

Jéssica de Freitas Rabelo

**Técnica de clareamento dental combinada e seu impacto na auto-percepção estética e nos fatores psicossociais em pacientes de diferentes idades: ensaio clínico**

*Combined dental bleaching technique on Esthetic Self-perception and Psychosocial Factors in patients of different ages: A Clinical Trial*

Dissertação apresentada à Faculdade de Odontologia da Universidade de Uberlândia, para obtenção do Título de Mestre em Odontologia na Área de Clínica Odontológica Integrada.

UBERLÂNDIA, 2018

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Odontológica Integrada.

Orientadora: Prof<sup>a</sup>. Dr<sup>a</sup>. Gisele Rodrigues da Silva

Banca Examinadora:  
Prof<sup>a</sup>. Dr<sup>a</sup>. Gisele Rodrigues da Silva  
Prof. Dr. Carlos José Soares  
Prof. Dr. Alessandro Dourado Loguercio

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Ata da defesa de DISSERTAÇÃO DE MESTRADO junto ao Programa de Pós-graduação em Odontologia, Faculdade de Odontologia da Universidade Federal de Uberlândia.

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As quatorze horas do dia vinte e três de fevereiro do ano de 2018 no Anfiteatro do Bloco 4L, Campus Umuarama da Universidade Federal de Uberlândia, reuniu-se a Banca Examinadora, designada pelo Colegiado do Programa de Pós-graduação em janeiro 2018, assim composta: Professores Doutores: Carlos José Soares (UFU); Alessandro Dourado Loguércio (UEPG); e Gisele Rodrigues da Silva (UFU) orientador(a) do(a) candidato(a) **Jéssica de Freitas Rabelo**. Ressalta-se que o Prof. Dr. Alessandro Dourado Loguércio participou da defesa por meio de Videoconferência na cidade de Ponta Grossa-PR e os demais membros da banca e o aluno(a) participaram *in loco*.

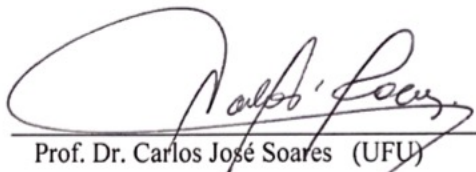
Iniciando os trabalhos o(a) presidente da mesa Dr. Gisele Rodrigues da Silva apresentou a Comissão Examinadora e o candidato(a), agradeceu a presença do público, e concedeu ao Discente a palavra para a exposição do seu trabalho. A duração da apresentação do Discente e o tempo de arguição e resposta foram conforme as normas do Programa.

A seguir o senhor (a) presidente concedeu a palavra, pela ordem sucessivamente, aos (às) examinadores (as), que passaram a arguir o (a) candidato (a). Após a arguição, que se desenvolveu dentro dos termos regimentais, a Banca, em sessão secreta, atribuiu os conceitos finais.

Em face do resultado obtido, a Banca Examinadora considerou o (a) candidato(a) A provado(a).

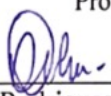
Esta defesa de Dissertação de Mestrado Acadêmico é parte dos requisitos necessários à obtenção do título de Mestre. O competente diploma será expedido após cumprimento dos demais requisitos, conforme as normas do Programa, a legislação pertinente e a regulamentação interna da UFU.

Nada mais havendo a tratar foram encerrados os trabalhos às 18 horas e 00 minutos. Foi lavrada a presente ata que após lida e achada conforme foi assinada pela Banca Examinadora.

  
Prof. Dr. Carlos José Soares (UFU)

Participou por meio de Videoconferência

\_\_\_\_\_  
Prof. Dr. Alessandro Dourado Loguércio (UEPG)

  
\_\_\_\_\_  
Profª Drª Gisele Rodrigues da Silva– UFU  
Orientador (a)

## **DEDICATÓRIA**

Dedico este trabalho primeiramente a Deus, que até aqui me ajudou. Dedico a minha mãe por toda dedicação que teve comigo e a minha orientadora que me fez crescer pessoalmente e profissionalmente.

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## RESUMO

O clareamento dental é um procedimento para melhorar a estética do sorriso do paciente. O presente estudo teve como objetivo avaliar a eficácia e o impacto na auto percepção estética e nos fatores psicossociais da técnica combinada de clareamento dental em pacientes de diferentes faixas etárias. Este ensaio clínico triplo-cego, paralelo a dois grupos, foi realizado com 56 pacientes saudáveis. Todos os pacientes receberam o mesmo tratamento de clareamento combinado (38% de peróxido de hidrogênio no consultório e 20% de peróxido de carbamida em casa). Foram avaliados, o risco de sensibilidade dentária, mudança de cor utilizando escalas visuais e qualidade de vida relacionada à saúde bucal (OHRQoL) atribuído à estética dentária, utilizando a Escala de Estética Orofacial (OES) e o Questionário de Impacto Psicossocial do Estética Dental (PIDAQ). Como resultado obtivemos que o clareamento de consultório gerou maior sensibilidade e mudança de cor mais efetiva nos pacientes mais jovens. Após a técnica combinada, ambos os grupos de pacientes apresentaram alterações de cor semelhantes e risco de sensibilidade dentária, independentemente da idade. Ambos os grupos tiveram maior nível de satisfação após a técnica de clareamento combinada e os pacientes mais jovens apresentaram maior satisfação do que os mais velhos ( $p < 0,001$ ). Os pacientes jovens sentiram-se mais felizes com o procedimento de clareamento do que os mais velhos ( $p < 0,001$ ). Após a técnica de clareamento dental combinada, OHRQoL foi melhor para ambas faixas etárias. Em relação aos escores do PIDAQ, o clareamento dental teve uma influência significativa sobre "Preocupação Estética" ( $p < 0,003$ ) para pacientes mais velhos e "Preocupação Estética" ( $p < 0,001$ ) e "Impacto Psicológico" ( $p < 0,001$ ) para pacientes jovens. Houve melhora nas pontuações de OES para ambas as faixas etárias ( $p < 0,001$ ). Sendo assim, a técnica de clareamento dental combinada foi capaz de influenciar positivamente a mudança de cor, a percepção dos pacientes sobre a estética do sorriso e, conseqüentemente, a qualidade de vida para pacientes mais jovens e mais velhos, mas, em geral, os pacientes jovens, apesar da maior sensibilidade na fase de consultório, sentiram-se mais felizes com o procedimento de clareamento do que os pacientes idosos.

