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DENTAL BLEACHING IN THE OFFICE WITH LOW CONCENTRATION GEL IN A PATIENT WITH A HISTORY OF CANCER - 6 YEARS OF CONTROL

Martha Beteghelli Michielin
Department of Operative Dentistry, Endodontics and Dental Materials, Bauru School of Dentistry, ''Universidade de São Paulo", Bauru, SP, Brazil

Oscar Stangherlin Gomes
Department of Operative Dentistry, Endodontics and Dental Materials, Bauru School of Dentistry, ''Universidade de São Paulo", Bauru, SP, Brazil

Gabriela Ulian Somensi
Department of Operative Dentistry, Endodontics and Dental Materials, Bauru School of Dentistry, ''Universidade de São Paulo", Bauru, SP, Brazil

Juliana Fraga Soares Bombonatti
Department of Operative Dentistry, Endodontics and Dental Materials, Bauru School of Dentistry, ''Universidade de São Paulo", Bauru, SP, Brazil

Marilia Mattar de Amôedo Campos Velo
Department of Operative Dentistry, Endodontics and Dental Materials, Bauru School of Dentistry, ''Universidade de São Paulo", Bauru, SP, Brazil

Rafael Francisco Lia Mondelli
Department of Operative Dentistry, Endodontics and Dental Materials, Bauru School of Dentistry, ''Universidade de São Paulo", Bauru, SP, Brazil

Abstract: Although tooth bleaching is a well accepted and conservative method, much has been investigated regarding the co-carcinogenic potential of agents based on hydrogen peroxide (H_2O_2). In view of the different bleaching techniques, the procedure performed in a dental office has been identified as the technique that offers greater safety and control, being the most indicated for patients who smoke, drink alcohol and have an individual or family history of cancer. Thus, the present case report aims to demonstrate the long-term clinical success of a 16-year-old patient with a history of acute lymphocytic leukemia (ALL) and a complaint of the color of his teeth. After prophylaxis of the teeth and registration of the initial color of A3 on the VITA scale, the gums were protected with a photopolymerizable barrier, followed by 4 applications of a low concentration whitening agent, containing nanometric particles of nitrogenated titanium dioxide (TiO_N), the first at 15% photocatalyzed with LED light source/blue laser, and the second at 10% photocatalyzed with LED light/violet laser. The protocol used was 3 photocatalysis for 2 min with intervals of 30 s between each application, totaling 30 min of gel action on the teeth per session. A total of his bleaching sessions was carried out, reaching color A1. At the end of each session, teeth polishing, application of desensitizer and laser therapy followed the whitening protocol. Six years after the second session, the patient remains satisfied with the whitening achieved, without any damage to his systemic health.

Keywords: Tooth whitening, dentin sensitivity, hydrogen peroxide, nanotechnology, dental aesthetics.

INTRODUCTION

Dental whitening is considered a conservative, non-invasive treatment and, when well indicated, can lead to a very

satisfactory aesthetic result for discolored or yellow teeth[1-4]. Its effect is obtained as a result of a hydrogen peroxide (H_2O_2) redox process, which allows free radicals to penetrate through the tooth structure and oxidize the organic molecules of pigments, responsible for coloring teeth[5].

H_2O_2 can be found in various forms of administration, such as toothpastes, mouthwash solutions, impregnated whitening strips, and gels for use in trays (supervised home technique) or in the office[6]. The main differences between them are in the concentration of H_2O_2 used, the duration of the treatment, and the protection or not of the structures adjacent to the teeth, related to the safety of the procedure.

However, postoperative sensitivity, an adverse effect reported by most patients undergoing tooth bleaching therapy, may be common to all techniques[7-10]. Many authors attribute this fact to damage to the pulp tissues[11-13], since the low molecular weight of H_2O_2 and its by-products favor the rapid diffusion of reactive oxygen ions through mineralized dental tissues[14], causing oxidative stress in pulp cells [13], that can lead to your death[15,16] or intense cell differentiation[17-19].

