

Full Length Research Paper

Endogenous and exogenous teeth whitening through gel-based bleaching hydrogen peroxide (35%) with the aid of silicon guide

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The aim of this study is to demonstrate through a case report, a proposed treatment for discolored teeth, with and without pulp vitality, by the technique of external and internal tooth bleaching with hydrogen peroxide to 35% Lase Peroxide Sensy (DMC) using Whitening Lase II Device (DMC), and a silicone guide (3M ESPE) in the palatine portion of the upper teeth. In this clinical case, the patient had darkened dental elements 11 and 22, and dissatisfaction with the coloring of other elements. It was observed that the techniques used and the materials chosen allowed for an excellent aesthetic result, with technical simplicity and low cost, and minimal occurrence of signs and symptoms.

Key words: Dental bleaching, hydrogen peroxide, silicon.

INTRODUCTION

Today's aesthetic standards are quite stringent for both anterior and posterior teeth. Modern dentistry requires smiles with lighter shades, as well as contoured line, setting a standard of beauty, health and personal presentation. However, vital and non-vital teeth present with color and/or altered form, compromises the aesthetics (Bispo, 2006; Carvalho et al., 2008; Cruz-Neto et al., 2008).

The change of color can be classified into two groups: intrinsic and extrinsic. Extrinsic stains are usually acquired after tooth eruption and are related to food and products with potential dye, such as coffee, tea, tobacco, associated with the accumulation of plaque, surface roughness of restorations, presence of cracks, or crevices. Since the intrinsic changes may be congenital-related to the formation of the teeth or acquired through a dental trauma, fluorosis and pulp mortification, the pigments are incorporated into the tooth structure and are only removed by bleaching or more invasive procedures

involving the wear or restoration of the tooth (Atali and Topbaşı, 2011; Attin et al., 2003; Portolani-Júnior and Candido, 2005; Moura-Morais et al., 2007; Benbachir et al., 2008; Berger et al., 2010; Benjamin, 2002; Cadenaro et al., 2011; Coldebella et al., 2009; Costa et al., 2009).

The mechanism of the action of bleaching is attributed to an oxidation reaction between the bleaching agent and the darkened substrate. This reaction modifies the molecule darkened by changing its characteristics, including its color. The organic materials are eventually converted into carbon dioxide and water. This occurs when the oxidative bleaching agent penetrates the dentinal tubules reacting with organic material inside the dentin (Floyd, 1997; Garber, 1997; Kabbach et al., 2010a; Kashima-Tanaka et al., 2003; Téó et al., 2010). The time at which the maximum bleaching occurs is called the saturation point and from this step, the molecules are no longer cleared and bleaching agent begins to work on the other chain and carbon compounds, such as enamel matrix proteins. At this point, the loss of enamel matrix material becomes very fast and is converted into carbon dioxide and water, which leads to an increase of porosity and brittleness of

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Figure 1. Initial appearance.



Figure 2. Silicon guide.

the tooth losing the aesthetic benefits of bleaching (Freedman and Reyto, 1997; Kabbach, 2008; Kabbach et al., 2010b; Kirk, 1893, 1889; Kashima-Tanaka et al., 2003; Kaneko et al., 2000; Yuko and Yasuko, 2011).

In a non-vital tooth, the darkening is associated with the phenomenon of degradation, resulting in pulp tissue necrosis, hemorrhage and faults committed during endodontic treatment (such as crown access, inappropriate or insufficient irrigation and debridement), and some restorative materials containing silver or zinc oxide and eugenol when left in contact with the pulp chamber for a long period of time.

Currently, the techniques and materials used for tooth whitening are directed to propose methods that do not cause damage to dental structures and oral mucosa, and the health of the patient have quick and effective restoration to the natural color of the teeth (Dezotti et al., 2002; Dinelli et al., 2010; Kirk, 1893, 1889; Lee et al., 2004).

MATERIALS AND METHODS

Female patients that are 29 years of age, with recurrent pregnancy loss (RPLX), who sought dental care reported dissatisfaction with the color of their central incisors and the right and left parts of their upper right lateral incisor (11, 21, and 22 teeth) (Figure 1). Through the clinical and radiographic examination, it was shown that the color change could be related to endodontic treatment. A treatment plan was carried out for endogenous and exogenous whitening gel with hydrogen peroxide based on 35% Lase Peroxide Sensy.