**PALAVRAS-CHAVE:** Clareamento dental, Dente, Ensaio clínico, Sensibilidade, Percepção de cor

## **ABSTRACT**

Dental bleaching is a procedure to improve the aesthetics of the patient's smile. This study aimed to evaluate the effectiveness and impact on esthetic self-perception and psychosocial factors of combined dental bleaching technique on different patient's age groups. This clinical triple-blind trial, parallel with two groups, was conducted with 56 healthy subjects. All patients received the same combined bleaching treatment (38% hydrogen peroxide for the in-office and at home 20% carbamide peroxide phases). The risk tooth sensitivity, color change using visual guides and oral health-related quality of life (OHRQoL) attributed to dental esthetics, using the Orofacial Esthetic Scale (OES) and the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ). As a result, in-office bleaching caused greatest sensitivity and was more effectiveness to color change in younger subjects. After combined technique, both patients have similar color change and risk to tooth sensitivity regardless age. Both age groups had more satisfaction level after combined bleaching treatment and younger patient had more satisfaction than older ( $P<0.001$ ). Young subjects felt happier with the whitening procedure than older ( $P<0.001$ ). After combined dental bleaching technique OHRQoL was improved for both age's group. Regarding the PIDAQ scores, tooth whitening had a significant influence on "Esthetic Concern" ( $P<0.003$ ) to older subjects and "Esthetic Concern" ( $P<0.001$ ) and "Psychological Impact" ( $P<0.001$ ) to young subjects. There were improving on OES scores to both age groups ( $P<0.001$ ). Therefore, the combined bleaching technique was able to positively influences color change, patients' perception about own smile aesthetics and consequently the quality of life for younger and older patients but overall, young patients in spite of related greater sensitivity in-office phase felt happier with the whitening procedure than older patients.

**KEY WORDS:** Clinical Trials, Color Perception, Sensitivity, Tooth, Tooth Bleaching

## 1. INTRODUÇÃO E REFERÊNCIAL TEÓRICO

O clareamento dental é um procedimento estético bastante difundido mundialmente, além de ser um tratamento conservador, simples e mais comumente realizado por clínicos para se obter um sorriso esteticamente agradável<sup>1</sup> e tem sido alvo de vários estudos laboratoriais e clínicos. Na técnica em consultório, utilizam-se peróxidos em altas concentrações, variando de 20% a 38%<sup>2,3</sup>. Na técnica caseira emprega-se peróxido de carbamida em concentrações que variam de 10% a 22% ou peróxido de hidrogênio em concentrações que variam de 4% a 10%.<sup>4</sup> Na tentativa de diminuir o número de sessões de clareamento no consultório, ou quando os pacientes não apresentam completa satisfação com a técnica de consultório, alguns autores propuseram a técnica de clareamento combinado.<sup>5-6</sup> Neste protocolo combinado, uma única sessão de clareamento no consultório é realizada e, em seguida, o clareamento continua sendo realizado em casa com a utilização de moldeira individual<sup>5</sup>. Alguns autores relataram que a combinação das técnicas reduziu o risco de sensibilidade dentária (TS) e irritação gengival, e obtiveram resultados satisfatórios em termos de clareamento<sup>5</sup>.

O peróxido de hidrogênio difunde-se através do esmalte e dentina com relativa facilidade, devido ao seu baixo peso molecular<sup>6-7</sup> e estando ativo, é efetivo para quebrar macromoléculas de pigmentos ou para permitir a abertura do anel de carbono das moléculas de pigmentos, convertendo-os em ligações simples que são de cor mais clara<sup>6-7</sup>. A sensibilidade dentinária é um efeito adverso comumente encontrado durante o tratamento clareador, principalmente com a utilização de peróxidos mais concentrados. Esse efeito pode variar de uma sensibilidade leve à severa, e sua intensidade tende a decrescer com o passar do tempo, não perdurando por mais de 48h<sup>8,9</sup>. Com relação à efetividade da cor, de acordo com a *American Dental Association* (ADA), os agentes clareadores são efetivos quando a cor reduz pelo menos quatro níveis na escala de cor ou quando decresce pelo menos três níveis no sistema CIELab<sup>10</sup>.

A cor do dente é um dos fatores mais importantes na realização de um sorriso estético agradável<sup>11</sup>. Também influencia substancialmente a auto percepção estética e tem um impacto psicossocial sobre as pessoas. Um ideal estético

depende de vários fatores, como cultura, educação, idade e gênero<sup>12,13</sup>. Com o avanço da idade e o envelhecimento, os dentes sofrem alterações de cor, apresentando coloração mais amarelada ou acinzentada<sup>14</sup>. O fato é que a maioria dos trabalhos que envolvem a técnica do clareamento dental, têm como fator de inclusão apenas pacientes adultos jovens, excluindo pacientes de faixas etárias mais avançadas. Por isso, é fundamental avaliar a técnica de clareamento dental nesses pacientes com mais idade, uma vez que é um tratamento que não causa dano para os indivíduos<sup>2</sup>, além de ser interessante saber se existe influência do processo de envelhecimento das estruturas dentárias na efetividade do clareamento dental.

Sendo assim o objetivo desta pesquisa foi desenvolver um estudo clínico randomizado, no qual avaliou-se a mudança de cor, risco de sensibilidade e a satisfação do paciente frente ao clareamento dental utilizando a técnica combinada. Após duas sessões clareamento de consultório (peróxido de hidrogênio 38%- Opalescende Boost-ULTRADENT- Jordânia do Sul/ Estados Unidos), o voluntário recebeu uma moldeira individual e o gel clareador (Peróxido de carbamida 20%- Opalescence PF-ULTRADENT) juntamente com as orientações de como prosseguir o clareamento em casa. A hipótese nula desse estudo clínico consistiu em não haver diferença na efetividade, satisfação do paciente e no risco de sensibilidade dentinária em pacientes de diferentes faixas etárias: 18 à 25 anos e 40 à 65 anos.

## **CAPÍTULO 1**

### **Combined dental bleaching technique on esthetic self-perception and psychosocial factors in patients of different ages: A clinical trial**

Jéssica de Freitas Rabelo<sup>1</sup>, Isabela Sousa de Araújo<sup>2</sup>, André Luís Faria e Silva<sup>3</sup>, Paulo César de Freitas Santos Filho<sup>4</sup>, Gisele Rodrigues da Silva<sup>4</sup>

<sup>1</sup>DDS, MSc student, Department of Operative Dentistry and Dental Materials, School of Dentistry, Federal University of Uberlândia, Uberlândia, MG, Brazil.

