

# Management of discoloured endodontically treated tooth using walking bleach technique: A Case Report

Ambar W. Raut<sup>1</sup>, Vijay Mantri<sup>2</sup>

<sup>1</sup>Associate Professor, Department of Conservative Dentistry & Endodontics,  
Swargiya Dadasaheb Kalmegh Smruti Dental College & Hospital, Nagpur

<sup>2</sup>Professor, Department of Conservative Dentistry & Endodontics, Modern Dental College & Research Centre, Indore

**Abstract:** Bleaching is an effective conservative method in the management of discoloured teeth. Non-vital or root canal treated teeth may become intrinsically discoloured. Walking bleach technique can be used to whiten such teeth. It involves the placement of mixture sodium perborate and water or hydrogen peroxide in the pulp cavity as bleaching material. This case report describes the management of discoloured endodontically treated tooth using walking bleach technique.

**Keywords:** Tooth discolouration, Bleaching, walking bleach, hydrogen peroxide, sodium perborate.

## INTRODUCTION

With evolution in Aesthetic Dentistry, more and more individuals are becoming aware of various treatment modalities to enhance the aesthetics. The practice of aesthetic dentistry has become an integral part of general dental practice. Every person wishes for a perfect smile without any flaws [1].

One of the commonly encountered concern of the patients for which they seek aesthetic treatment is the discoloured teeth. The teeth may be discoloured either intrinsically or extrinsically. The characteristics of discolouration vary widely with its etiology. Intrinsic discolouration may result from systemic or local factors. The common local causes of intrinsic discolouration of teeth include intra-pulpal haemorrhage, pulpal necrosis, incomplete removal of pulpal remnants during root canal treatment and coronal restorative materials [2].

The most common treatment modality for management of discoloured teeth is the 'bleaching' of teeth. It is the most 'non-invasive' method to modify the tooth colour to an aesthetically pleasing appearance. The various techniques of bleaching comprise of in-office method, dentist supervised home-bleaching, bleaching using over-the-counter products and walking bleach technique/ non-vital bleaching [3].

Trauma to teeth may result in intra-pulpal haemorrhage & subsequently necrosis of pulp, thus necessitating root canal treatment. During root canal treatment, pulpal remnants may not be completely removed & result in subsequent tooth discolouration [4]. In such cases, 'non-vital bleaching', also called as 'walking bleach', is the treatment of choice [5].

Various materials have been used to bring about the lightening of the tooth colour. They include carbamide peroxide, hydrogen peroxide, calcium hypochlorite & sodium perborate [6]. In non-vital bleaching, hydrogen peroxide and sodium perborate are commonly used as bleaching agents, either in combination or independently.

## CASE REPORT

A 17-years old female patient reported to the Department of Conservative Dentistry & Endodontics with a chief complaint of discoloured upper right front tooth from six months. She did not have any pain or discomfort associated with the tooth. She informed that she had suffered from trauma about 1 year back & had severe pain with the same tooth at that time. Root canal treatment was carried out with the affected tooth within a week of trauma incident & restored with a tooth-coloured restorative material. She noticed discoloration in the same tooth about six months back. She informed that the discolouration increased over a period of time. Clinical examination showed a brown to black intrinsic discolouration with maxillary right central incisor (Fig. 1). The coronal tooth structure was intact without any fracture. Tooth coloured coronal restoration was visible on the palatal surface. Intraoral periapical radiograph showed an adequate obturation with 11. There was no periapical radiolucency associated with 11. Patient & her parents were informed about the cause of discolouration and need for treatment by non-vital bleaching. Patient & her parents agreed for the treatment plan. Informed consent was obtained.



**Figure 1 Pre-operative photograph**

Shade of the discoloured tooth was assessed in a daylight using Vita shade guide & pre-treatment clinical photograph was taken. Rubber dam was applied. Coronal restoration was removed using a high-speed handpiece. Coronally, 2 mm of gutta percha below cemento-enamel junction was removed. Coronal cavity was rinsed with water and dried. 2 mm layer of glass ionomer cement was applied in this area to form a 'cervical seal' and allowed to set. After setting of glass ionomer cement, sodium perborate powder was mixed with 3% hydrogen peroxide in 2:1 ratio. The mix was placed in the coronal cavity using amalgam carrier. A cotton pellet was placed over it and the cavity was sealed using a temporary restorative material. Patient was recalled after a week.

At second visit, the shade of the tooth was lighter. Temporary restorative material and bleaching agent was removed. It was rinsed, dried and the bleaching agent was re-applied for another week. At third visit, the shade of the tooth was matching with that of the adjacent tooth and the patient was satisfied with the result of bleaching (Figure 2). Post-treatment shade of the tooth and clinical photograph were recorded. After removal of temporary restoration and bleaching agents, the cavity was filled with calcium hydroxide paste for 2 weeks and temporarily restored. After 2 weeks, the cavity was restored using composite resin.



**Figure 2 Post-bleaching photograph**

## DISCUSSION

Non-vital teeth get discoloured commonly due to internal pulp bleeding induced by traumatic injury to the tooth or diffusion of components of blood into the dentinal tubules during extirpation of pulp. The blood accumulated in the dentinal tubules degrades over time and degradation products (like haemin, haemosiderin and haematin) release iron [4].

