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Combination of at-home and in-office bleaching techniques: case series

Combinação das técnicas de clareamento dental caseira e de consultório: relato de casos

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ABSTRACT

Tooth bleaching is one of the most conservative aesthetic techniques. At-home and in-office bleaching may be performed, as well as the combination of both techniques. As this combination may be done in different manners, distinct orders of combinations were proposed in this report. A 24 years-old man, whose upper central incisor and canine shades were A2 and A3 respectively, was initially treated by chair-side with 40-min application of 40% hydrogen peroxide (HP) for two sessions. Afterwards, an two-week overnight at-home bleaching was performed with 10% carbamide peroxide (CP). The shade of upper central incisors changed to 1M1 and canine was B1. Conversely, a 30 years-old woman was firstly conducted with at-home bleaching (overnight 4-weeks 10% CP) and, subsequently, with a single appointment of in-office bleaching for 45 minutes (35% HP). The shade of her upper central incisor changed from A1 to 0.5M1 and the upper canine from A3 to B1. The VITA classical (A1-D4) shade guide and VITA Bleached guide 3D-MASTER were used to determine the tooth color during the treatments. In both bleaching treatments, patients reported no significant tooth sensitivity and the final outcomes met their expectation.

Indexing terms: Carbamide peroxide. Hydrogen peroxide. Tooth bleaching.

RESUMO

O clareamento dental é uma das técnicas estéticas mais conservadoras no âmbito odontológico. Técnicas de clareamento caseira ou de consultório, ou a combinação de ambas, podem ser realizadas para alcançar o prognóstico desejado. Esta combinação das técnicas pode ser realizada por meio de diferentes abordagens, como apresentado neste relato de casos. Um paciente do gênero masculino, 24 anos de idade, cujos incisivo central superior e caninos apresentaram cor A2 e A3, respectivamente, foi inicialmente submetido à técnica de clareamento de consultório de duração por sessão de 40 mim com gel de peróxido de hidrogênio (PH) 40%, em duas sessões. Posteriormente, a técnica de clareamento caseira foi realizada durante duas semanas com gel de peróxido de carbamida (PC)

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a uma concentração de 10%.A cor final dos incisivos centrais superiores foi alterada para 1M1, enquanto a dos caninos para B1. Por outro lado, uma paciente do gênero feminino, 30 anos de idade, foi inicialmente submetida ao clareamento caseiro (durante a noite, por 4 semanas- PC 10%), e subsequentemente, com aplicação pontual de agente clareador (PH 35%) em consultório, em sessão de 45 min. A cor do incisivo central superior da paciente, mudou de A1 para 0,5M1 e do canino superior de A3 para B1. As escalas de cor VITA Classic (A1-D4), e VITA Bleachedguided 3D-MASTER foram utilizadas nesta série de casos para determinar a coloração dos dentes durante os tratamentos. Em ambos os tratamentos, os pacientes não reportaram sensibilidade dental significante, e suas expectativas finais foram atendidas.

Termos de indexação: *Peróxido de carbamida. Peróxido de hidrogênio. Clareamento dental.*

INTRODUCTION

As an overwhelming appreciation of Cosmetic Dentistry is observed among patients in recent days, starting oral rehabilitation or minor aesthetic treatment by a minimally invasive procedure as tooth bleaching is considered a suitable conservative approach [1]. Tooth bleaching in vital teeth may be performed either at home or in dental office. However, combination of both techniques is a prevalent measure taken by the dentists, commonly used as an attempt to enhance the bleaching effectiveness [2].

While carbamide and hydrogen peroxides under low concentrations are normally tray-delivered overnight during few weeks, higher concentrated bleaching agents are applied by the dentist for a shorter period of time for some appointments [3]. Thus, at-home bleaching, which must be supervised by the dentist, is prone to cause less tooth sensitivity. However, in-office therapy has been largely used in clinical routine since it provides faster color alteration [4]. Furthermore, it provides an opportunity to the patient not comfortable to use the tray to still be treated with a conservative approach instead of being directly submitted to more invasive treatments, e.g. direct and indirect restorations [5].

Although some studies reported the efficacy of both at-home and in-office techniques separately or combined [4,6,7], literature has pointed out that combined bleaching may enhance bleaching efficacy [6] and increase tooth sensitivity [6,8]. Even though studies are inconclusive, advantages of the combined techniques are based on the boost of the bleaching efficacy and the improvement of color stability. Also, motivation of patients might increase since the color change would be visible more immediately [9]. Nevertheless, factors such as severity and origin of tooth staining, dentin thickness, age, commitment and expectation of the patients should also be taken into account in the decision for combined bleaching [3].

In view of these facts, and also of the heterogeneous clinical aspects that may be found among patients looking for aesthetic procedures, combination of techniques appears as a feasible alternative when the initial proposed treatment does not meet the expected outcome. Hence, a comparison of bleaching combination in different approaches is reported in a case series.