<sup>2</sup>DDS, MSc, PhD student, Department of Operative Dentistry and Dental Materials, School of Dentistry, Federal University of Uberlândia, Uberlândia, MG, Brazil.

<sup>3</sup>DDS, MSc, PhD, Professor, Department of Operative Dentistry, School of Dentistry, Federal University of Sergipe, Alagoas, SE, Brazil.

<sup>4</sup>DDS, MSc, PhD, Professor, Department of Operative Dentistry and Dental Materials, School of Dentistry, Federal University of Uberlândia, Uberlândia, MG, Brazil.

Corresponding author:

Dr. Gisele Rodrigues da Silva

Federal University of Uberlândia

School of Dentistry

Avenida Pará, 1720, Bloco 4L, Anexo A, Sala 4LA33, Campus Umuarama.

Uberlândia - Minas Gerais – Brazil | CEP: 38405-320

Tel.: +55 34 3225 8106

E-mail: giselerosilva@yahoo.com.br

## **Combined dental bleaching technique on esthetic self-perception and psychosocial factors in patients of different ages: A clinical trial**

### **ABSTRACT**

**Background:** This study aimed to evaluate the effectiveness and impact of the combined dental bleaching technique on esthetic self-perception and psychosocial factors on patients from different age groups.

**Methods:** This triple-blind clinical trial, parallel with two groups (Younger: 18 to 25 years; and Older: 40 to 65 years), was conducted with 56 healthy subjects. All patients received the same combined bleaching treatment protocol (in-office: 38% hydrogen peroxide; at home: 20% carbamide peroxide). The risk for tooth sensitivity, color change using visual guides and oral health-related quality of life (OHRQoL) attributed to dental esthetics using the Orofacial Esthetic Scale (OES) and the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) were assessed for the patients of both groups.

**Results:** In-office bleaching produced greatest sensitivity and was more effective for promoting color change in younger subjects. After using the combined technique, patients presented similar tooth sensitivity and color change, regardless of the age group. The both age groups showed increased satisfaction level after using the combined bleaching technique, while younger subjects presented more satisfaction with the treatment than older ( $P<0.001$ ). Young subjects felt happier with the whitening procedure than older ( $P<0.001$ ). After the combined dental bleaching technique, OHRQoL was improved for the both groups. Regarding the PIDAQ scores, tooth whitening had a significant influence on the “Esthetic Concern” ( $P<0.003$ ) to older subjects and “Esthetic Concern” ( $P<0.001$ ) and “Psychological Impact” ( $P<0.001$ ) to young subjects. Improved OES scores were detected for both age groups ( $P<0.001$ ).

**Conclusion:** The combined bleaching technique was able to positively influence color change, patients' perception about own smile aesthetics and consequently the quality of life for younger and older patients. Despite greater sensitivity

observed on the in-office phase, younger patients felt happier with the whitening procedure than older subjects.

**Practical Implications:** The difference between the ages of subjects influenced the satisfaction and efficacy of tooth bleaching.

**Key Words:** Clinical Trials, Color Perception, Sensitivity, Tooth, Tooth Bleaching.

## INTRODUCTION

Dental appearance is a determining factor in the facial esthetics and is decisively to the personal satisfaction of patients. Physiological changes can occur in dental tissues over time,<sup>1,2</sup> with increased chromaticity in teeth from elderly patients due the presence of more translucent enamel following the reduction on its thickness by physiological wearing. Additionally, it was reported that the ongoing remineralization and continuous deposition of secondary dentin could result in yellowing of teeth with ageing.<sup>1,2</sup> Tooth color is one of the most important factors for achieving an esthetically pleasing smile. It also can substantially influences esthetic self-perception besides producing a psychosocial impact.<sup>3</sup> An esthetic ideal depends on several factors such as culture, education, age, and gender.<sup>4</sup> Dental bleaching is a recognized therapy for improving smile aesthetics and has been investigated by several laboratory and clinical studies.<sup>5-11</sup> The effectiveness of at-home and in-office dental bleaching techniques and the degree of whitening can be affected by individual response, product formulation and using protocol.<sup>1-13</sup> Regardless of the protocol or bleaching used, the peroxides and their sub-products act on the organic structure of the tooth substrates, resulting in lighter color aspect.<sup>14,15</sup>

Despite color changes, according to the American Dental Association (ADA), bleaching agents are effective when the color levels are reduced at least four levels in the visual color scale or when it decreases at least three levels in the CIELab scale system.<sup>16,17</sup> Despite the known favorable changes in tooth color produced by dental bleaching techniques, tooth sensitivity is a common side effect of vital tooth bleaching, especially when suing more concentrated peroxides<sup>18,19</sup>, since the higher the concentration of the bleaching agent, the

higher the aggression to pulp cells.<sup>20,21</sup> Thereby, the combined bleaching technique (in-office and at-home) has been proposed to reduce the risk of increased tooth sensitivity (TS) and gingival irritation while obtaining satisfactory results in terms of whitening.<sup>22-25</sup> However, it is unclear if age would influence the satisfaction of patients with bleaching outcomes, since most of clinical trials included only young subjects, with mean age not exceeding 30 years.<sup>26</sup>

Therefore, this study aimed to evaluate the effectiveness and impact of the combined dental bleaching technique on esthetic self-perception and psychosocial factors on patients from different age groups (younger patients (YP):18 to 25 years; and older patients (OP):40 to 65 years). The null hypothesis tested was that no significant differences would be detected in the treatment effectiveness or in the esthetic self-perception and psychosocial impact of younger and older patients treated with combined bleaching technique using in-office 38% hydrogen peroxide and 20% carbamide peroxide for at-home bleaching.

## **MATERIAL AND METHODS**

### *Ethics approval, trial design, settings, and data collection location*

This clinical investigation was approved by the local Ethics Committee (#5725221620005152) and the research protocol was registered at *clinicaltrials.gov* (#NCT03194984) and conducted according to CONSORT guidelines.<sup>27</sup> Prior to the participation, all subjects were informed about the purpose of the study and signed a written informed consent.