The coronal opening was performed on teeth whitening, which receives endogenous and removes the filling material until they gained access to the pulp chamber. A thickness of 3 mm of the filling material was removed and a cervical plug was made with glass ionomer cement (Vitrebond). According to the manufacturer's recommendations, it was applied to the pulp chamber to prevent the penetration of the bleaching gel into the duct. Later, the construction of the Robinson brush plug held elements of prophylaxis with pumice and water.

Molding with silicone plus (3M ESPE) was performed to obtain the wall to facilitate the insertion of the bleaching material against the palate of endodontically treated elements. The gingival barrier was applied on the labial and lingual so that the soft tissue around stay protected from contact with the bleaching material, and light cured for 30 s (Figures 2 to 6).

The manipulation of the bleaching material was performed as follows: 15 drops of hydrogen peroxide with 5 drops of thickener, uniformly mixed product in the bottle, and applied on the labial of all the teeth and cheeks and palate of the elements 11 and internal 21, and polymerized 3 min with the Whitening Lase II (DMC) (660±10 nm) (Figure 7) in the labial, 3 min on the palate, 12 min was over.

RESULTS AND DISCUSSION

After the bleaching procedure, excess gel was removed with the aid of cotton wool rolls and washing with abundant water. Two sessions were held, consisting of three applications of the whitening gel in each session, at weekly intervals, using the same application protocol of the previous session. At the end of the last session, the polishing was done with dental records soflex. The color



Figure 3. Endogenous teeth whitening with silicon guide.



Figure 6. Session 2 bleaching material and light cured for 30 s.



Figure 4. Exogenous teeth whitening with silicon guide.



Figure 5. Bleaching material and light cured for 30 s.



Figure 7. Laser equipment; Whitening II.

(Figure 8), later the patient was suggested to carry out a tooth faceting of the element in question, but the patient reported that he was satisfied with the result obtained by bleaching, and choose not to perform the procedure.

Currently patients presenting with teeth color changes, whether they be pigmentations by extrinsic or intrinsic origin, and seek to improve the aesthetics, tooth whitening is a widespread technique with satisfactory results, if the technique is performed correctly (Bolanho et al., 1998; Albuquerque et al., 2004).

The darkening of endodontically treated teeth is an aesthetic failure that often requires treatments such as bleaching or tooth whitening (Kaneko et al., 2000). It is preferred by patients and professionals who wear them to preserve their natural teeth, unlike prosthetic treatments such as veneers or implants (Dezotti et al., 2002). In addition, it is simple and economical (Lee et al., 2004).

obtained after the treatment featured a satisfactory result



Figure 8. Satisfactory result.

In the mechanism of action of dental bleaching, hydrogen peroxide and bleaching agent is widely used, as such, it breaks down into free radicals of oxygen and water. These are extremely reactive free radicals. They combine with the structures of organic molecules in the darkened dyes. This reaction changes the structure of the darkened molecule and changes some of its features, including its color (Kirk, 1893; Saquy et al., 1992; Sun, 2000).

The activation by light (laser, LED or halogen light) used in tooth whitening is to energize the bleaching agent to accelerate the release of free radicals. Some authors (Freedman and Reyto, 1997; Kashima-Tanaka et al., 2003; Reyto, 1998) studied the generation of active oxygen free radicals and the activation of hydrogen peroxide by lights and lasers. The effect of bleaching has been improved by this activation since the amount of free radicals released was increased. The laser energy has the potential to catalyze reactions accelerating the whitening process (Benjamin, 2002; Freedman and Reyto, 1997; Garber, 1997; Reyto, 1998).

The light-activated bleaching has the advantage of a shorter treatment time, which increased patients comfort and immediate results (Benjamin, 2002; Reyto, 1998). On the other hand, halogen lamps promote warming, which is disadvantageous (Sun, 2000). However, the LEDs and lasers generate minimal increase in temperature; it does not heat the tooth structure, but affects only the bleaching agent (Zanin et al., 2004). Furthermore, the use of peroxides and free radicals can cause tissue damage, and are best controlled when used in the clinic under professional supervision (Floyd, 1997). Nevertheless, the conventional technique is cheaper and requires less clinical time for its realization.

Regardless of the technique used, the success of the dental bleaching treatment is directly related to the

penetration of the bleaching agent in the dentinal tubules, where the molecules are darkened (Kirk, 1893; Saquy et al., 1992; Sun, 2000).

Conclusions

In order to attain success in the profession, one should have knowledge of the probable diagnosis of color change on tooth whitening and the mechanism of action of bleaching substances, to be followed by an efficient protection of the profession. It is then seen with the clinical case that using the technique of endogenous and exogenous whitening, treatment success and patient satisfaction was obtained by the harmony of their smile.

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