

Treatment of Discolored Non-Vital Endodontically Treated Teeth : A Case Report

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Abstract

Internal bleaching technique is a common treatment option for discolored non-vital anterior teeth, but it is not advisable for cases with internal cervical resorption. Therefore, other conservative bleaching techniques, such as external bleaching, may be proper treatment options in this situation. Among bleaching techniques,

The walking bleach technique with sodium perborate and distilled water stands out because of its superior esthetic results with no side effects. Remaining discoloration should be covered by restorative options. The best choice for conservative restorations is ceramic laminate because of color stability, biocompatibility and durable esthetics. This clinical report presents the treatment of two discolored non-vital maxillary central incisors in a 18-year-old girl. A step-by-step practice is proposed for bleaching and restorative treatments of these discolored teeth are described.

Key words: Discoloration; Walking bleach; Non-vital tooth; Sodium perborate.

Introduction

Nowadays esthetics is considered as essential as function.(1) Patients' esthetic expectations have expanded notably in the last decade. The appearance of dentition is of concern to many people seeking dental treatments and the color of teeth is of particular esthetic value.(2) Importantly, the accurate diagnosis of the cause of discoloration is a condition with multifactorial etiology; it is classified as extrinsic and intrinsic and can occur due to a number of metabolic diseases, systemic conditions and local factors such as injuries. These factors affect the developing dentition and change the color of the teeth.(2-4) Trauma to one or more permanent anterior teeth is the common cause of discoloration in young patients with trauma. Discoloration of teeth may be due to post-traumatic pulp hemorrhage and intermittently physiologic retraction of the coronal and radicular extensions of pulp by apposition of secondary dentin.(5) Maxillary permanent incisors are the most frequently injured teeth.(6,7) The cause of slightly more frequent seeking of dental treatment after injury is due to esthetic than symptom.(8) Two treatment options currently exist for discoloration: (i)

ultraconservative chemical bleaching (office, home or walking belching techniques);(5) (ii) complete coverage restoration (resin composite or porcelain). However, prevention of avoidable causes of tooth staining, which leads to tooth discoloration by practitioner and patient, should be considered.(3,4) Internal bleaching procedures such as the "walking bleach" technique can be used for whitening of discolored root-filled teeth, which is simple and time-saving method with superior esthetic results and safety. This technique is performed by application of a paste consisting of sodium perborate and distilled water or 30% hydrogen peroxide (H₂O₂) respectively, in the pulp chamber (1). This mixture releases H₂O₂ which is able to react with the staining substances. The first description of the walking bleach technique with a mixture of sodium perborate and distilled water was mentioned in a congress report by Marsh and published by Salvas (2). Nutting and Poe (3), advocated the use of 30% H₂O₂ instead of water. The present article reports the successful bleaching of discolored non-vital, endodontically treated tooth using walking bleach technique with good prognosis and no side effects.



Fig 1. Pre-treatment photograph of maxillary central incisors showing discoloration due to necrotic pulp caused by trauma

Fig 2. Periapical radiograph of maxillary central incisors

Case Report

A 18-year-old female patient, in good general health, with discoloration of two of her maxillary central incisors was presented to our Postgraduate Operative Department. Discoloration was the chief complaint of the patient. Intraoral examination revealed Ellis class IV fracture in relation to both maxillary central incisors, which was discolored. Upon reviewing the dental history, it was noted that the same teeth had been traumatized 2 years previously. She had not received any treatment during this period. A treatment plan of endodontic therapy, walking bleach followed by restorative treatments of these two teeth was planned.

Technique

Nonsurgical endodontic treatment was performed before bleaching. In the next visit access cavity opened and approximately 3 mm

of guttapercha filling was removed from the access cavity till cervical third of the crown using gates glidden drill (Fig.2a). The cavity was irrigated with 1% orthophosphoric acid to remove smear layer, debris. A plug of a resin-modified glass ionomer (Vitremar, 3M ESPE) was placed on top of the gutta-percha filling to prevent percolation of bleaching agent into the cervical and apical region. A mixture of sodium perborate and distilled water (Fig.2b) was placed inside the cavity and restored with composite. Patient recalled every 7 days once, for changing bleaching agent. After 3 visits there was a drastic change in the tooth color with satisfactory results. The fractured incisal edge was restored with composite (Restorative Z 100, 3M). Patient was followed regularly to check the occurrence of external cervical resorption and color stability.

