Esthetic alternative for fluorosis blemishes with the usage of a dual bleaching system based on hydrogen peroxide at 35%

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Esthetic dental procedures in pediatric dentistry represent sources of satisfaction and realization, as much for the patient as for the professional. Lack of dental esthetics may develop psychological problems in infant as well as in adolescent patients. Blemishes produced by fluorosis appear as a challenge to the pediatric dentist and alternatives for treatment are desired. The scope of this present paper is to relate a clinical case with esthetic solution for blemishes in teeth enamel due to fluorosis. A dual system of bleaching was used (photo/chemically activated) based on hydrogen peroxide at 35% (Hi-Lite-Shofu) in a male eight-year-old patient with white fluorosis blemishes on teeth 11 and 21. The bleaching system used was efficient in bleaching teeth with white blemishes due to fluorosis, thus masking the blemishes and providing a more uniform appearance.
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INTRODUCTION

Esthetic dental procedures in pediatric dentistry represent sources of satisfaction and realization, as much for the patient as for the professional. Lack of dental esthetics may develop psychological problems in infant as well as in adolescent patients. Blemishes produced by fluorosis appear as a challenge to the pediatric dentist and alternatives for a treatment are desired.

The quest for esthetics is also a constant presence in pediatric dental clinic. Blemishes produced by fluorosis, chromatic alterations provoked by dental trauma and structural alterations that may affect deciduous or permanent dentition constitute a challenge to the pediatric dentistry. Diagnosis of the nature of the blemish, position and composition are very important in obtaining success in esthetic problems.[9] The successful indication of a product and/or method of dental bleaching depend on the correct diagnosis of the decolorization.[13]

Fluorosis, also known as mottled enamel, is a form of enamel hypoplasia, frequently characterized by moderate to severe color alteration on the surface of enamel. Fluorosis is a result of extended exposition to fluoride during the period of teeth formation.[5] High levels of fluoride cause metabolic alterations in the ameloblasts during enamel formation, resulting in deficient formation and maturation.

Thus, if improper fluoride ingestion occurs during the first year of life, the anomaly will affect the incisors, canines and first molars. Teeth with fluorosis are clinically opaque and with blemishes of various colors (white, yellow, light brown, dark brown and black). In more severe cases enamel surface may present itself with irregularities and typical lines of erosion. Lines and opaque stria, white and narrow, that extend from mesial to distal dental surfaces are also found.[2,5,9] According to McEvoy[9] brown colored blemishes generally occur by the incorporation of external pigments that penetrate the hypoplastic enamel after the eruption of the tooth.

Bleaching techniques are employed to solve some types of esthetic problems. They can be done in the dental office or at home, either on vital or non-vital teeth.

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In these techniques a series of chemical agents are used, among them hydrogen peroxide at 35%, a bleaching agent used in dentistry years for the removal or modification of blemishes associated with fluorosis, tetracycline and traumas.[8] The reaction of the tooth to 35% hydrogen peroxide is based on the liberation of oxidants, which will penetrate enamel and dental tubules and enable dental bleaching.[1] Various application techniques of hydrogen peroxide at 35% have been employed, as with the usage of lamps, heat, lights or laser to enhance the bleaching effect of hydrogen peroxide and to obtain faster results.[10]

Amongst products with a 35% hydrogen peroxide base, Hi-Lite (Shofu Dental) stands out, a photo activated bleaching agent used in the treatment of pathological decolorations of teeth.[7] Said product is composed of hydrogen peroxide at 35%, manganese sulfate as photo activator and iron sulfate as chemical activator. Presented in form of a powder and a liquid, that when mixed result in a gel that changes from a greenish-blue coloration to white when the dual process of activation (photo-chemical) is realized with the use of a halogen light. For Hanosh and Hanosh[4] this bleaching system increases the satisfaction of the patient as results are immediate, shortens care time and allows complete supervision and control by the dentist.

According to Lopes *et al*.[6] this product was considered safe, producing no adverse effects in the micro-nature of the enamel or on the surface morphology. Ernst, Marroquini and Willershauinzonnchen[3] also did not find alteration in surface of teeth where Hi-Lite bleaching agent was used. As stated by Nathanson[11] some patients may show sensitivity and discomfort after bleaching of vital teeth with hydrogen peroxide at 35%, but clinical experience suggests that these episodes are reversible and produce no further damage.

