Case Report

Report of Two Cases using Vital Tooth Bleaching on Fluorosed Teeth

Saha P, Sawhny A, Paul S, Raina A

Abstract: Discoloration of tooth is a common esthetic problem caused by either intrinsic or extrinsic factor. The normal color of such a tooth can be restored by decolorizing the stain with a powerful oxidizing agent such as 35% hydrogen peroxide which is directly placed on the labial surfaces of the tooth to be treated. The bleaching agent is commercially available in the form of a gel. This process involves the application of light to activate the bleaching agent. Effective results were obtained when the process of bleaching was correctively performed on the patient. In today's world of immediate gratification, in-office bleaching is one of the most requested procedures in many dental offices, a great way to get a fast and immediate change in the color of their teeth. This article throws a light on how we have achieved normal tooth colour by using 35% Hydrogen peroxide in the following case series.

Key words: Bleaching agents; Dental; Dentin desensitizing agents; Fluorosis; Hydrogen peroxide.

INTRODUCTION

The demand for esthetic dentistry has increased continuously and the smile has become an integral part of social attractiveness of a person.[1] Tooth discolouration of is a common esthetic problem caused by either intrinsic or extrinsic factor. Bleaching is the most conservative treatment option when compared to other restorative techniques used to treat the tooth discolouration.[1] There are two main types of bleaching procedures -- non-vital bleaching which is done on a tooth that is root canal treated and no longer has nerve innervations, vital bleaching is performed on teeth that have live nerves.

The most common type of vital tooth whitening uses a gel like whitening solution applied directly to the tooth surface like hydrogen peroxide, sodium perborate, carbamide peroxide followed by a heating up of the gel. Vital bleaching is an in-office procedure which uses high concentration of hydrogen peroxide and often referred to as "one hour bleaching."[2]

Hydrogen peroxide (H_2O_2) is a chemical substance with high oxidative potential. It is highly unstable and they dissociate into water, oxygen and free radicals when they come in contact with the tissues, the latter accounting for the observed bleaching effect due to their ability to oxidize organic pigments. It is known that the diffusion of H_2O_2 through the dentin depends on the concentration of the gel, the period of time that the agent is in contact with the tooth and the thickness of dental structure.[3] Final outcome of bleaching influenced by patient's age original shade of the tooth colour, concentration of bleaching agent, time for which the bleaching agent is exposed to the tooth structure.[4]

Different light sources can be used for in-office bleaching for heating up the gel to accelerate the dissociation of H_2O_2 into oxygen radicals such as halogen lamps, light emitting diode, plasma arc lamps and lasers with different wavelengths.[2] In this case series in-office bleaching was performed using 35% H_2O_2 and light emitting diode as the light source.

CASE REPORTS

Case 1: A 25 year old male reported to the Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Institute with discolored maxillary and mandibular anterior tooth. After clinical examination the case was diagnosed that the discolouration of the tooth in this patient was due to both extrinsic and intrinsic stains. The extrinsic yellowish and reddish stains observed in the patient were due to high consumption of tea and non-smoked chewable tobacco in the form of gutka and the intrinsic brownish discolouration was due to mild to moderate fluorosis according to Dean's fluorosis index (Fig 1). In office bleaching procedure was then explained to the patient. After taking his consent the treatment was performed.

Figure 1: Preoperative treatment (Case 1).

Case 2: A 30 year old male patient reported with the chief complaint of discolored and un-esthetic appearance of anterior teeth in relation to maxillary central and lateral incisor to the Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital Research Institute with discolored. On examination the case was diagnosed as moderate to severe fluorosis according to Dean's fluorosis index (Fig 2). First tooth vitality was carried out by using electronic pulp tester for maxillary and mandibular anterior teeth and all teeth were found to be vital.

Figure 2: Preoperative treatment (Case 2).

The treatment procedure followed in both the patients was same. Radiographic examination was also carried out to check the presence of periapical pathologies. A shade guide (VITA Classical) was used for matching the shade by visual examination and the color shade B1 was chosen for the first patient and shade B2 for the second patient as the best match with patient's natural teeth. Oral prophylaxis and polishing was carried out before starting the bleaching procedure.

