

## Bleaching Discolored Devital Teeth with Using Of New Agents

İbrahim Umar DDS<sup>1</sup>, Hakan Kamalak DDS<sup>1</sup>

<sup>1</sup> (İnönü University, Faculty of Dentistry, Department of Restorative Dentistry, Turkey)

---

**Abstract :** *The discoloration of teeth on front part form fundamental aesthetic problems. In order to treat this kinds of teeth, different methods have been used. Yet the most conservatif one is intracoronal bleaching technique. Various agents such as sodium perborate, hydrogen peroxide, carbamide peroxide and sodium perborate have been used as bleaching agent. 30% of hydrogen peroxide has been shown to cause resorption in cervical areas. But nowadays this effect has been proved not to be existed in the newly developed agents. Formula of 40% Hydrogen Peroxide also includes potassium nitrate and flüoride which reduces sensitivity and strengthens enamel and the expected sensitivity in patients has been seen to decrease after bleaching. In this case report, the two patients who had the discolored anterior teeth depending on the endodontic treatment were presented. In line with these findings, 40% of hydrogen peroxide, and sodium perborate were used for the discolored non-vital teeth and by taking the photos of the patient before and after the treatment, they were evaluated objectively.*

**Key Words:** *Devital bleaching, discoloration, 40 % of hydrogen peroxide, sodium perborate.*

---

### I. INTRODUCTION

The first reports on bleaching of devital teeth emerged 19 century and then different chemical agents such as chlorinated lime, oxalic acid, chlorine compounds and solutions, sodium peroxide, sodium hypochlorite, different concentrations of hydrogen peroxide have been suggested over time [1].

In 1924, Prinz pointed out that bleaching can be done by fitting sodium perborate into pulp cavity [2]. Determining the reason of dental discoloration with a complete examination is very important. this has a profound effect on success of treatment. To know the etiology of dental discoloration is important for clinician in planning which treatment to apply [3].

Dental discoloration varies according to internal, external, local and sistemic etiologies [4]. Local intrinsic discoloration may result from pulp necrosis, intra-pulpal hemorrhage, pulp residues remaining after endodontic treatment, endodontic materials, resorption and aging [1].

#### 1.1 THE REASONS OF LOCAL INTRINSIC DISCOLORATION

##### 1.1.1.PULP NECROSIS

Bacterial, mechanical or chemical irritations can cause pulp necrosis. Discoloration occurs due to release of harmful products and their penetration to dentinal tubules. The degree of discoloration is proportional to time in which pulp remains necrotic. Substances causing discoloration are extensively found in the pulp chamber. They are often treated with Intracoronal bleaching [5].

##### 1.1.2.INTRA-PULPAL HEMORRHAGE

Pulp extirpation and severe trauma can cause bleeding in the pulp. Then the blood compounds flow into dentinal tubules causing dental discolorations. Initially, a temporary pink coloration is observed in crown [3]. Then it is followed by the hemolysis of red blood cells. Hemeoglobin resulting from haemolysis of erythrocytes is decomposed and iron (Fe) emerges. The hydrogen sulfide and iron released as a result of necrosis unite and form black iron sulfur compounds. Then the teeth are discoloured because these reactions occur in dentine channels. The color of tooth changes depending on degree of disintegrated hemoglobin [6].

##### 1.1.3. POST ENDODONTIC PULP TISSUE RESIDUE

In similar with intra pulpal hemorrhage, because the whole pulp tissue can not be removed completely after pulp extirpation, the pulp residue and blood can cause dental discoloration. The blood components remaining in pulp cavity slowly infiltrate into the dentinal tubules and it causes discoloration as in hemorrhage. Removing remaining tissue and the intra-coronal bleaching treatment generally result in success.

##### 1.1.4.ENDODONTIC MATERIALS

The filling materials and sealer residues or pads including tetracycline can cause dental discoloration in endodontically treated teeth. These materials are in direct contact with dentin for a long time and causes dental discoloration by flowing into the dental tubules. Although intracoronal bleaching is a preferred treatment, the prognosis depends on the type of materials and contact time [7]. For example, stains caused by metal ions are

removed difficult by bleaching treatment. For this reason, the dentine walls must be cleaned and all the used materials residues must be removed before starting the treatment [5].