Toh[14] in a study about the effectiveness of bleaching treatment in teeth with discoloration, utilized the photo activated bleaching agent Hi-Lite (Shofu). The coloration changes in teeth involved was monitored by Vita Shade scale and a camera. The author observed changes in coloration of 1/2 to 2 shades lighter after each treatment session. It was necessary for one to three treatment sessions to successfully obtain desired results. The exceptions were on teeth with severe blemishes of tetracycline. Rosenstiel *et al*.[12] sought to measure color changes that occurred in teeth that were submitted to bleaching with hydrogen peroxide at 35% and extracted and compared the change with a control group of teeth. After six sessions of bleaching the color change observed after the first session was significant when compared to the control group, but changes in further sessions were very small, suggesting that very small benefit exists in repeated sessions of bleaching.

The object of this paper is to present a clinical case of esthetic solution for enamel blemishes due to fluorosis by using a bleaching system with a dual activation process (photo/chemical) based in hydrogen peroxide at 35% (Hi-Lite-Shofu).

CASE REPORT

Male, eight-year-old patient directed to the Clinica Odontologica da Fundação Desenvolvimento Tecnologico da Universidade de São Paulo/USP (FUNDECTO), with white blemishes in teeth 11 and 21 (Figure 1). Patient related discomfort and nuisance by the presence of mentioned blemishes, wishing for an aesthetic solution for teeth involved.

In clinical examination blemishes were observed, being very white, irregular and opaque, localized in the incisal third of both teeth. With the blemishes characteristics and data collected (coloring, symmetric presence in teeth of same age of formation and calcification and previous history of excessive ingestion of fluoride during formation and calcification periods of these elements) diagnosis was fluorosis, and treatment indication was to use a bleaching system with dual activation process (photo and chemically activated) on a hydrogen peroxide at 35% basis. The treatment option was discussed with the parent, who agreed and authorized the treatment and the use of documentation for further publication.

After applying gingival protection (Opaldam) and absolute isolation of maxillary central incisors, prophylaxis with pumice and water was performed (Figure 2) thus obtaining dental surfaces clean and free of any accretions. Following, conditioning with phosphoric acid at 37% (Etch 37 Bisco) was performed for 15 seconds, surfaces were washed with air/water spray for 30 seconds and after drying, a thin layer of adhesive (Scothcbond Multi Purpose – 3M) was applied in the white blemishes' region that was polymerized for 40 seconds with photopolymerizer (Optilight II Gnatus power 500 mw/cm^2) (Figure 3).

Bleaching system with dual activation process (photo/chemical) with hydrogen peroxide at 35% basis (Hi Lite – Shofu) was used. According to the recommendation of the manufacturer, bleaching agent was dosed and powder was incorporated to the liquid until a bluish-green gel was obtained. Bleaching agent was then taken to teeth involved, care taken to apply it only to the medial and cervical thirds (Figure 4). The bleaching agent, as soon as placed on dental surface was exposed to photo polymerizer's light for four minutes, sufficient time for the agent to become white (Figures 5 and 6). Following this, the product was removed with copious washing with air/water spray, and a whitish aspect of the enamel was then observed (Figure #7). Dental surfaces were polished with finishing disks Soft-Lex (3M) type and also with finishing points. After removal of absolute isolation and hydration of the teeth, a satisfactory esthetic result was observed by the masking the white blemishes (Figure 8).

Figure 1. Initial aspect of maxillary central incisors of a male eight-year-old Patient. Accentuated irregular and opaque white blemishes are seen, localized in the incisal third of teeth 11 and 21 diagnosed as fluorosis.

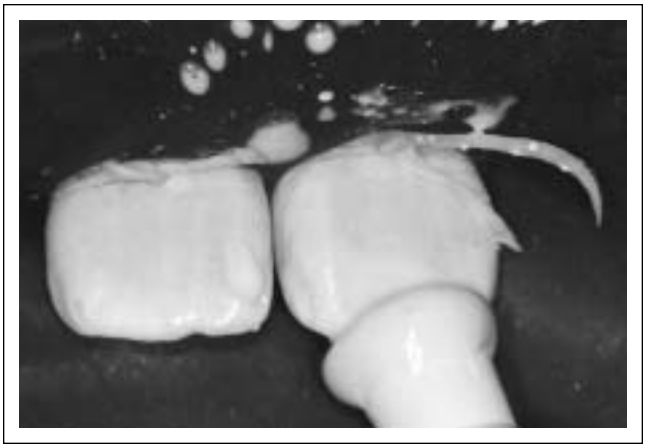

Figure 2. Absolute isolation and prophylaxis with pumice and water of elements 11 and 21 to apply bleaching with dual activation process (photo/chemical) of hydrogen peroxide at 35% basis (Hi Lite – Shofu).

Figure 3. Application of a thin layer of adhesive (Scotchbond Multi Purpose – 3M) in the region of white blemishes in elements 11 and 21 that were polymerized for 40 seconds with photopolymeriser (Opttilight II, Gnatus, power 500mw/cm2) over white blemishes.