CASES REPORT

Case 1

A 24 years-old man sought for the clinical facilities of Piracicaba Dental School with the main complaint of discolored teeth. The patient had not previously undergone to tooth bleaching. After dental prophylaxis and clinical examination, patient was considered eligible for bleaching therapy. Considering VITA classical (A1-D4) shade guide (VITA Zahnfabrik, Germany), initial shade of upper central incisor and canine showed shade A2 (figure 1A) and A3 (figure 1B), respectively. After two sessions with two 20-min 40% hydrogen peroxide (HP) (Opalescence Boost 40% – Ultradent, USA) application (figure 2A), shades of upper central incisor and canine diminished to A1 (figure 1C) and A2 (figure 1D), respectively. As the patient's expectation of canine shades was not met, at-home bleaching was performed with 10% carbamide peroxide (CP) (Whiteness Perfect 10%, FGM, Joinville, SC, Brazil) for 4 hours a day during 2 weeks. An individual acetate tray was made and instructions of gel application from right to left premolar in both arches were prescribed (figure 2B). Seven days elapsed from the end of the treatment, upper central incisor (figure 1E) showed shade 1M1 and upper canine, B1 (figure 1F). The shade of incisor was measured by means of a bleached shade guide that ranges from 0M1 to 5M3 (VITA Bleached guide 3D-MASTER, VITA Zahnfabrik, Germany). The figure 3 showed the initial and final patients aspect, respectively (figure 3A-B).

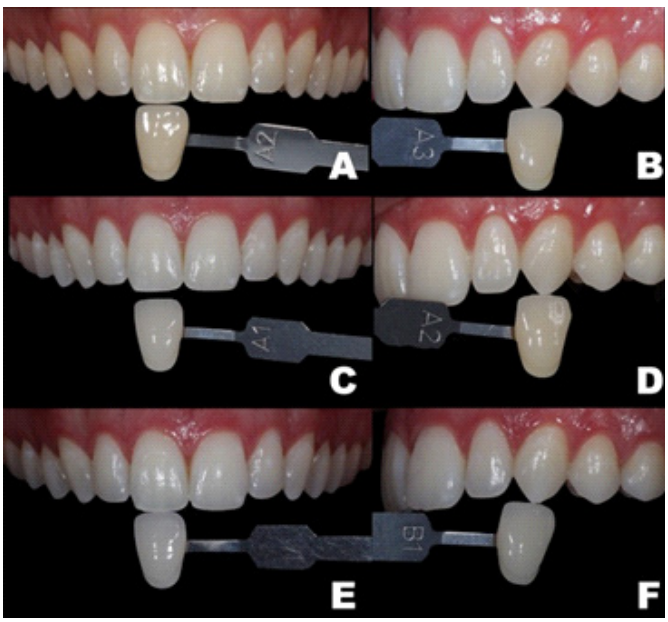

Figure 1. Treatment starting by in-office technique followed by at-home bleaching. A - Initial color aspect, in which upper central incisor showed shade A2; B - The upper canine showed shade A3; C - Following the in-office bleaching procedures, upper central incisor shade changed to A1; D - Upper canine showed shade A2 after in-office bleaching; E - At the end of the combined bleaching, central incisor showed shade 1M1; F - The canine showed shade B1 following the combined technique.

Figure 2. Bleaching procedures performed during the first case. A - Application of the in-office bleaching gel with an adequate gingival barrier; B - Individual acetate tray made for at-home bleaching technique.

Figure 3. Clinical picture of the first patient before and after combined bleaching started by in-office technique. A - Initial color aspect of the patient showing good oral health, but teeth with yellow appearance. B - Final clinical aspect, in which the health of the patient was maintained and whiter teeth, was detected.

Case 2

The shades of upper central incisor and canine of a 30 years-old woman, who has also never undergone tooth bleaching, showed A1 (figure 4A) and A3 (figure 4B). Initially, 10% CP at-home bleaching was indicated for 2 weeks with supervision from operators. After seven days, shades A1 and A2 were shown for upper incisor and canine (figure 4C and 4D). Finally, after two weeks of at-home bleaching, upper incisor and canine showed 1M1 and B1, respectively (figure 4E and 4F).

The patient reported that the higher discoloration observed in upper canine (B1) and lower incisors (A1) in comparison to upper incisors (1M1) after the at-home bleaching did not meet her expectations (figure 5A-C). In view of these facts, in-office application of 35% HP [3 x 15 min (Whiteness HP, FGM, Joinville, SC, Brazil)] was performed only on the teeth considered discolored by the patient (figure 5D). Seven days elapsed from professional HP application, shades of incisor and canine showed 0,5M1 and B1, respectively (figure 5E and 5F), and the lower incisors showed B1 (Figure 5G). As in the previous case, the shade of incisor was measured by means of a bleached shade guide (VITA Bleachedguide 3D-MASTER, VITA Zahnfabrik, Germany). The initial and final patients aspect is observed at Figure 6, respectively (figure 6A and 6B).