Concerns have also been raised regarding the safety of using H_2O_2 in tooth bleaching in relation to its possible co-carcinogenic effect. Studies have shown that H_2O_2 caused mutations in some cells[20-21], acting as a carcinogen or tumor promoter in the duodenum and jejunum of rats[22-23]. To offer greater safety to the treatment, some authors recommend that professionals use products containing lower concentrations of H_2O_2. In addition, basic care such as avoiding ingestion and product contact with the skin and mucous membranes[24], especially in smokers, alcoholics and patients with an individual or family history of cancer, must be respected.

The clinical approach presented in this case report aims to elucidate the bleaching technique selected for a young patient with a history of cancer, combining safety, aesthetics and quality of life.

CLINICAL CASE REPORT

A 16-year-old male patient, with a history of ALL (acute lymphocytic leukemia) at the age of 8, sought the Dentistry clinic of the Faculty of Dentistry of Bauru, ‘’Universidade de São Paulo” (FOB-USP) complaining about the color of his teeth and dissatisfied with the aesthetics. After a detailed anamnesis and physical examination, the color of their teeth was recorded using photographs and the classic Vita color scale, corresponding to the A3 color (Figures 1 and 2). Complementary radiographic examination was performed, demonstrating periapical integrity (Figure 3).

The treatment plan was designed with the aim of restoring aesthetics, linked to the greater safety and control that the in-office extrinsic bleaching technique provides. In addition, in order to minimize postoperative sensitivity, a low concentration bleaching agent was chosen, containing nanometric particles of nitrogenous titanium dioxide (TiO_N) associated with photocatalysis.

After prophylaxis with pumice stone and water and protection of the gums with a photopolymerizable gingival barrier, the Lase Peroxide Lite gel (DMC Equipamentos Ltda., São Carlos, SP, Brazil), 15% H_2O_2, was applied for 7 min/30s, following the photocatalyst protocol with LED light/blue laser Whitening Lase II (WLII) (DMC Equipamentos Ltda., São Carlos, SP, Brazil) recommended by the manufacturer, which consists of 3 activations of the gel for 2 min with an interval of 30 s between them. The total contact time of the bleaching agent with the teeth was 30 min, since the patient showed sensitivity after the fourth application of the gel (Figures 4 and 5).

After bleaching, the buccal surface of the

teeth was polished with felt discs impregnated with Oxgloss I and II polishing paste (KG Sorensen, Cotia, SP, Brazil), application of Lase Sensy 2% desensitizer containing potassium nitrate and sodium fluoride for 4 min, and laser therapy with the laser coupled to the WLII (Figures 6, 7 and 8). The patient was instructed not to consume dyes, avoid thermal shocks and acidic foods for the next 7 days.

After a period of 7 months, with the teeth corresponding to shade A2 on the VITA scale, the patient returned for the second bleaching session (Figure 9). This time, we chose to use an experimental bleaching agent based on 10% H_2O_2 (DMC Equipamentos Ltda., São Carlos, SP, Brazil) photocatalyzed with a violet LED/laser light source (DMC Equipamentos Ltda., São Carlos, SP, Brazil), in an attempt to further minimize postoperative sensitivity. The same steps and photocatalyzed whitening protocol were performed and the patient showed sensitivity again after the fourth application of the gel. After the sensitivity ceased, 24 hours after the procedure, the A1 color was recorded and the degree of whitening achieved met the patient's expectations (Figures 10 and 11).

The patient was followed up by the team for 6 years after the second whitening session, with annual controls at the Boldrini Children's Cancer Hospital, remaining extremely satisfied with the color of his teeth and without any harm caused by the procedure to his systemic health.

DISCUSSION

Sensitivity during or after surgery is the adverse effect most commonly reported by patients undergoing bleaching of vital teeth[7,10]. The concentration of H_2O_2 and the time of contact of the gel with the tooth surface are factors that, in addition to influencing this aspect, also affect the final result of the degree of whitening[25].