The study design was parallel, with allocation ratio of 1:1, comparing the outcomes from dental bleaching between younger and older patients, making impossible to blind the operator, evaluator and participants, or to perform any randomization. The study was conducted at the school of dentistry of the Federal University of Uberlândia from July to December 2017.

### *Recruitment and eligibility criteria*

Patients included in this clinical trial were selected and divided into two age groups, 18 to 25 years and 40 to 65 years, presenting good general and oral health and without reporting any type of tooth sensitivity. The subjects were required to have at least six caries-free maxillary anterior teeth without restorations and periodontal disease. The upper canines should match A2 or darker<sup>3</sup> shade as verified by comparison with a value-oriented shade guide (Vita Classical, Vita Zahnfabrik, Bad Säckingen, Germany). Subjects presenting anterior restorations or dental prosthesis, with orthodontics apparatus, severe internal tooth discoloration (tetracycline stains, fluorosis and pulpless teeth) were not included in this study. Additionally, pregnant/lactating women, or subjects with any other pathologies that could cause teeth sensitivity such as recession, dentine exposure or presence of visible cracks in teeth, smokers, bruxists or subjects that had undergone tooth-whitening procedures were also excluded.

### *Sample size calculation*

To perform the sample calculation, a minimum sample size of 56 patients (28 per group) was required to have an 90% chance of detecting a decrease in the primary outcome measure from 90% in the control group to 45% in the experimental group with a 5% significance level. Moreover, an adjustment of 9.5% was considered to non-compliance/cross-over.<sup>6,28,29</sup> The sample size was calculated on the website [www.sealedenvelope.com](http://www.sealedenvelope.com).

### *Study intervention*

The patients from the both age groups received the same combined bleaching treatment in the maxillary/mandibular dental arches. Two weeks before the bleaching procedures, all the volunteers received a dental prophylaxis using a rubber cup with pumice and water. For the treatment, patients were submitted to two clinical sessions of in-office bleaching with 38% hydrogen peroxide gel (Opalescence Boost, Ultradent, South Jordan, UT, United States) and then, bleaching was continued using at-home protocol with a silicon tray, delivering 20% carbamide peroxide gel (Opalescence PF, Ultradent). The composition and

mode of application of the bleaching products are detailed in Table I. The 38% hydrogen peroxide gel was used in three subsequent 15 min applications following manufacturer's directions. Two bleaching sessions with one-week interval were performed for in-office bleaching. Thus, the tray-delivered at-home bleaching was initiated with 20% carbamide peroxide (Opalescence PF, Ultradent). The patients were instructed to load the bleaching tray with the gel and wear it for two hours daily over the period, until complete satisfaction achieved within the maximum time of 30 days. All subjects were instructed to brush their teeth regularly using fluoridated toothpaste, provided by the researchers.

#### *Color evaluation*

Two calibrated evaluators recorded the tooth shade of each participant before, after the in-office (after 30 days), and after the at-home bleaching treatment (combined technique) until complete satisfaction of the patients was achieved within the maximum period of 30 days. The color changes were assessed by SGU (shade guide units) using a conventional value-oriented shade guide (Vita Classical, Vita Zahnfabrik ) and a bleached shade guide (Vita Bleachedguide 3D-MASTER, Vita Zahnfabrik). For the subjective examination using the Vita Classical shade guide, its 16 tabs were arranged from highest (B1) to lowest (C4) value. Although this scale is not linear in the truest sense, we treated the changes as representing a continuous and approximately linear ranking for the purpose of analysis, as already performed in several studies.<sup>18,29</sup> The Vita Bleachedguide 3D-MASTER (Vita Zahnfabrik) contains lighter shade tabs and is already organized from highest (0M1) to lowest (5M3) value.<sup>30</sup> The buccal middle third surface of the upper canines was used as reference for shade matching evaluation.

The two examiners, blinded to study factor, scheduled the patients for bleaching and evaluated teeth shade using the shade guides at the different time assessments. Color changes were calculated from the beginning of the bleaching active phase through to the individual recall times by calculating the changes in the number of shade guide units ( $\Delta$ SGU), which occurred toward the lighter end

of the value-oriented list of shade tabs. In the event of disagreements between the examiners during shade evaluation, a consensus was reached by a third experienced examiner.

#### *Tooth sensitivity evaluation (TS)*

TS was evaluated at baseline, and 1 h, 24 h and 48 h after in-office bleaching, and daily during the at-home dental bleaching. The patients were asked to indicate the degree of TS at the different assessment points using a five-point verbal rating scale, in which 0 = none, 1 = mild, 2 = moderate, 3 = considerable, and 4 = severe sensitivity. If the patient selected zero (no TS) for all the assessments, this patient was considered to be insensitive to the bleaching protocol. In all other circumstances, the patients were considered to have a determinate degree of sensitivity to the bleaching procedure. This dichotomization allowed us to calculate the absolute risk of TS, which represents the percentage of patients who reported TS at least once during the treatment. Moreover, the relative risk of TS was also calculated using data from younger patients as control. If any patient reported severe TS, the researchers immediately helped the patient to reverse the pain using desensitizing gels or analgesic/anti-inflammatory medications.<sup>28-32</sup>

#### *Assessment of patient's satisfaction*

As a measure of oral health-related quality of life (OHRQoL) attributed to dental esthetics, subjects reported the dimensions of their OHRQoL<sup>33-35</sup> using the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ),<sup>36-38</sup> and the Orofacial Esthetic Scale (OES).<sup>36-38</sup> These psychometric instruments were applied for each participant before, after the in-office and after the at-home bleaching treatments (combined technique). PIDAQ contains 23 items with answers on a five-point Likert-type scale with values ranging from 0 = no impact, to 4= maximal impact. Items were grouped into four dimensions: dental self-confidence (6 items), social impact (8 items), psychological impact (6 items), and esthetic concern (3 items).<sup>38</sup> OES has 8 items with answers based on a ten-point

Likert-type scale with values ranging from 1 = completely unsatisfied, to 10 = completely satisfied. OES has one dimension that evaluates satisfaction with smile. Moreover, after in-office and at-home bleaching procedures, the level of satisfaction of patients with their smile was assessed by visual analogic scale (VAS), in cm, and subjects answered about the following questions on a Likert-type five-point scale:

- Regarding the teeth color achieved with the bleaching procedures, where 0 = I did not notice any change on my teeth color; 1 = There was a slight color change, but it was not noticed by other persons; 2 = There was a slight color change noticed by other persons; 3 = There was a moderate color change; 4 = There was a significant color change.
- How do you define your level of satisfaction with the ultimate color achieved with the bleaching procedures?, where 0 = Very unhappy; 1 = Unhappy; 2 = Happy; 3 = Very happy; 4 = Extremely happy.