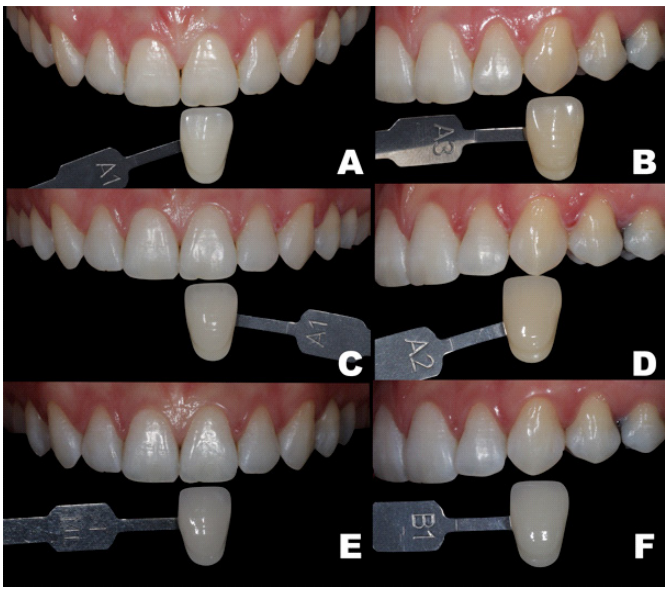

Figure 4. Clinical evaluation of the second patient at the first phase of the bleaching treatment (at-home technique). A - Initial upper central incisor showing shade A1; B - Initially, upper canine showed shade A3; C - Shade A1 was shown for upper central incisor after 1 week; D - Upper canine showed shade A2 after 1 week; E - After 2 weeks, central incisor showed shade 1M1; F - The canine showing shade B1.

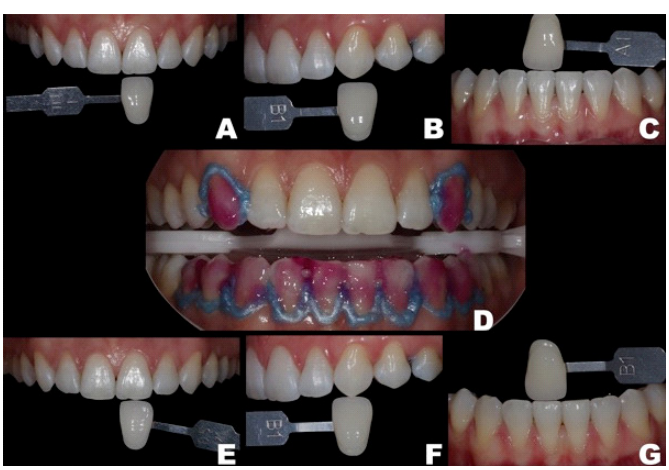

Figure 5. The second phase of the bleaching therapy applied in the second patient (in-office technique). A - Upper central incisor showing shade 1M1 after 2-week at-home bleaching; B - Shade B1 was shown for upper canine; C - Lower central incisors showed shade A1 after at-home bleaching during 2 weeks; D - In-office bleaching technique only on upper Canines and lower teeth; E - Following the in-office bleaching, central incisor reduced to 0.5M1; F - Final upper canine was maintained in B1; G - Lower incisors showed shade B1 after the in-office bleaching appointment.

DISCUSSION

In these case series, bleaching was planned based on the information collected during initial interview of both patients. Upon the first appointment, the male patient reported a very important academic presentation due the following two weeks. Since the patient desired whiter teeth for this upcoming event and short time was available, two in-office bleaching appointment were performed [4]. As a further in-office session was not possible, two-week at-home bleaching was determined so that the expectations could be meet. Even though studies in literature are controversial regarding additional color change promoted by combination of bleaching techniques, Vaez et al. [10] reported that a single preliminary session of in-office bleaching with 35% HP enhanced color change for patients submitted to at-home therapy with 10% CP. However, it is important to take into account that CP's application regimen for our patient was four times greater, which not ensures that combination would be beneficial for color change in other patients. Although the variety of concentration and time of gel's applications hampers the interpretation of bleaching combination efficacy [11], the first clinical case showed an adequate final result.

Figure 6. Clinical picture of the second patient before and after combined bleaching started by at-home technique. A - Starting aspect of the patient presenting acceptable oral health and yellow appearance of the teeth. The colors of upper and lower arches were unpaired. B - Clinical aspect after the bleaching therapy with whiter teeth and improved color harmony among the arches.

