



**MANAGEMENT OF DISCOLORED & FRACTURED INCISOR WITH MINIMALLY
INVASIVE APPROACH – CASE REPORT**

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ABSTRACT

Discolouration and fracture, especially when of the front teeth means a significant disturbance of aesthetics and may decrease a patient's self-esteem. Public demand for aesthetic dentistry, including tooth whitening and conservative restoration of fractured tooth, has increased in recent years. Dental bleaching offers a conservative, simplified, and low cost approach to change the color of discoloured teeth. The pigments oxidation is responsible for tooth bleaching and can be carried out with two different products; carbamide peroxide and hydrogen peroxide. This case report presents non-vital bleaching of maxillary central incisor with composite resin buildup of fractured incisal edge with the remarkable change of tooth colour by walking bleaching technique.

KEYWORDS: Non-vital bleaching, Hydrogen peroxide, composite resin.

INTRODUCTION

The discolouration of a tooth could be a result of trauma, intrapulpal hemorrhage, previous restoration or the endodontic procedure itself.^[1] With advancement in the dentistry and Patient concern regarding their esthetics, bleaching procedures had gained popularity. 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 periodontal tissues.^[2] A pretreatment is indicated in the cases where the root canal filling is inadequate or where it is improperly condensed.^[3]

Reports on bleaching discolored nonvital teeth were first described during the middle of the 19th century^[4], advocating different chemical agents.^[5] Initially, chlorinated lime was recommended, followed later by oxalic acid and agents such as chlorine compounds and solutions^[6-8], sodium peroxide^[9], sodium hypochlorite (10), or mixtures consisting of 25% hydrogen peroxide in 75% ether (pyrozone).^[11] An early description (1884) of the use of hydrogen peroxide was reported by Harlan.^[12] Superoxol (30% hydrogen peroxide) had been mentioned by Abbot^[13] in 1918. Prinz^[14] in 1924 recommended using heated solutions consisting of sodium perborate and Superoxol for cleaning the pulp cavity. Some authors proposed using light, heat, or electric currents to accelerate the bleaching reaction by activating the bleaching agent.^[15-17]

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 female patient reported to the Department of Conservative Dentistry and Endodontics of the University with complaints of the discoloured and unaesthetic appearance of her upper tooth. She had undergone one appointment with some general practitioner. Clinical and radiographic examinations were carried out [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 pulp tester, Parkell Inc, NY, USA). The endodontic treatment was carried out under a rubber dam. The access cavity was refined and temporarily sealed with Cavit (3M ESPE, St. Paul, MN, USA). The patient was recalled after one week for the bleaching procedure.

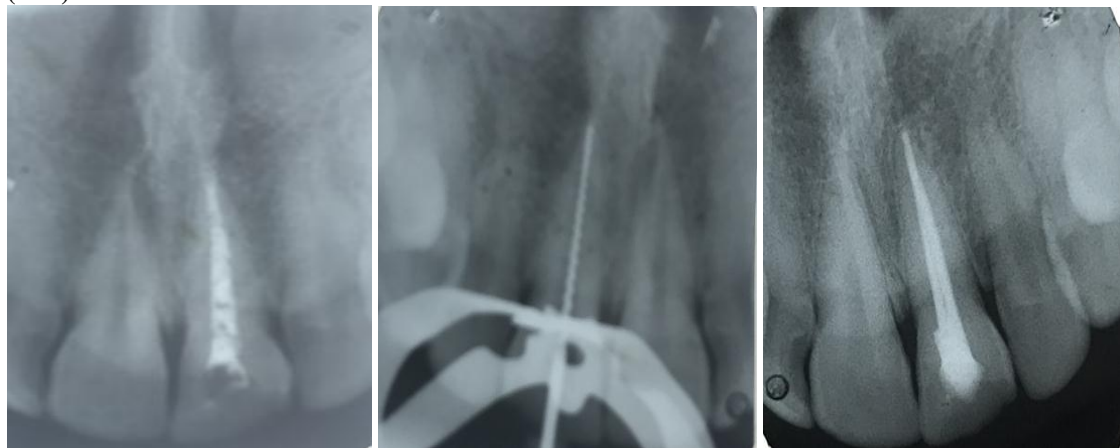
In the subsequent visit, the tooth was cleaned with pumice and the shade was noted. A rubber dam was applied to ensure the complete isolation of the tooth. The root filling in the coronal pulp chamber was removed to

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 GIC was placed over the gutta percha [Table/Fig-3]. The barrier placement was based on Steiner and West's recommendations.^[6] The access cavity was sealed temporarily with Cavit and the patient was recalled after 24 hours. After 24 hours, the temporary filling was removed. 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 [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). The fractured incisal third was restored 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.

Figure (A-E)



A) initial radiograph

B) working length IOPA

C) Post obturation IOPA



D) Initial clinical picture

E) after 1st Appointment



F) final clinical picture.

DISCUSSION

There are two main types of whitening procedures-Non-vital whitening which is done on a tooth that has had root-canal treatment and no longer has a live nerve, vital whitening is performed on teeth that have live nerves. The most common type of vital tooth whitening uses a gel-like whitening solution that is applied directly to the tooth surface.

Bleaching of an endodontically treated teeth that present with chromatic alterations is a conservative alternative to a more invasive esthetic treatment such as placement of crowns or veneers. Most reports present optimal initial results after bleaching, with complete color matching of the bleached tooth (teeth) with the adjacent one(s).^[18] However, occasionally darkening after internal bleaching is a major concern indicating that the treatment is not permanent. Apart from recurrence another factor which stops the dental practitioner from performing this procedure is the fear of invasive cervical resorption, which has been reported to occur in several cases after internal bleaching.^[19] The first 4 reported cases were published by Harrington and Natkin^[20] in 1979. It has been reported that bleaching can increase resin solubility, decrease enamel bond strength, and consequently increase marginal leakage.^[21] Ten percent carbamide peroxide has been reported to adversely affect the physical properties of zinc phosphate and glass-ionomer luting agents.^[22] Finally, bleaching techniques do not bleach synthetic materials; thus, existing restorations might need replacement to improve color matching after successful bleaching.

In-office bleaching can be provided to patients as either a one-visit of 1–1.5 hour treatment or a multiple visit procedure.^[23] One can use one of the light enhanced bleaching techniques, a laser activated bleach or merely a paint-on bleaching gel or solution. For the in-office, light-enhanced systems, usually the light can only be used for bleaching. One light system is based on a plasma arc high-intensity photo polymerization device that can be used for in-office whitening and for resin photo polymerization.^[24] An in vitro study suggests that use of some lights may results in light radiation exposure levels approaching or exceeding safety limits.^[25] There is conflicting evidence on the effects of bleaching lights on tooth color change as most of studies comparing effectiveness of in-office bleaching with or without light application were conducted in vitro.^[26] The effects on tooth color change were variable, and some differences detected digitally were not detectable visually. This observation was reported in a recent clinical study report as well.^[27] Heat and light application may initially increase whitening due to greater dehydration, which reverses with time. Based on the clinical results reported with professional tooth bleaching, it is a viable, aesthetic treatment for the discolored dentition. Its conservative nature and little, if any, risk makes it an important part of an aesthetic dentistry treatment plan. Many patients are now aware that in office bleaching is a procedure that

many dentists offer and is a greatway to get change in the color of their teeth.

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