#### *Statistical analysis*

The analysis followed the intention-to-treat protocol and involved all subjects who were allocated to the groups.<sup>39</sup> In case of missing data, the last observation was carried forward. The statistician was blinded to the study groups. For bleachedguide and Vita Classical scales, the number of shade guide units ( $\Delta$ SGU) were calculated from baseline to express the color alteration. Mann-Whitney test was used to analyze the effect of patient's age on color changes and scores attributed to answers of questions regarding the patient's perception about the results of tooth bleaching. The Wilcoxon Signed Rank Test was used to evaluate the effect assessment time about the parameters above mentioned. Data of satisfaction level of patients after bleaching procedures were submitted to 2-way repeated measures ANOVA, while the factors evaluated were "patient's age" and "assessment time" (repetition factor). The time spent by patients with at-home bleaching until satisfaction with the treatment was analyzed by Mann-Whitney Rank Sum test.

For PIDAQ data, the score observed at different assessment times were performed by paired t-test. When PIDAQ scores were not normally distributed (Shapiro-Wilk test), the non-parametric Wilcoxon Signed Rank Test was used. The effect of size for each domain and total scores were calculated by differences between the means (observed effect) by means observed at baseline. For each question of OES, means observed at baseline were compared to those recorded after combined tooth bleaching by paired t-test. Wilcoxon Signed Rank Test was used when data did not present normal distribution (Shapiro-Wilk Test). The effect size for each question was calculated using the same procedure described for PIDAQ. Absolute risks and confidence intervals at 95% of patients to report any sensitivity at verbal scale (score different from 0) were calculated for each experimental condition (bleaching assessment time  $\times$  patient's age). Polled absolute risk for each patient's age was also calculated. The relative risks and confidence intervals at 95% were calculated using the younger patients as control and differences on absolute risks between younger and older patients were assessed by Fisher's Exact test. Data analysis was performed using the SigmaStat v.3.5 statistical software package (Systat Software Inc., Chicago, IL, USA). The significance level was set at  $\alpha = 0.05$  for all analyses.

## RESULTS

### *Characteristics of the enrolled subjects*

A total of 56 subjects were selected according to the eligibility criteria (Figure 1). For the younger patient group the mean (SD) age was 21 (0.9) years and for the older patients group the mean (SD) age was 44.6 (6.8) years.

### *Color evaluation and risk to tooth sensitivity*

At the end of the bleaching protocols, a whitening of approximately 4 shade guide units was detected for the both groups, what means a relevant clinical whitening. Results for SGU (Vita Classical and Vita Bleached guides) differed over assessment time ( $P < 0.001$ ), as shown in Table II. In-office bleaching caused greater sensitivity (Table 3) and was more effective to color change

(Table 2) in younger patient group than in the older patient group. However, after combined technique, both groups have similar color change (Table 2) and risk to tooth sensitivity, regardless age (Table 3).

#### *Patient's satisfaction analysis*

As measured by VAS, both age groups had more satisfaction level after combined bleaching treatment and younger patient group had more satisfaction than the older patient group (Table 4). The mean number of days of at-home treatment required for subjects to report being completely satisfied was similar between groups (about 20 days;  $p=0.675$ ). On the other hand, Table 5 showed an increased perception to significant color change after in-office bleaching to younger patient group, but the scores became similar for the both groups after using the combined technique and the results of color changes after the last bleaching phase was more perceived by the older patient group. Overall, young patient group felt happier with the whitening procedure than the older patient group.

It seems that tooth bleaching improved the oral health-related quality of life (OHRQoL) of the evaluated patients. The PIDAQ scores (Table 6) were significantly different at baseline compared with combined bleaching treatment to older patient group ( $P<0.001$ ), especially on the "Esthetic Concern" item ( $P<0.003$ ). For the younger patient group, tooth whitening had a significant influence on the items "Esthetic Concern" ( $P<0.001$ ) and "Psychological Impact" ( $P<0.001$ ). Improved scores for the Orofacial Esthetic Scale are shown in Table 7 to both age groups ( $P<0.001$ ) after using the combined dental bleaching technique.

## **DISCUSSION**

The null hypothesis tested in this clinical trial was accepted since no significant differences were found for the combined bleaching technique outcomes and oral health-related quality of life in the both age groups evaluated.

However, in overall, younger patient group felt happier with the whitening procedure than the older patient group and after the in-office bleaching phase, the younger patient group showed more effectiveness to color change in spite of greater sensitivity than the older patient group. The findings of an earlier study showed the variability of bleaching efficacy among people, what could be explained by the combination of the independent factors as baseline color, age and bleaching technique used<sup>26</sup> This study also detected that with an increase of one year in the participant age, resulted in a 0.07 decrease in the degree of whitening for the final  $\Delta$ SGU.<sup>26</sup>

The tooth color is determined mainly by the color of dentin and hydrogen peroxide whitens teeth by oxidizing their transparent organic matrix into an opaque whiter material.<sup>15</sup> But over time, teeth reduce its organic content by the occlusion of dentinal tubules with mineral deposition,<sup>1</sup> and the enamel hydroxyapatite crystals can be increased with age,<sup>40</sup> reducing the permeability of enamel to hydrogen peroxide. Thereby the degree of whitening is negatively affected by the patient age. However, we observed in the present clinical trial that after using the combined bleaching technique, the whitening results become similar, regardless of the age group. Additionally, similar mean periods were required for obtaining satisfaction with the whitening results during at-home bleaching phase for the both age groups. A previous multi regression and logistic analysis<sup>26</sup>, including patients not exceeding 30 years of mean age, revealed that baseline tooth color was shown to have a significant effect on overall whitening efficacy; the darker the teeth, the higher the degree of whitening. Perhaps, the lower whitening magnitude to younger patients after at-home protocol might be reflected by the lighter color obtained after the in-office bleaching phase. If there is little to bleach, then of course the scope for lightening will be limited.<sup>41</sup>

