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From dull to dazzling: A non-vital tooth bleaching case report

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Abstract
Non-vital tooth bleaching is a popular cosmetic dental procedure aimed at enhancing the aesthetic appeal of discoloured teeth. This abstract examines current knowledge on non-vital bleaching techniques, emphasizing principles, materials, and clinical procedures. The primary objective is to address intrinsic discoloration stemming from pulp necrosis, trauma, or endodontic treatment. Commonly used bleaching agents like hydrogen peroxide and sodium perborate, either alone or combined, aim for satisfactory outcomes. Clinical protocols typically involve applying the bleaching agent within the pulp chamber and sealing it to prevent leakage. The effectiveness hinges on factors such as discoloration severity, patient compliance, and treatment duration. While non-vital tooth bleaching can significantly enhance dental aesthetics, clinicians must carefully manage risks like cervical resorption and tailor treatments to individual patient needs. Further research is needed to explore innovative bleaching techniques and optimize outcomes in non-vital tooth bleaching.

Keywords: Nonvital, bleaching, sodium perborate

Introduction

The appearance and hue of teeth serve as indicators of overall systemic health. Numerous intrinsic and extrinsic factors contribute to tooth color variation. Intrinsic discoloration can result from various sources such as trauma, diminished vitality, endodontic interventions, and dental restorations, alongside recognized local and systemic influences [1]. Extrinsic tooth stains occur due to poor tooth brushing techniques, smoking, dietary intake of tannin-rich foods, excess use of chlorhexidine mouth wash, and/or consumption of metal salts [2].

In instances where patients exhibit concern over a discoloured non-vital anterior tooth with intact structure, the preferred treatment involves endodontic intervention with minimal access cavity preparation followed by intra-coronal bleaching. This approach, characterized by its minimally invasive nature, contrasts with alternatives such as full ceramic crowns, ceramic fused to metal crowns, or veneers, which necessitate more extensive removal of tooth structure, leading to irreversible damage and increased cost [3].

Intra-coronal bleaching is efficient and safe but carries a risk of cervical root resorption, potentially influenced by factors like prior trauma, patient age, and high H_2O_2 concentrations with heating. Success depends on accurate diagnosis, meticulous execution, and careful case selection. Tooth and surrounding tissue health, along with a properly positioned barrier, are crucial for preventing bleaching agent leakage into periapical tissues [4, 5].

Case report

A 28 year-old male patient presented with a complaint of discoloration in his upper right central incisor. He had a history of trauma to the tooth 8 years ago and reported no significant medical issues or allergies. The treatment plan discussed with the patient involved root canal treatment followed by bleaching to treat the discoloration. Written consent was obtained from the patient after providing detailed information about the procedure. Preoperative photographs and radiographs were taken. The discoloured tooth's shade was evaluated with a Vita shade guide under normal daylight conditions. A traditional endodontic procedure was performed, followed by bleaching using Sodium perborate powder. Local anaesthesia was administered. The procedure was carried out under rubber dam isolation. Endodontic access cavity was prepared and working length was established using a 15K file and biomechanical preparation was done with ptotaper rotary files upto F3. Calcium hydroxide intracanal medicament was placed in the canal for a week. After a week, obturation was done using AH plus sealer and F3 cone and after sealing it properly a glass ionomer cement (GIC) base was placed over it to create a barrier. Than at the next visit, the gutta-percha was carefully reduced by 2mm below the CEJ. Subsequently, a 1mm layer of GIC was meticulously placed as a protective barrier. Sodium perborate, mixed with saline, was then applied over the dentinal walls, followed by the placement of a cotton pellet and Cavit for temporary sealing.

During the subsequent visit, conducted after a week's interval, noticeable changes in tooth color were observed, particularly with light spots on the facial aspect. Removal of temporary restorative material was done followed by re-application of Sodium perborate and sealing with a cotton pellet and Cavit to maintain temporary restoration. After a week, sodium perborate was removed and the chamber was irrigated with normal saline and dried properly and calcium hydroxide was placed in chamber for a week. After a week calcium hydroxide was removed and then composite restoration was done. There was improvement in the shade of the tooth. The shade was re-assessed with vita shade guide. Postoperative photographs were taken.

Fig 1: Pre-Operative Photograph

Fig 2: Post-Operative Photograph

Discussion

In modern dentistry, restoring dental aesthetics is a primary objective, driving ongoing advancements in materials and treatment techniques. Among these, dental bleaching stands out as a conservative approach compared to options like laminate veneers and full crowns. It operates on the principle of hydrogen peroxide penetrating the tooth and producing free radicals that oxidize organic stains [6]. Dental bleaching is generally considered safe, provided adequate protection measures are taken, including isolation of soft tissues like gingiva, lips, tongue, and cheeks to prevent potential burns from peroxide exposure [7].

It's essential to mitigate the risk of cervical resorption by placing a 1-2mm layer of glass ionomer cement over the root filling material, creating a mechanical barrier between the sealed root canal and the bleaching agent, as observed in previous research [8]. Additionally, achieving the desired shade guide entails obturating the pulp chamber with calcium hydroxide for seven days before applying the final filling material. This step eliminates residual oxygen, which can hinder polymerization, and alkalizes the medium, reducing the risk of cervical resorption [9].

Variations in outcomes may arise depending on the bleaching material used and the number of treatment sessions required. Studies by Amato *et al* and Feiglin *et al* utilized a combination of sodium perborate and hydrogen peroxide with heat to enhance bleaching effectiveness, contrasting with our study's sole use of sodium perborate.[10] The occurrence of cervical root resorption in reported cases is linked to high concentrations of bleaching agents combined with heat exposure. Treatment visits are typically limited to four or fewer to mitigate the risk of resorption. Dental bleaching is increasingly valued for its minimally invasive nature and ability to deliver satisfactory aesthetic outcomes. Multiple studies affirm the success of office-based whitening procedures.

Conclusion

In summary, non-vital tooth bleaching offers a promising avenue for enhancing dental aesthetics, yet requires careful consideration to mitigate risks such as cervical root resorption, especially with high-concentration bleaching agents and thermal application. Despite these considerations, it remains a valuable and safe procedure in contemporary dentistry, providing effective solutions for patients seeking to address tooth discoloration.

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