### 1.1.5. CRORONAL FILLINGS MATERIALS

The microleakage formed in resin composite causes discoloration in margins and tooth tissues in time. The amalgam which is used as crown filling after endodontic treatment converts the dentine to dark grey due to black metallic compounds. The metal posts used in making of cors bring about dental discoloration due to the metallic ion release and transparent enamel. In such circumstances, the restorations must be removed and afterwars the bleaching must be done.[1]

## II. MATERIALS AND METHODS

Two patients of 18-years-old and 21-years-old consulted to our clinic with the probleme of dental discoloration on front parts (**Fig.1 and 2**). The both patients with discoloration stated that they bothered while speaking. The treatment was started after the patients were given needed information. Different methods are used in Devital bleaching operations. In these patients' treatments, the most commonly used walking bleaching technique was used.

Walking bleaching technique with Sodium perborate, and distilled water mixture was first informed by Marsh and Salvas. This operation was kept in pulp chamber for a few days and the mouth of cavity was covered with a temporary cement [8].

Mixture of sodium perborate and water was taken up again by Spasski and Nutting and Poe advocated that 30% Hydrogen peroxide was needed to be used to increase the bleaching efficiency [9-10].

Nowadays Sodium perborate and water or hydrogen peroxide mixture is used as an efficient technique for intracoronal bleaching [11].



**Fig. 1:** A. Before treatment. B. Old restorations are removed C. And D. cementum enamel border gutta percha was placed on the CIS for walking technique E. Palatal view of the cavity F. And G. After treatment.



**Fig.2:** A. Before treatment B. Cementum enamel border gutta percha was placed on the CIS for walking technique C. After treatment E. Before treatment F. After treatment.

To enhance the bleaching action in our patients, 40% of HP was applied to the labial surfaces of teeth and into the cavities for 10 minutes. Then afterwards, Sodium perborate mixture was fit into cavity. The cavity is suggested to be covered with zinc phosphate cement or glass ionomer cement. The materials used during the treatment of patients has been shown at following **Table 1**.

| MATERIALS                      | PRODUCER FIRM                          | THE PURPOSE OF USE                   |
|--------------------------------|--|--------------------------------------|
| Transparent Matrix Band        | Kerr Hawe Strip,China                  | Proximal Adaptation                  |
| Kama                           | Fixing Wooden Wedges,E.U               | Excellent Filling Without Overflow   |
| The Phosphoric Acid Gel of %37 | Etching Gel, Kerr, USA                 | Roughen the Surface of the Enamel    |
| Bonding ajan                   | Clearfil SE bond, Kuraray, Japan       | Increase Retention                   |
| Composite Resin                | Voco Arabesk Composite Resin, Germany  | More Resistant Aesthetic Restoration |
| The Finishing Discs            | 3M ESPE Sof-Lex,U.S.A                  | Smooth Surface                       |
| The Finishing Fريس (ankansas)  | FG Diamond Bur Composite Finishing Kit | Smooth Surface Form                  |
| % 40 Hidrojen Peroksit         | Opalescence Boost                      | Devital Bleaching                    |
| Sodyum Perborat                | ---                                    | Devital Bleaching                    |

**Table 1:** Materials used during the treatment

### III. DISCUSSION

When pulp cavity is prepared, there are steps that are needed to be considered while applying bleaching agent in servical region. Necrotic pulp cavity residues must be prepared to completely remove remaining restorative materials and root canal materials. Particularly on incisor teeth, the boundaries of cavity must encompass mesial and distal pulp horns. The remaining pulp tissue residues can cause dental discoloration. In addition to mechanical cleaning, to wash the cavity with sodium hypo chloride can provide the removal of tissue residues [5]. Even some researchers stated that with the purpose of a better penetration of the bleaching agent, in order to open dentine tubules, the removal of the smear layer and treatment of cavity with orthophosphoric acid are needed [12, 13]. But the necessity of removing smear layer is still a controversial topic [1]. In addition, to wash the cavity with alcohol before placing the agent is suggested in order to have dehydrate dentine and to reduce surface tension [5].

Root canal filling must be applied to 1-2 mm bottom of the cementum enamel junction or must be reduced to that level [1]. The canal filling can be insufficient in the prevention of the diffusion of bleaching agent towards coronal-apical foramen. Therefore, it is necessary to do cervical obturation [14, 15]. Usually hydraulic fill materials and various cavity floor material such as glass ionomer cement have been proposed for obturation [16, 17]. While the final restoration is done, obturation materials used temporarily must be removed [18].

Sodium perborate is mixed at a ratio of 1/2 (g / ml) with distilled water [19]. The mixture is placed in the cavity with amalgam bearers. It must be changed to do after 3-7 days.

