

Non Vital Bleaching – A Non Invasive Post Endodontic Treatment Option: A Case Report

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ABSTRACT

The dental practitioner is provided with a variety of post endodontic treatment options which range from invasive methods like full veneer crowns to least invasive and aesthetic procedures like bleaching. The most important parameter in non-vital bleaching is the placement of a barrier to prevent the resorption of the tooth which has a poor prognosis. The aim of this paper was to report a case of successful non-vital bleaching by using mineral trioxide aggregate (MTA) as a barrier, with follow up reports of two years. This article describes a one year follow up of a case of non vital bleaching which was performed on a root canal treated, discoloured,

maxillary central incisor. By using mineral trioxide aggregate as a barrier, a mixture of sodium perborate and distilled water was used as the bleaching agent. The follow up visits showed significant improvement in the shade of the bleached teeth even after 24 months, with no evidence of resorption. This is the first paper to report on the use of MTA as a barrier for non-vital bleaching. The placement of a proper bleach barrier is the most important factor for successful intracoronal bleaching. Non vital bleaching can be considered as a safe, effective and non invasive treatment option in the management of endodontically treated, discoloured teeth.

Key Words: walking bleach, mineral trioxide aggregate, bleach barrier, external resorption

INTRODUCTION

The discolouration of pulpless teeth could be a result of an aetiological factor (trauma) or the endodontic procedure itself. A haemorrhage in the pulp chamber may result from either a blow, death of the pulp or a failure in controlling the bleeding during endodontic therapy. The penetration of blood into the dentinal tubules, followed by haemolysis of the red cells, which results in the release of haemoglobin and its breakdown products, produces a yellowish brown discolouration. This discolouration occurs when the iron pigments get degraded to iron sulfide. Such a discolouration may appear some months after the endodontic treatment is completed and it is similar to haemorrhagic discolouration [1, 2].

The failure of the operator to remove blood or other organic material completely from the pulp chamber during the treatment appears to be the most important and common reason for this post endodontic discolouration [1]. Inadequate access to the cavity preparation results in the presence of shelves of dentin which make it difficult to remove the debris from the pulp horns and the lingual area of the pulp chamber. Therefore, adequate access for the complete debridement of the pulp chamber is essential. Medication and sealing pastes must be removed from the coronal pulp space subsequent to the completion of the root canal therapy. Many of these agents contain silver, which, if left in the crown, will cause discolouration [2]. One material which has been used extensively in the past, for the restoration of lingual access cavities, subsequent to the root canal treatment, is silver amalgam. This material causes a grayish discolouration of the tooth, probably as a result of the penetration of the sulfidized by products of the corrosion process into the dentin tubules. The use of resin materials without the acid-etch technique, usually results in a marginal percolation, with the eventual internal staining of the crown.

Extensively discoloured, non vital teeth are highly receptive to the bleaching techniques. But the clinical situation must be carefully assessed before the bleaching treatment is considered. The quality and the type of the root canal filling that has been employed are of primary importance in this regards. Proper apical sealing is necessary to prevent percolation of the bleaching agents into the periodical tissues. A pretreatment is indicated in the cases where the root canal filling is inadequate or where it is improperly condensed. Also, the crown should be relatively intact, since a crown with large carious lesions or restorations can be better treated by means of a cast post and core, together with full coverage [3-5].

The dental practitioner is provided with a variety of post endodontic treatment options which range from invasive methods like full veneer crowns to least invasive procedures like bleaching [4]. Though non-vital bleaching has been widely mentioned in the literature as an option in the post endodontic management, an extensive review of the literature surprisingly showed us that there were very scanty case reports and follow up reports on non- vital bleaching. The main reason for this fear of cervical resorption following non-vital bleaching is that adequate precautions are not taken during the procedure. This article is aimed towards filling that void by presenting a case of non vital bleaching and its follow up.

CASE REPORT

A 24-year old male patient reported to the Department of Conservative Dentistry and Endodontics of the University with complaints of the discoloured and unaesthetic appearance of his upper tooth. Clinical and radiographic examinations were carried out [Table/Fig-1 and 2]. A diagnosis of non vital maxillary right central incisor was made, based on the vitality testing which was performed by using an electric pulp tester (Parkell Digitest Digital



[Table/Fig-1]: Pre-operative image of patient's tooth.



[Table/Fig-2]: TP re-operative radiograph of patient's tooth.



[Table/Fig-3]: Radiographic image after root canal treatment and placement of barrier



[Table/Fig-4]: Post-operative image after 2 weeks follow-up

pulp tester, Parkell Inc, NY, USA). The endodontic treatment was carried out under a rubber dam. The access cavity was temporarily sealed with Cavit (3M ESPE, St. Paul, MN, USA). The patient was recalled after one week for the bleaching procedure.