Another parameter analyzed was tooth sensitivity. It is widely known that tooth sensitivity is an undesirable side effect of bleaching.<sup>28-32</sup> Hydrogen peroxides promote an inflammatory reaction of different magnitudes in the dental pulp,<sup>42</sup> which releases inflammatory mediators. These mediators are responsible for pain, local vasodilation and increased vascular permeability.<sup>43-45</sup> Bleaching gels with a higher concentration whiten the teeth at a faster rate, but are more

likely to cause increased tooth sensitivity.<sup>18-21</sup> In this study, in-office bleaching caused greater sensitivity in absolute risk for both groups. Hydrogen peroxide with higher concentrations diffuses more quickly through the tissues than the products with lower concentration.<sup>46</sup> Researchers have suggested that the oxygen bubbles that form in dentinal tubules during the application of hydrogen peroxide can cause movements in the dentinal fluids, which activate nerve endings.<sup>47</sup>

Another theory suggests that hypersensitivity could be caused by oxygen released from the bleaching agents that passes through the permeable enamel and dentin, causing harm to the pulp tissues.<sup>48</sup> Moreover, the absolute risk of tooth sensitivity is commonly decreased with age after in-office bleaching. Older patients have a thicker dentin structure than younger patients and hydrogen peroxide needs to travel longer to reach the pulp tissue in older teeth, reducing the amount of hydrogen peroxide that reaches the pulp and the consequent damage. However, a previous study have not showed correlation between age and bleaching-induced tooth sensitivity, maybe because the subjects mean age have not exceeded 30 years.<sup>26</sup>

The present study showed that the bleaching procedure improved the oral health-related quality of life (OHRQoL) for the enrolled subjects, especially on esthetic and psychological concerns. The both age groups presented increased satisfaction level after using the combined bleaching treatment, with younger patient group showing more satisfaction and felling happier than the older patient group after whitening procedures. Quality of life criteria is complex, important, and poorly reported, and multiple factors may influence it. However, dental esthetics is important, even if the influence of patient perception and the impact of psychological and social factors is little studied and known.<sup>3,49</sup> The PIDAQ is a specialized tool for the evaluation of a dental aesthetic-related quality of life, developed at Germany, tested in young adults between 18 and 30 years published in English<sup>35</sup> and validated in a Portuguese version.<sup>50</sup> The original instrument was not designed for patients who have undergone bleaching as it is usually used for orthodontic patients<sup>35</sup> to determine their esthetic expectations; however, it fails to evaluate which areas are expected to be modified to solve a

particular esthetic problem.<sup>3,49</sup> The PIDAQ consists of 23 items grouped into one positive domain: dental self-confidence and three negative domains: aesthetic concern, psychological impact and social impact. A decrease of the values in the field of esthetic concerns,<sup>3</sup> were detected after bleaching, regardless of the patient age group.

The psychosocial impact was more observed on younger subjects. This may be related to many other elements, aside from color, that can be influenced by the perception of how one sees and the opinion of others about oneself, which is not so important for the older subjects since they are already satisfied with themselves. In the biopsychosocial model of health conditions, the clinical findings should be taken into considerations for the context of a patient's perception of restrictions on their ability to perform everyday activities, social contact and the alterations of emotions, all of which provide guidelines for various therapeutic options and the dynamics of problem solving.<sup>51</sup> This is a likely reason why younger individuals could were able to perceive better the results of the bleaching and were more demanding when evaluating tooth color. On the other hand, OES is a more specific tool to measure satisfaction with the smile aesthetics. For this reason, it was able to demonstrate that dental bleaching positively influences patients' perception of their own facial appearance, mouth, teeth and gingiva, regardless of their age.

## **CONCLUSION**

The combined bleaching technique was able to influence the color change of teeth, patients' perception about own smile aesthetics and consequently the quality of life for younger and older patients, but overall, young subjects felt happier with the whitening procedure than older. However, regarding only the in-office phase the younger patients had more effectiveness to color change and greater sensitivity than older subjects.

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## Illustrations

**Figure 1:** Flow diagram of the clinical trial, including detailed information on the excluded subjects.

**Table 1.** Details of the Brand, Composition, and Mode of Application of Each Bleaching Product According the Manufacturer

**Table 2.** Medians (1<sup>st</sup>/ 3<sup>rd</sup> quartiles) of color changes assessed by SGU using the Vita Classical and Bleachedguide scales.

**Table 3.** Risk to tooth sensitivity during any assessment time according to patient`s age.

**Table 4.** Means (standard deviation) of level satisfaction of patients after bleaching procedures and time spent by subjects with at-home bleaching until be satisfied.

**Table 5.** Medians (1<sup>st</sup>/ 3<sup>rd</sup> quartiles) of scores attributed to answers of questions regarding the patient`s perception about the results of tooth bleaching procedures.

**Table 6.** Means (standard deviation) of responses for each domain of the PIDAQ questionnaire measured at baseline and after combined tooth bleaching.

**Table 7.** Means (standard deviations) of responses for each question of the OES questionnaire measured at baseline and after combined tooth bleaching.

Figure 1: Flow diagram of the clinical trial, including detailed information on the excluded subjects.