Figure 4. Bluish-green initial aspect of the mixture of bleaching agent of the bleaching system with dual activation process (photo/chemical) on hydrogen peroxide at 35% basis (Hi Lite – Shofu) on medial and cervical thirds of elements 11 and 21.

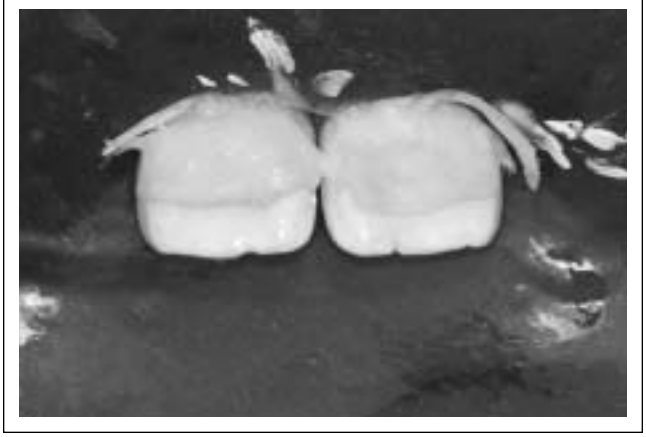

Figure 5. Bleaching agent of the bleaching system with dual activation process (photo/chemical) on hydrogen peroxide at 35% basis (Hi Lite – Shofu) on mesial and cervical thirds of teeth 11 and 21 after applying light for 2 minutes (Photopolimerizer Optilight II, Gnatus, power 500 mw/cm2).

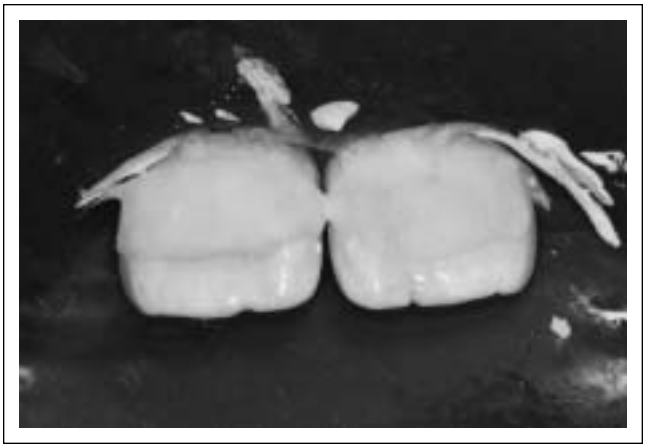

Figure 6. Final coloring of bleaching agent of the bleaching system with dual activation process (photo/chemical) on hydrogen peroxide at 35% basis (Hi Lite – Shofu) after light application for four minutes, indicative of its maximum potential.

Figure 7. Whitish aspect immediate after application of bleaching system with dual activation process (photo/chemical) on hydrogen peroxide at 35% basis (hi Lite – Shofu). This aspect is due to the dehydration of dental elements and the presence of residual O_2.

Figure 8. Final aspect obtained by the treatment of maxillary central incisors after bleaching treatment with dual activation process (photo/chemical) on hydrogen peroxide at 35% basis (Hi Lite – Shofu).

COMMENTS

After diagnosis determined fluorosis, in this particular clinical case the option was to use a bleaching system with dual activation process (photo/chemical) on hydrogen peroxide at 35% basis. This procedure is not invasive and presents confirmed effectiveness for over 30 years. According to Hanosch and Hanosch[4] bleaching technique with hydrogen peroxide at 35% and light activated is safe, fast and effective and of easy application, which renders said practice advantageous either in vital as on non vital teeth. It is important to point out, according to Sarret[13] that success of a product or a dental bleaching method depends on the correct diagnosis of the discoloration.

Considering the white color of the blemish the patient presented, bleaching was restricted to the cervical and medium third of the elements involved, in an attempt to match the coloration of these two thirds to the coloration of the blemishes present in the incisal third of the two dental elements, that were extremely white. For this same motive adhesive was applied over the blemishes, to isolate and protect those areas, as no more bleaching was intended on those regions.

As hydrogen peroxide is a caustic product that may cause damage to soft tissues, gingival protection is needed,[15] which was done in this report of a clinical case. With this precaution no damage occurred to the gingival tissues.

The usage of a light is to intensify the action of the bleaching agent. As the clearing agent liberates oxides, it begins to change color, from greenish blue to light blue until it becomes white, indicating that the activating process was completed and reached a maximum potential.

CONCLUSION

The bleaching system with dual activation process (photo/chemical) on hydrogen peroxide at 35% base (Hi Lite – Shofu) was shown to be efficient in the bleaching of teeth with white blemishes due to fluorosis.

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