In the subsequent visit, the tooth was cleaned with pumice and the shade was noted (VITA shade guide). A rubber dam was applied to ensure the complete isolation of the tooth. The root filling in the coronal pulp chamber was removed to 1 mm below the facial

cemento enamel junction. The procedure was adopted from Wray and Welbury [4]. Following this, a 1 mm thick layer of white MTA (ProRoot MTA, Dentsply Tulsa) was placed over the gutta percha [Table/Fig-3]. The barrier placement was based on Steiner and West's recommendations [6]. A wet cotton pellet was used to condense the MTA. A pellet of cotton was placed in the chamber, it was sealed temporarily with Cavit and the patient was recalled after 24 hours. After 24 hours, the temporary filling and the cotton pellet were removed completely. The chamber was etched with 37 % phosphoric acid (Total Etch, Ivoclar Vivadent, Liechtenstein) for 30 seconds and it was washed and dried. A mixture of sodium perborate (in the tetrahydrate form) (Degussa, Hanau, Germany) and 30 % hydrogen peroxide (in the ratio, 1 g of powder: 0.5 ml of liquid) was made and it was placed in the pulp chamber and condensed with a wet cotton pellet [7]. A piece of dry cotton was placed over this mixture and the access cavity was sealed with modified zinc oxide eugenol cement (IRM, Dentsply). The patient was recalled after 2 weeks for a review.

After 2 weeks, the tooth showed a definitive improvement in the shade, except at the incisal third tooth [Table/Figure-4]. So, the internal bleaching procedure was repeated and the patient was recalled after 1 week. The sodium perborate – water mixture was removed from the pulp chamber and the access cavity was sealed with composite resin (Filtek Z350, 3MESPE, MN, USA). Radiographs were taken to serve as a comparison for the subsequent follow up visits. The patient was asked to report after 12 months and 24 months for reviews. The bleached shade was maintained even 24 months after the bleaching and the radiographs showed no evidence of the cervical resorption.

DISCUSSION

The literature has reported numerous reviews on the bleaching of vital and non vital teeth; yet, there are extremely few published case reports on successful non-vital bleaching. One factor which stops the dental practitioner from performing this procedure in the clinical practice is the fear of invasive cervical resorption, which has been reported to occur in several cases following internal bleaching [8-11]. The "walking bleach" technique that was introduced in 1961 involved the placement of a mixture of sodium perborate and water into the pulp chamber that was sealed off between the patient's visits to the clinician [12]. The method was later modified and water was replaced by 30–35% hydrogen peroxide, to improve the whitening effect [13,14]. Some reports have suggested the use of a mixture of sodium perborate and water because of its decreased potential to cause cervical resorption [10,13,15].

Non vital bleaching has not found much favour amongst the clinicians because of the fear of resorption following the procedure, which has a poor prognosis. But our case report has shown that adhering to the proper barrier placement methods can definitely prevent the development of the resorption. The protective barrier was placed 1 mm below the facial CEJ because it resulted in more acceptable aesthetic results, particularly in the cervical region [6]. However, this procedure exposed more dentinal tubules, leading towards the approximal cervical parts of the periodontal ligament. But the placement of the intra-coronal bleach barrier based on Steiner and West's protocol prevents the extra radicular diffusion of the bleaching agent.

This is the first clinical case report to describe the use of MTA as a barrier material prior to the non-vital bleaching. Several barrier materials and supplementary barriers have been proposed in the

literature. They range from materials like Cavit to Modified Zinc Oxide eugenol (IRM), glass ionomer cement, calcium hydroxide and resin modified glass ionomer cement [11, 14, 15]. But taking into consideration the properties of MTA, like its high alkaline pH, insolubility and reduced moisture permeability, it appears to be a favourable material which can serve as an intracoronal isolating barrier prior to the bleaching [15, 16]. After placing the MTA, the patient was asked to report after 24 hours for the bleaching procedure, as MTA took about 2 hours and 45 minutes to set.

The tetrahydrate form of sodium perborate which was mixed with distilled water was used in this case, because of the decreased leakage of hydrogen peroxide, and hence, a reduced potential risk of invasive cervical resorption was noted with this material [7, 17].

Non vital bleaching has several advantages over other post endodontic treatment options like full veneer crowns. Difficulties in shade matching and achieving the life like appearance and the emergence profile of the natural teeth are the possible drawbacks of the full coverage restorations. In contrast, non vital bleaching is a non invasive procedure and it is also less time consuming and economical. Also, the patient's natural tooth structure is preserved.

CONCLUSION

This case report demonstrates the successful management of a discoloured, endodontically treated tooth by non-vital bleaching. Non vital bleaching can be used as a very effective and safe post-endodontic treatment for discoloured anterior teeth, provided the procedural protocol and precautions are strictly adhered to.

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DECLARATION ON COMPETING INTERESTS:

No competing Interests.

Date of Submission: **Nov 04, 2011**
Date of Peer Review: **Jan 07, 2012**
Date of Acceptance: **Jan 27, 2012**
Date of Publishing: **May 01, 2012,**