After 6 months follow up esthetic result remained satisfactory With no reversal of discoloration (Fig. 3a) and radiograph showed absence of external cervical resorption in relation to the bleached tooth (Fig. 3b).

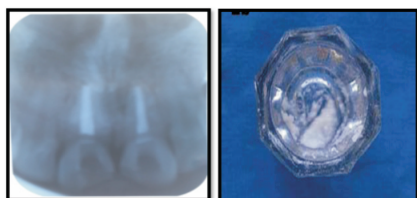


Fig 3. Radiograph showing 3mm gutta percha removal after root canal treatment.

Fig 4. Mixture of sodium perborate and distilled water



Fig 4 Clinical view of central incisors after home bleaching technique



BEFORE

AFTER THE RESTORATIVE TREATMENT

Discussion

When the bleaching agent is applied inside the pulp chamber and sealed, the bleaching occurs between dental appointments via the walking bleach technique. This technique traditionally has been used to treat discolored non-vital teeth. The other bleaching options involve the thermocatalytic technique and in-office external bleaching technique using high concentrated hydrogen peroxide and carbamide peroxide gel (1). It is not advisable to use the thermocatalytic method with heating of a 30% H₂O₂ solution, as this procedure increases the risk of external cervical resorption which is a serious complication (4-6). For the same reason, 30% H₂O₂ should not be used for the

walking bleach technique. External cervical resorption is mostly asymptomatic and is usually detected only through routine radiographs. However, sometimes swelling of the papilla or percussion sensitivity of bleached teeth can be observed. One month after bleaching, no changes in the tooth substance could be detected. It is also caused by lack of cervical seal. Because H₂O₂ can diffuse through dentinal tubules as far as the cervical periodontal ligament, altering these structures and generating inflammatory root resorption (7,8). It has been proved that formation using either 30% H₂O₂ alone or in combination with sodium perborate are more toxic for periodontal ligament cells as compared to a perborate-water suspension, presumed that application of bleaching agents led to denaturation of dentine in the cervical region of tooth (6,8,9). Patients who had bleaching therapy at a young age often have external resorption. A possible explanation is that H₂O₂ can more easily penetrate into the periodontium because of wide open dentinal tubules in young teeth. Increased permeability of dentin is associated with both decreased dentine thickness and high surrounding temperature (10). Application of heat (thermocatalytic method) leads to widening of dentinal tubules and facilitates diffusion of molecules into the dentin. This explains the increasing dissemination of H₂O₂ into dentin with an increase in temperature. Moreover, application of heat resulted in generation of hydroxyl radicals from H₂O₂ that are extremely reactive and have been shown to degrade components of connective tissue (7). As a consequence, today the thermocatalytic technique is used less especially in young children because of the high risk of external root resorption. Thus walking bleach technique is the ultimate treatment of choice in children with discolored non-vital tooth. There is a paucity of evidence based literature that shows the prognosis of bleached non-vital teeth. According to Howell (11), walking bleach techniques have an immediate success rate of 89.5%. However, there is a possibility of recurring discoloration, which means that the initial results cannot be considered permanent. Several authors have evaluated the incidence of color regression one to six years after internal bleaching and reported different percentages of darkening (8, 11, 12). While Holmstrup et al (12) and Brown (13) both reported a success rate of 75% or more after one to five years. In the present case we found more than 90% success rate without change in the colour and with no pericapical changes in the tooth. Feiglin (8) reported a success rate of only 45% after six years. It seems that the more difficult it becomes to obtain a satisfactory result, the more likely the chance for reversal. Some authors have suggested that teeth that have been discolored for several years do not respond as well to bleaching as teeth that are stained for a short period of time (11, 13). Brown (13) reported that trauma or necrosis-induced discoloration can be

successfully bleached in about 95% of the cases, compared with lower percentages for teeth discolored as a result of medicaments or restorations. Some studies (14, 15) have reported that stained teeth in young patients are easier to bleach than discoloration in older patients, presumably because the wide open dentinal tubules in young teeth enable a better diffusion of the bleaching agent. This paper provides information to every dentist, based on the case presented that, the walking bleach technique can lead to successful whitening of non-vital root filled teeth without the risks of side-effects. Because the clinical results of other techniques have many disadvantages, the walking bleach technique, which is easy to perform, consumes the least time, relatively inexpensive and requires no special equipment, is the ultimate method of choice. It can be concluded from this case report that walking bleach technique is an important and valuable tool for discolored non-vital endodontically treated permanent teeth.

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