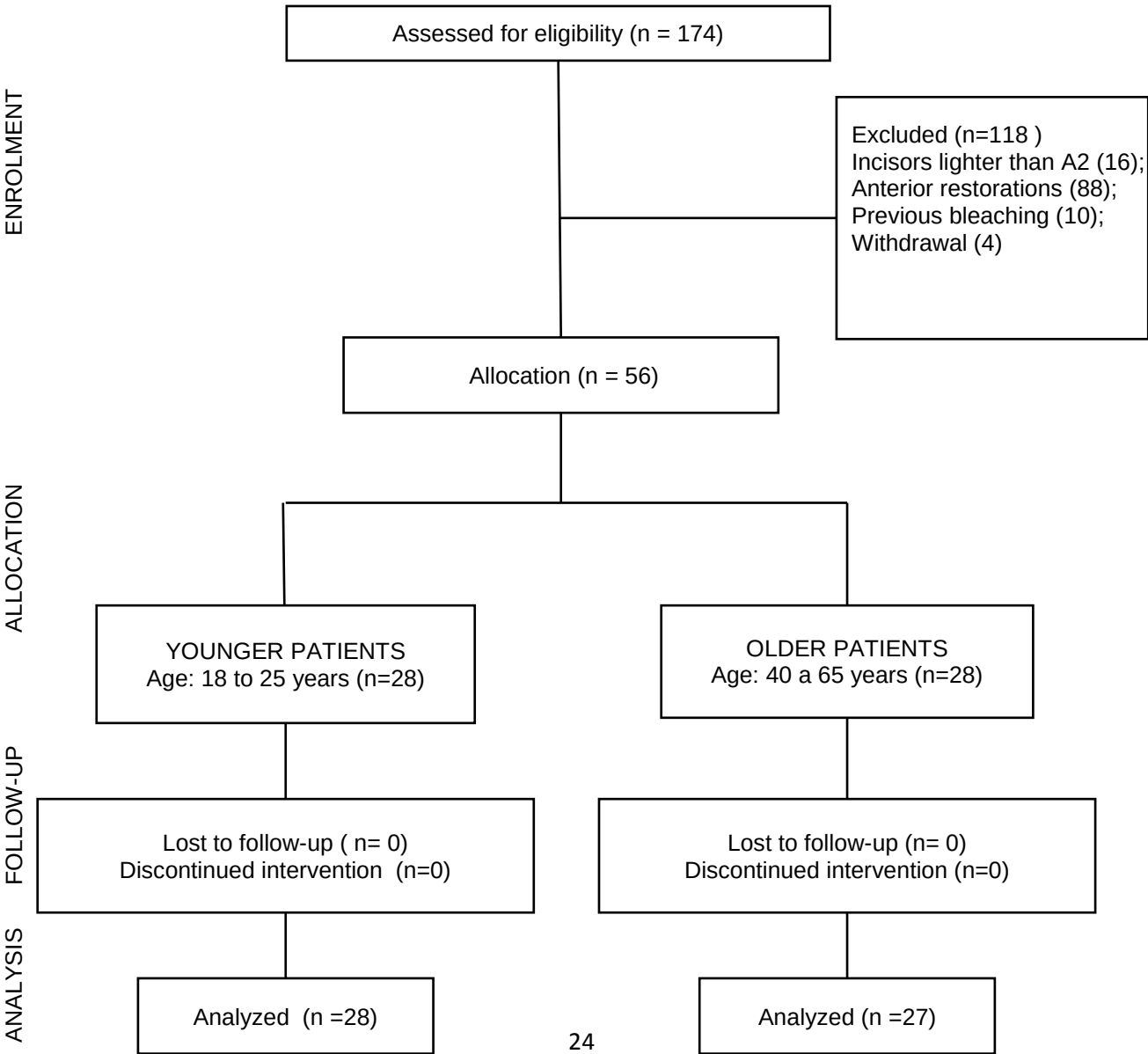


**Table 1.** Details of composition and mode of application of each bleaching product according to the manufacturer's directions.

| Material/Brand                                         | Composition                                                                                                                                                                                                                           | Mode of Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 38% hydrogen peroxide<br>(Opalescence Boost/Ultradent) | <i>Active ingredient:</i> 38% hydrogen peroxide (after mixture of phases). pH: 7.6<br><i>Inactive ingredients:</i> Thickeners, inert red pigment, neutralizing agent, potassium nitrate, sodium fluoride, glycol, and deionized water | 1.Ensure the red and clear syringes are securely attached together<br>2.Press the plunger of the red syringe in, pushing all the contents into the clear syringe. Mix the contents of both phases by alternately pressing the plungers of the syringes in opposite directions up to thirteen times on each side.<br>3.Press the entire mixture content into one of the syringes.<br>4.Apply a 0.5–1.0mm thick layer to the labial surface of the tooth and slightly onto the incisal/occlusal surfaces.<br>5.Allow the gel to remain on the teeth for 15 minutes.<br>6.Suction gel from teeth surgical Suction tip without use water.<br>7.Repeat steps 5–7 three times at each clinical appointment. |
| 20% carbamide peroxide<br>(Opalescence PF,/Ultradent). | 20% Carbamide peroxide, neutralized carbopol, potassium nitrate, sodium fluoride, humectant (glycol), deionized water. pH: 6.3-6.6                                                                                                    | 1. Press the syringe plunger and apply the bleaching gel into the dental tray. The small drop per tooth is sufficient to cover the teeth.<br>2.Place the tray on the teeth and press lightly so that the gel is distributed all over the dental surface.<br>3. Remove the excess gel with a finger or toothbrush.<br>4.Use the gel for two hours.<br>5.Wash the tray well before storing it and using it.                                                                                                                                                                                                                                                                                             |

**Table 2 .** Medians (1<sup>st</sup>/ 3<sup>rd</sup> quartiles) of color changes assessed by SGU using the Vita Classical and Bleachedguide scales.

| SGU                  | Assessment time | Patient's age      |                   | p-value* |
|----------------------|-----------------|--------------------|-------------------|----------|
|                      |                 | Younger subjects   | Older subjects    |          |
| Vita Classical scale | After in-office | -7.0 (-9.0/ -6.0)  | -6.0 (-7.0/ -4.0) | 0.020    |
|                      | After at-home   | -8.0 (-10.0/ -8.0) | -8.0 (-9.3/ -7.0) | 0.204    |
|                      | P-value**       | < 0.001            | < 0.001           |          |
| Bleachedguide scale  | After in-office | -4.0 (-5.0/ -4.0)  | -4.0 (-4.5/ -2.0) | 0.028    |
|                      | After at-home   | -6.5 (-7.0/ -6.0)  | -6.0 (-7.5/ -5.0) | 0.432    |
|                      | P-value**       | < 0.001            | < 0.001           |          |

\* Mann-Whitney Rank Sum Test, evaluating the effect of patient's age; \*\* Wilcoxon Signed Rank Test, evaluating the effect assessment time. SGU – shade guide units.

**Table 3.** Risk to tooth sensitivity during any assessment time according to patient's age.

| Time assessment | Younger subjects                |                        | Older subjects                  |                        | Relative risk * (95% CI) | P-value** |
|-----------------|---------------------------------|------------------------|---------------------------------|------------------------|--------------------------|-----------|
|                 | # subjects with any TS/ # total | Absolute risk (95% CI) | # subjects with any TS/ # total | Absolute risk (95% CI) |                          |           |
| In-office       | 28/28                           | 1.00 (0.88-1.00)       | 23/28                           | 0.82 (0.64-0.92)       | 0.82 (0.69-0.98)         | 0.051     |
| At-home         | 25/28                           | 0.89 (0.73-0.93)       | 20/28                           | 0.71 (0.53-0.85)       | 0.80 (0.61-1.05)         | 0.177     |

\* Risk relative calculated using data from younger subjects as control. \*\* Fisher's exact test. TS – tooth sensitivity. CI – confidence interval.

