informed to the patient before beginning the case and informed consent was taken as managing the expectations of the patient at the outset of the treatment is a crucial step.

In situations where discolouration originates intrinsically, the recommended treatment is often bleaching of NVT through intra-canal techniques.^{10,11} In the present case report, walking bleach technique was employed. Our findings are in corroboration with the findings from various other studies.¹²⁻¹⁴ To address the significant severity of tooth discolouration and the requirement for potent products to achieve optimal results, a blend of 20 % hydrogen peroxide and sodium perborate was selected. When sodium perborate is mixed with water, satisfactory results might not be

achieved. Moreover, the use of water with sodium perborate might extend the time required to achieve desired results.¹⁵

Dental bleaching is generally considered a safe procedure, with certain protective measures in place. Firstly, it is imperative to achieve complete isolation of the soft tissues, including the gingiva, tongue, cheeks and lips to shield them from potential burns caused by the hydrogen peroxide. Secondly, there is a consideration for the risk of cervical resorption. Therefore, it is recommended to apply a 1-2mm base of glass ionomer cement over the root filling material.¹⁶ A mechanical barrier is thus created between the sealed canal of NVT and the bleaching material used, aligning with findings from other studies.¹⁷

In order to achieve the desired shade, the pulp chamber is packed with calcium hydroxide for seven days before doing the post endodontic restoration. This is a critical step as it facilitates the elimination of residual oxygen, which can interfere with the polymerization of the post endodontic restoration. Additionally, it helps minimize the risk of cervical root resorption by shifting the pH to an alkaline state.¹⁸

This case was followed up for two years and the colour stability was observed. In contemporary dentistry, the effective and satisfactory seal offered by adhesive systems combined with composites plays a crucial role in preventing the migration of pigments and bacteria into the pulp chamber. This factor may contribute to justifying the colour stability observed. This aligns with Abbott's findings in 2009, who noted that all teeth exhibiting colour regression in their study also had unsatisfactory restorations.¹⁹ Despite this, the precise mechanism causing lightening of shade in NVT is not completely comprehended, and if a recurrence takes place, a new treatment plan of bleaching can be discussed with the patient.²⁰

The outcomes of tooth bleaching frequently lack predictability, and attaining a completely natural tooth colour is not assured. Certain authors propose that teeth discoloured for an extended period may not respond as effectively to internal bleaching as those with a shorter discolouration duration.²¹ This discrepancy could potentially be attributed to the limited number of reported cases, variations in bleaching techniques, and/or disparities in the quality of final restorations for long-term discoloured teeth.

The success of the technique applied in this clinical case highlights aspects that warrant additional investigation. Future studies should document the clinical cases that detail the successful outcome of long standing NVT.

CONCLUSION

The current case report illustrates the efficacy of NVT bleaching utilizing carbamide peroxide and hydrogen peroxide to achieve a predictable esthetic outcome.

Over a two-year follow-up period, there was no evidence of discoloration relapse or cervical root resorption. Consequently, it can be inferred that the walking bleach technique is a viable and effective treatment option for non-vital, discoloured teeth.

Author's Contribution:

Concept & Design of Study: Muhammad Qasim Javed, Swati Srivastava
 Drafting: Muhammad Qasim Javed, Swati Srivastava
 Data Analysis: Muhammad Qasim Javed, Swati Srivastava
 Revisiting Critically: Muhammad Qasim Javed, Swati Srivastava
 Final Approval of version: Muhammad Qasim Javed, Swati Srivastava

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