Conversely, bleaching on the female patient started by at-home treatment due to her preference. However, after 4 weeks of CP overnight application, both patient and professionals noticed that lower arch and upper canines did not follow the same color change pattern as upper incisors. Therefore, an additional in-office session with high-concentrated HP was performed to provide faster result than at-home bleaching [4]. There is no data

in the literature investigating the difference among upper and lower teeth on bleaching efficacy. Effect of peroxides is believed to be a result of HP's free radicals interaction with dentin chromogens [3]. However, the enamel/dentin penetration of hydrogen peroxide is inversely proportional to the diffusion distance [12]. Therefore, it could be hypothesized that free radicals of HP pass through lower dentin faster than in the upper, thereby diminishing the break down of staining molecules of dentin. As other factors could have influenced this clinical aspect such as periodicity of CP's application by the patient or the stability of the bleaching gel, research on this topic are paramount to determine the influence of teeth's thickness for bleaching.

While bleaching combination presents long-term clinical stability [13], a recent clinical trial revealed no difference among at-home or in-office and combined techniques [8]. A recent systematic review with meta-analysis revealed that there was no statistical difference between the techniques regarding color change. Nevertheless, the authors pointed out that these data should be cautiously evaluated due to the wide variation of gels application times both chair-side and at-home [11]. Furthermore, there is little information regarding which sequence of bleaching combination would produce higher color change. Most studies performed an initial in-office session followed by at-home therapy for few weeks, which is known as "jump start" technique [14]. However, the opposite way could also be investigated once clinical situation such as in the second case might overcome color discrepancy among arches faster due to higher concentration of in-office bleaching gels [3].

Initial color evaluation of both cases was performed using a classical visual guide shade. However, the final color measurement of central incisor was determined by means of a bleached-guide once the tooth was incompatible with B1, the highest value found in classical guides [7]. Although the same was not observed for upper canine, B1 was reached in both case series. Even though randomized controlled clinical trials are more indicated to determine comparison of both combinations' efficacy [4,7], the two techniques herein adopted were efficient to produce color change on upper canines, regardless of the age of patients. As luminosity and yellowness of teeth are lower and higher, respectively, in older patients [15], longer regimen would be necessary to breakdown the chromopheres.

Given the combination of in-office and at-home bleaching, an in vivo study showed that this combination is beneficial for the patient and the dentist owing to the synergy among both techniques that potentiates shade alteration and, consequently, shorten the time of treatment [11]. Nonetheless, individual risk of tooth sensitivity must be considered when combining in-office and at-home bleaching. Zhao et al. [15] indicated in vivo that at-home application of low-concentrated gel is likely to enhance tooth permeability, which, in turn, increased high-concentrated HP penetration towards dental tissues. Thus, the authors stated that such sequence of bleaching combination should be avoided in patients presenting teeth's morphology alteration and hypersensitivity. As the volunteers of our cases presented teeth with no major implications, no contraindication was found for the combination of at-home and in-office bleaching whatsoever. Indeed, the patients reported a minor tooth sensitivity only during the day of HP application but the pain did not last any longer, which is in accordance with the literature [16].

Tooth sensitivity as a response of tooth bleaching may be related to the presence of hydrogen peroxide presence in pulp tissue after gel's application [14,17]. It has been recently demonstrated that the pH of high-concentrated HP gels plays a role in peroxide penetration through tooth structures towards pulp chamber [18]. Balladares et al. [19] showed that high-concentrated HP, which was used in the first case, led to the same intrapulpal concentration of HP under different application techniques (1 x 45 min or 3 x 15 min). However, three 15-min application of the same 35% HP used in the second case resulted in significant lower penetration. The pH of both bleaching gels decreased only during 1 x 45 min application. Even though availability of hydrogen peroxide is still high even after a single 45-min gel application [20], caution is still necessary when deciding to replenish or not peroxide gels since a variety of products with different and unknown pH values are commercialized [21]. To date, there is a lack of data regarding the intrapulpal penetration of low-concentrated agents and combined techniques.

Despite the fact that information in the literature is missing to indicate the sequence of bleaching techniques combination, the combinations presented in these case series were efficient to meet the expectations of the patients. According to the previously evidences discussed, combination of techniques should be indicated when supported by an adequate investigation of color aspect and expectations of each patient.

Collaborators

MA FERRETTI, responsible for the bleaching treatment and patient follow-up performed in the first clinical report; described and discussed the first clinical report. M KURY, responsible for the bleaching treatment and patient follow-up performed in the second clinical report; described and discussed the second clinical report. BC MENDONÇA, responsible for the photographic documentation of both clinical cases and prepared the figures for paper. M GIANNINI, responsible for correcting full article and paper formatting for publication. V CAVALLI, clinical supervisor responsible for treatment and follow-up the second case report. FHB AGUIAR, clinical supervisor responsible for treatment and follow-up the first case report.

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