Inside-Outside bleaching of discolored non-vital teeth
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Abstract
Tooth discoloration has a multifactorial etiology as a result of complex physiochemical interaction between chromogens and tooth substance. This article reports the management discoloration of non-vital tooth using the inside-outside bleaching technique.

Keywords: Carbamide Peroxide; Bleaching; Discoloration; Inside-Outside Technique; Non–Vital Teeth

Introduction
Cosmetic dentistry is a very important part of today’s restorative dental practice. The last three decades have witnessed immense changes in dentistry beginning with the professions dramatic and unprecedented success in caries reduction and aesthetic enhancement. Besides invasive therapies such as crowning or placement of veneers, the whitening of teeth is a relatively noninvasive alternative therapeutic method to treat anterior tooth aesthetic impairment. This article focuses on bleaching non vital teeth with an open pulp chamber during bleaching using 10% carbamide peroxide gel.

Case Reports

Case 1: A 35 year old male reported to the Department of Conservative dentistry and Endodontics with discolored maxillary central incisors for an improvement in esthetic appearance. The patient presented a history of trauma 10 years ago and had undergone root canal treatment approximately 3 years ago. Radiographs were taken to verify the adequacy of root canal treatment and the treatment protocol decided was inside/outside bleaching using a 10% carbamide peroxide gel. Patient was familiarized with the possible causes of discoloration, the procedure to be followed, the expected outcome and the possibility of future re-discoloration. Clinical photographs were taken and thorough oral prophylaxis was done (Figure 1).

The fabrication of a study model was done from an alginate impression. A light cured composite material was placed on the model of the teeth to be treated. This allows a reservoir to be created in a vacuum processed plastic mouth guard, whose thickness usually varies between 0.020 and 0.035 inches. The mouth guard was trimmed to the cervical margins on the labial and lingual portions (Figure 2). Excess gutta percha was removed from the access cavities. The height of clinical crown was measured with a periodontal probe and it was made sure that gutta percha is removed approximately 2mm below this level. Light cured glass ionomer barrier of 2mm was placed over gutta percha and cured using an LED light curing unit. This barrier helps in preventing the diffusion of bleaching agent through the tooth to the periodontal ligament and the periapical region.

The patient was instructed to inject the 10% carbamide peroxide gel into the coronal orifices and the mouthguard. After insertion of the mouthguard; any excess bleaching gel can be removed from around the margins with a toothbrush. The patient was instructed to sleep with the bleaching gel and mouthguard in place (Figure 3). At the end of daily treatment, the patient was told to rinse his mouth thoroughly and place a small cotton pellet in each of the coronal orifices to prevent food from getting into the opening.

A no. 17 dental explorer was given to the patient to aid in removing the cotton pellet before next treatment. The patient was followed up after one week. A complete metamorphosis of the discolored teeth was evident and the present color was comparable to that of adjacent teeth (Figure 4). The pulp chambers were flushed generously with water to remove the bleaching agent and were obturated with calcium hydroxide and water paste. Coronal access cavities were sealed with resin composite. Recall revaluation was done after six months and no significant shade regression was observed.

Figure 1. Pre-operative, Figure 2. Splint, Figure 3. Splint in position, Figure 4. Final photograph.
Case 2: A 25 year old male reported to the Department with the chief complain of missing maxillary central incisor and unsightly discoloration of adjacent left central incisor following trauma (Figure 5). Root canal treatment was performed in the tooth no. 21 after vitality testing. To improve the esthetic outcome, the tooth no. 21 was bleached using the inside/outside bleaching technique. The clinical protocol followed was similar to that described in case 1. After 5 consecutive nights time applications of bleaching agent, a significant shade improvement was achieved (Figure 6).

Discussion
Tooth color is determined by a combination of phenomena associated with optical properties of tooth structure and light. Intrinsic color is determined by the optical properties of enamel and dentin. Extrinsic color depends on material absorption on enamel surface.(4) Treatment modalities for discolored teeth includes removal of surface stains, micro abrasions, bleaching, veneering and placement of porcelain crowns.(5) Bleaching is the simplest, least invasive, least expensive means available to lighten discolored teeth and diminish and eliminate many stains in both vital and non vital teeth.(6) Intra coronal bleaching of non-vital teeth involves the use of chemical agents within the coronal portion of endodontically treated teeth to remove tooth discoloration.(4) Commonly used bleaching agents are carbamide peroxide. Hydrogen peroxide and sodium hydroxide and non- hydrogen peroxide containing materials i.e. sodium perborate.(7)

Benefits of inside/outside bleaching technique are more surface area is available both internally and externally for bleach to penetrate, as a lower concentration of bleaching agent (10% carbamide peroxide) with neutral pH will minimize the risk of external cervical root resorption and gingival irritation, the need to change the access cavity dressing is eliminated as the access cavity is left open, treatment time is reduced to days rather than weeks. Repeated replenishment at home allows a comfortable treatment and need for multiple office visits is eliminated, patient can discontinue bleaching once the desired color has been achieved, so chances of over bleaching are reduced and no heat is required to activate bleaching material further reducing risk of external cervical resorption.(8-10)

Conclusion
In conclusion the two cases, showed that the inside/outside bleaching technique using 10% carbamide peroxide was effective in bleaching discolored, non-vital teeth within 7 days.

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