2-4 sessions may be needed depending on the intensity of the discoloration [10]. Patients should be warned against the risk of over-bleaching and should be advised to check their teeth on a daily basis [5].

Bleaching agent before being applied to the cavity, 37% orthophosphoric acid should be applied to the enamel margins and must be covered with a temporary adhesive filling material. Adhesive filling material is better to prevent the leakage of bleaching agent into oral cavity than the other temporary filling materials. A good sealer can prevent other debris transition into the cavity. And it doesn't cause to reduce the agent efficiency and the discoloration to re-exist [20].

### IV. Conclusion

Doing the whitening treatment correctly depends upon the cause of discoloration to be researched well and the region where the discoloration agent is applied and the frequency of treatment. The type of bleaching agent and the techniques applied by physicians influence prognosis. Some cases in which successful results were obtained have shown that discoloration can repeat itself after a few months. A significant reason for this has not been found. By mixing freshly prepared sodium perborate powder with distilled water and by applying the 40% hydrogen peroxide according to the manufacturer's instructions, adequate bleaching can be achieved. The newly released 40% Hydrogen Peroxide Formula also includes potassium nitrate and fluoride which reduces the sensitivity and strengthens enamel and the expected reduction of sensitivity in patients has been observed after the bleaching.

### REFERENCES

- [1] Plotino, G., et al., Nonvital tooth bleaching: a review of the literature and clinical procedures. *J Endod.*, 18(2), 2008, 394-407.
- [2] Prinz, H., Recent improvements in tooth bleaching. *A clinical syllabus. Dental Cosmos*, 1924,558-600.
- [3] Watts, A. and M. Addy, Tooth discoloration and staining: a review of the literature. *Br Dent J*, 190(6), 2001, 309-316.
- [4] Hattab, F.N., M.A. Qudeimat, and H.S. al-Rimawi, Dental discoloration: an overview. *J Esthet Dent*, 11(6), 1999,291-310.
- [5] Attin, T., et al., Review of the current status of tooth whitening with the walking bleach technique. *Int Endod J*, 36(5),2003, 313-29.
- [6] Goldstein, R.E. and D.A. Garber, *Complete dental bleaching*. Berlin: Quintessence, 1995.
- [7] van der Burgt, T.P. and A.J. Plasschaert, Bleaching of tooth discoloration caused by endodontic sealers. *J Endod*, 12(6), 1986,231-234.
- [8] Salvias, C.J., Perborate as a bleaching agent. *J Am Dent Assoc* ; 1938, 324.

- [9] Spasser, H.F., A simple bleaching technique using sodium perborate. N Y State Dentl J, 27, 1961,332– 334.
- [10] Nutting, E.B., Poe, G.S. , A new combination for bleaching teeth. J South Californian Dent Assoc ;31, 1963, 289.
- [11] Boksmann L, J.R., Skinner DH. , Non-vital bleaching internal and external. Aust Dent J ,28,1983, 149 –152.
- [12] Casey, L.J., et al., The use of dentinal etching with endodontic bleaching procedures. J Endod, 15(11), 1989, 535-538.
- [13] Horn, D.J., M.L. Hicks, and J. Bulan-Brady, Effect of smear layer removal on bleaching of human teeth in vitro. J Endod, 24(12),1998, 791-795.
- [14] Costas, F.L. and M. Wong, Intracoronar isolating barriers: effect of location on root leakage and effectiveness of bleaching agents. J Endod, 17(8),1991, 365-368.
- [15] Smith, J.J., C.J. Cunningham, and S. Montgomery, Cervical canal leakage after internal bleaching. J Endod, 18(10), 1992, 476-481.
- [16] McInerney, S.T. and R. Zillich, Evaluation of internal sealing ability of three materials. J Endod., 18(8), 1992, 376-378.
- [17] Hansen-Bayless, J. and R. Davis, Sealing ability of two intermediate restorative materials in bleached teeth. Am J Dent, 5(3), 1992, 151-154.
- [18] Rotstein, I., et al., Effect of different protective base materials on hydrogen peroxide leakage during intracoronar bleaching in vitro. J Endod, 18(3), 1992, 114-117.
- [19] Holmstrup, G., A.M. Palm, and H. Lambjerg-Hansen, Bleaching of discoloured root-filled teeth. Endod Dent Traumatol, 4(5), 1988,197-201.
- [20] Waite, R.M., D.L. Carnes, Jr., and W.A. Walker, 3rd, Microleakage of TERM used with sodium perborate/water and sodium perborate/superoxol in the "walking bleach" technique. J Endod, 24(10), 1998,648-650.