Various techniques can be used to treat the non-vital discoloured teeth. Walking bleach is a common technique used to whiten discoloured non-vital or root canal treated teeth, which involves the placement of mixture of sodium perborate and water or hydrogen peroxide in pulp chamber. An external bleaching using carbamide peroxide gel may also be used for bleaching of endodontically treated teeth [7]. Thermo-catalytic technique involves placement of 30-35%  $H_2O_2$  in pulp cavity and heating it using a heated instrument or lamp [8].

Walking bleach technique has proven to be a successful method in management of such cases. Sodium perborate mixture decomposes to release  $H_2O_2$ . Different radicals or ions are generated from  $H_2O_2$ , which have the ability to crack the unsaturated double bonds of long, coloured molecules or reduce the coloured metallic oxides. This results in lightening of tooth colour or 'bleaching effect' [9].

Root canal obturation materials cannot completely prevent the diffusion of bleaching materials from pulp cavity to apical part [10]. Hence, it is necessary to place a 2mm barrier of glass ionomer cement. It should be placed up to the level of epithelial attachment or cemento-enamel junction [11].

The bleaching agent used in walking bleach technique is 'sodium perborate (tetrahydrate)'. It can be mixed with either water or 3% H<sub>2</sub>O<sub>2</sub>. Various studies have evaluated whether sodium perborate mixed with H<sub>2</sub>O<sub>2</sub> is more effective than that mixed with water. Most of the studies have shown that there is no significant difference between them [12, 13]. 3% H<sub>2</sub>O<sub>2</sub> may be preferred to be mixed with sodium perborate in case of severe discolouration.

The commonest complication associated with walking bleach technique is the 'cervical resorption' [14]. It is usually asymptomatic and only detected during routine radiographic examination. Use of 30% H<sub>2</sub>O<sub>2</sub> as a bleaching agent or thermo-catalytic technique involving heating of 30% H<sub>2</sub>O<sub>2</sub> should be avoided as it predisposes the bleached teeth to cervical resorption [15]. A radiograph may be taken at 1 year follow up to rule out the presence of cervical resorption.

## CONCLUSION

Walking bleach technique is an effective method for management of discoloured non-vital or root canal treated teeth.

## REFERENCES

- [1] Meireles SS, Goettens ML, Dantas RV, Bona AD, Santos IS, Demarco FF. Changes in oral health related quality of life after dental bleaching in a double-blind randomized clinical trial. *J Dent* 2014;42:114-21.
- [2] Watts A, Addy M. Tooth discoloration and staining: a review of the literature. *British Dental Journal*. 2001;190(6):309–316.
- [3] Alqahtani MQ. Tooth-bleaching procedures and their controversial effects: A literature review. *Saudi Dent J* 2014;26:33-46.
- [4] Arens D. The role of bleaching in esthetics. *Dent Clin North Am*. 1989 Apr;33(2):319-36.
- [5] MacIsaac AM, Hoen CM. Intracoronal bleaching: Concerns and considerations. *Journal Canadian Dental Association*. 1994;60(1):57–64.
- [6] Nathoo SA. The chemistry and mechanism of extrinsic and intrinsic discoloration. *Journal of the American Dental Association*. 1997;128:6S–10S.
- [7] Frazier KB. Nightguard bleaching to lighten a restored, nonvital discolored tooth. *Compend Contin Educ Dent*. 1998 Aug;19(8):810-3. Erratum in: *Compend Contin Educ Dent* 1998 Sep;19(9):864.
- [8] Boksman L, Jordan RE, Skinner DH. A conservative bleaching treatment for the nonvital discolored tooth. *Compend Contin Educ Dent*. 1984 Jun;5(6):471-5.
- [9] Attin T, Paqué F, Ajam F, Lennon AM. Review of the current status of tooth whitening with the walking bleach technique. *Int Endod J*. 2003 May;36(5):313-29.
- [10] Smith JJ, Cunningham CJ, Montgomery S. Cervical canal leakage after internal bleaching. *J Endod*. 1992 Oct;18(10):476-81.
- [11] Rotstein I, Zyskind D, Lewinstein I, Bamberger N. Effect of different protective base materials on hydrogen peroxide leakage during intracoronal bleaching in vitro. *J Endod*. 1992 Mar;18(3):114-7.
- [12] Rotstein I. In vitro determination and quantification of 30% hydrogen peroxide penetration through dentin and cementum during bleaching. *Oral Surg Oral Med Oral Pathol*. 1991 Nov;72(5):602-6.
- [13] Weiger R, Kuhn A, Löst C. Radicular penetration of hydrogen peroxide during intra-coronal bleaching with various forms of sodium perborate. *Int Endod J*. 1994 Nov;27(6):313-7.
- [14] Friedman S. Internal bleaching: long-term outcomes and complications. *J Am Dent Assoc*. 1997 Apr;128 Suppl:51S-55S.
- [15] Kinomoto Y, Carnes DL Jr, Ebisu S. Cytotoxicity of intracanal bleaching agents on periodontal ligament cells in vitro. *J Endod*. 2001 Sep;27(9):574-7.