For these patients pola-office was chosen. This material contains 35% H_2O_2. All teeth were cleaned with pumice slurry and air dried. After that gingival barrier was applied and light cured for 20 seconds (Fig 3). Later 35% H_2O_2 gel was applied on the labial surfaces of the teeth using a small cotton pellet (Fig 4). Then light source (LED) light source was activated for 30mins. After that the light source was removed and allowed the teeth to cool down for 5mins. Then pumice was used on the teeth to remove residual exposed gel from enamel surface.

Figure 3: Gingival Barrier application (Case 1).

Figure 4: Bleaching agent applied (Case 1).

Thorough irrigation was done and the teeth were dried. Then the teeth were polished with the composite resin polishing cup. Following which it was observed that the discoloration was eliminated (Fig 5 (case 1) & 6 (case 2)). The patients were asked to return in 10 days to evaluate the results (Fig 7). Using standard visual examination and shade guide (VITA Classical) a noticeable shade change occurred. The post operative shades were now an A1 for both the patients. Final polishing of the teeth was performed after the desired shade improvement for both the patients. The patients noticed a marked improvement and were very happy with the final outcome.

Figure 5: Post operative treatment (Case 1).

Figure 6: Post operative treatment (Case 2).

Figure 7: After 10 days recall (Case 1).

DISCUSSION

Before starting the bleaching procedure, proper clinical evaluation and history taking is important to know the etiology responsible for tooth discoloration and the degree of discoloration. Non-vital and traumatic tooth usually looks discolored hence before bleaching procedure electric pulp test should be performed to avoid wrong diagnosis and treatment planning. As both isolation and protection of mucosal tissues are essential we have also followed the same in the above cases. Dentists may also wish to consider prescribing NSAIDs prior to treatment since post operative sensitivity is unpredictable.[5] In-office bleaching may represent a degree of biological damage to the dentin-pulp complex.

There are many factors known to increase sensitivity such as high concentration of H_2O_2, high enamel permeability, prolonged use of bleaching agents, heat during the application of accelerator LED light and differences in the structural morphology of enamel and dentin with pores which facilitate the infiltration of bleaching agent. Sensitivity issues have led some manufacturers to release bleaching gels with lower concentrations of H_2O_2 and desensitizing agent in order to minimize the side effects produced by peroxide radicals.[6] Pola office consists of 35% H_2O_2 and 0.5% dentin desensitizing agent (Potassium nitrate).

Many in-vitro studies have shown that penetration of bleaching into pulp chamber when bleaching agent has exposed to tooth surface for 60mins. Hanks et al concluded that bleaching agent took around 15mins to reach into the pulp chamber. As molecular size and weight of peroxide molecule is very low and has the ability to denature the protein present in dentin, that is why it moves easily through dentinal tubules and reach to the pulp chamber. In-vivo studies show a reverse result of in-vitro studies.[8] In-vivo studies by Cohen and Robertson shows either no or very minimal inflammation of pulp when exposed to 35% H_2O_2.

The protective mechanism of pulp against bleaching agent is by breakdown of peroxide molecule by enzyme peroxidase and catalase. Anderson reported heameoxigenase 1 enzyme is protective enzyme present in endothelial cells and odontoblasts present near the bleached enamel and prevent the diffusion of bleaching molecule into the pulp chamber.[4] Another factor responsible for diffusion of bleaching molecule into the pulp chamber is positive pressure within the pulp chamber and osmotic pressure of the bleaching agent.[9]

Heat and light application may initially increase whitening due to greater dehydration which reverses with time. Actual color change will not be evident until 2-6 weeks after bleaching treatment. The average number of in-office visit for maximum whitening is 3, with a range of 1-6 visits, so the patient should be prepared for additional in-office treatments.[3] Hence 35% H_2O_2 has been preferred in the above cases for better results in the stipulated time.

CONCLUSION: Vital tooth bleaching is an effective, conservative and esthetic treatment modality to change the appearance of teeth. It has gained a lot of popularity among the general public due to its fast and immediate change in teeth color. In today's world of immediate gratification, in-office bleaching is the most requested procedures

in many dental offices. As per newer bleaching material evolution into the field of conservative dentistry, in-office bleaching is safe without any adverse effect on tooth structure when proper concentration of bleaching agents and instructions is to be followed.

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