In the present clinical case, the in-office technique was chosen because it was a high-risk patient with a history of cancer. When compared to home administration, the in-office procedure offers more safety, control of treatment time, protection of contact between the gel and the cementoenamel junction (preventing cervical resorption), oral mucous membranes, in addition to making it difficult to ingest[26].

In the case of a young patient, with a large pulp chamber, the chances of presenting sensitivity would be great, therefore, it was decided to reduce the concentration of the H_2O_2 gel and the time of contact of the gel with the tooth surface, through photocatalyst, in two bleaching sessions. Although the patient had sensitivity, 24 h after the procedure there were no more complaints, as shown by some studies[27-30].

Moncada et al.[28] observed that the increase in the concentration of whitening gels led to a greater incidence of tooth sensitivity immediately after the procedure, ceasing in 7 days. On the other hand, Reis et al.[10] showed that both 35% H_2O_2 and the lowest concentration agent (20%) had the same degree of sensitivity, indicating that H_2O_2 can cause pain and discomfort to patients, even at low concentrations. However, in a more recent study, Bortolatto et al.[31] concluded that the use of low concentration agents containing TiO_N nanoparticles resulted in a lower degree of sensitivity after tooth bleaching, when compared to 35% H_2O_2.

TiO_N nanoparticles allow the oxidation-reduction reaction to be accelerated when a hybrid light source is associated, thus allowing a shorter contact time between the gel and the teeth, and consequently, a reduction in postoperative sensitivity.

The heat sources used in the past had the same objective of accelerating the oxidation reaction that teeth undergo during

whitening. However, it is known that a distinct increase in intrapulpal temperature can lead to pathological and irreversible pulp changes[32,33], in addition to significant increases in sensitivity and reduced long-term color stability. However, with the evolution of light sources and photosensitive bleaching agents, one can no longer associate them with sensitivity and color instability after bleaching. These mechanisms generate a minimal increase in temperature, without damage to the pulp tissue, since they heat the product and not the tooth structure[34-37].

CONCLUSION

The present clinical case demonstrated that in-office bleaching offered greater safety to patients with a history of cancer. Sensitivity can be reduced using low concentration bleaching agents, containing TiO_N nanoparticles and photocatalyst, as performed in the present report.

Figure 1. Initial image of the patient's smile, showing a yellowish appearance.

Figure 2. A3 color record of the initial smile.

Figure 3. Periapical X-ray of the upper incisors, demonstrating a satisfactory condition of the periapex, without root resorption.

Figure 4. Gingival barrier and application of whitening gel protocol.

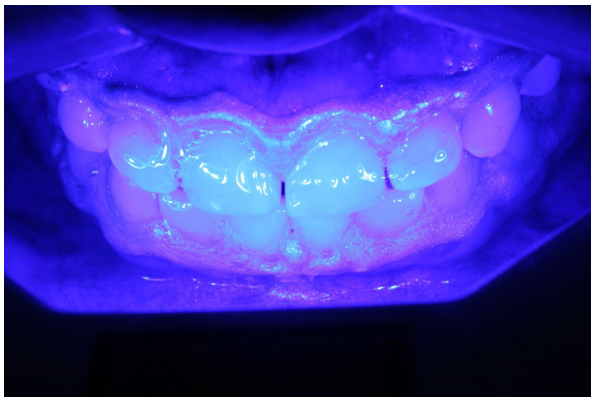

Figure 5. Photocatalysis of the whitening gel with hybrid light (violet LED/Laser), following the manufacturer's protocol.

Figure 6. Final polishing after the whitening session with a felt disc impregnated with Oxgloss I and II polishing paste.

Figure 7. Application of Lase Sensy 2% desensitizer containing potassium nitrate and sodium fluoride for 4 min.

Figure 8. Final appearance of the smile after the first whitening session.

Figure 9. After 7 months, color registration on the Vita A2 scale to start the second whitening session.

Figure 10. Immediate final appearance after the second whitening session.

Figure 11. After 6 years of follow-up, the patient's smile was recorded in color A1, with great satisfaction.

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