**Table 4.** Means (standard deviation) of level satisfaction of subjects after bleaching procedures and time spent by subjects with at-home bleaching until be satisfied.

| Patient's age    | Level of satisfaction of subjects with their smile assessed by VAS (in cm) |                        |                        | Time of at-home bleaching (days)* |
|------------------|----------------------------------------------------------------------------|------------------------|------------------------|-----------------------------------|
|                  | Assessment time                                                            |                        | Pooled average         |                                   |
|                  | After in-office                                                            | After at-home          |                        |                                   |
|                  |                                                                            |                        |                        |                                   |
| Younger subjects | 7.8 (1.3)                                                                  | 9.9 (0.3)              | 8.9 (1.4) <sup>a</sup> | 20.3 (6.2)                        |
| Older subjects   | 6.8 (1.5)                                                                  | 9.2 (1.4)              | 8.0 (1.8) <sup>b</sup> | 20.2 (6.6)                        |
| Pooled average   | 7.3 (1.4) <sup>B</sup>                                                     | 9.5 (1.0) <sup>A</sup> |                        |                                   |

For level of satisfaction, distinct letters (uppercase for line, lowercase for column) indicate statistical difference ( $p < 0.05$ ). For level of satisfaction, factor "patient's age" –  $p = 0.002$ ; factor "assessment time" –  $p < 0.001$ ; interaction –  $p = 0.373$ . \* Data did not present normal distribution and were analyzed by Mann-Whitney Rank Sum Test ( $p = 0.675$ ).

**Table 5.** Medians (1<sup>st</sup>/ 3<sup>rd</sup> quartiles) of scores attributed to answers of questions regarding the patient's perception about the results of tooth bleaching procedures.

| Question 1. Regarding the teeth color achieved with the bleaching procedures.<br>0 – I didn't notice any change on my teeth color; 1 – There was a slight color change, but it wasn't noticed by other persons; 2 - There was a slight color change noticed by other persons; 3 – There was a moderate color change; 4 – There was a significant color change |                  |                |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------|----------|
| Assessment time                                                                                                                                                                                                                                                                                                                                               | Patient's age    |                | p-value* |
|                                                                                                                                                                                                                                                                                                                                                               | Younger subjects | Older subjects |          |
| After in-office                                                                                                                                                                                                                                                                                                                                               | 4.0 (3.0/ 4.0)   | 3.0 (2.0/ 4.0) | 0.011    |
| After at-home                                                                                                                                                                                                                                                                                                                                                 | 4.0 (4.0/ 4.0)   | 4.0 (3.0/ 4.0) | 0.249    |
| P-value**                                                                                                                                                                                                                                                                                                                                                     | 0.068            | < 0.001        |          |
| Question 2. How do you define your level of satisfaction with the ultimate color achieved with the bleaching procedures?<br>0 – Very unhappy; 1 Unhappy; 2 - Happy; 3 – Very happy; 4 – Extremely happy.                                                                                                                                                      |                  |                |          |
| Assessment time                                                                                                                                                                                                                                                                                                                                               | Patient's age    |                | p-value* |
|                                                                                                                                                                                                                                                                                                                                                               | Younger subjects | Older subjects |          |
| After in-office                                                                                                                                                                                                                                                                                                                                               | 3.0 (2.0/ 3.0)   | 2.0 (2.0/ 3.0) | 0.030    |
| After at-home                                                                                                                                                                                                                                                                                                                                                 | 4.0 (3.8/ 4.0)   | 3.0 (2.0/ 3.0) | < 0.001  |
| P-value**                                                                                                                                                                                                                                                                                                                                                     | < 0.001          | 0.064          |          |

\* Mann-Whitney Rank Sum Test, evaluating the effect of patient's age; \*\* Wilcoxon Signed Rank Test, evaluating the effect assessment time.

**Table 6.** Means (standard deviation) of responses for each domain of the PIDAQ questionnaire measured at baseline and after combined tooth bleaching.

| Domains                          | Baseline           | After bleaching   | P-value <sup>1</sup> | Observed effect   | Effect size  |
|----------------------------------|--------------------|-------------------|----------------------|-------------------|--------------|
| Younger subjects                 |                    |                   |                      |                   |              |
| Esthetic Concern (3 items)       | 6.0 (3.1)          | 3.8 (1.5)         | < 0.001 <sup>2</sup> | -2.2 (3.3)        | -0.37        |
| Psychological Impact (6 items)   | 15.0 (3.8)         | 17.3 (2.8)        | < 0.001              | 2.3 (3.1) ¥       | 0.15         |
| Social Impact (8 items)          | 17.1 (5.1)         | 16.0 (2.3)        | 0.185                | -1.1 (4.3)        | -0.06        |
| Dental Self-confidence (6 items) | 14.8 (3.0)         | 13.7 (2.2)        | 0.066                | -1.1 (3.1)        | -0.07        |
| <b>Overall perception</b>        | <b>52.9 (10.7)</b> | <b>50.8 (6.4)</b> | <b>0.288</b>         | <b>-2.1 (9.0)</b> | <b>-0.04</b> |
| Older subjects                   |                    |                   |                      |                   |              |
| Esthetic Concern (3 items)       | 5.0 (1.5)          | 3.9 (1.7)         | 0.003 <sup>2</sup>   | -1.2 (2.0)        | -0.24        |
| Psychological Impact (6 items)   | 14.9 (2.6)         | 14.8 (3.3)        | 0.834                | -0.1 (3.6) ¥      | -0.01        |
| Social Impact (8 items)          | 14.5 (2.5)         | 14.2 (1.9)        | 0.606                | -0.3 (2.6)        | -0.02        |
| Dental Self-confidence (6 items) | 13.7 (2.2)         | 12.6 (2.3)        | 0.371 <sup>2</sup>   | -1.1 (2.4)        | -0.08        |
| <b>Overall perception</b>        | <b>48.2 (6.3)</b>  | <b>45.4 (7.2)</b> | <b>&lt;0.001</b>     | <b>-2.7 (6.6)</b> | <b>-0.06</b> |

1. T-test; 2. Data did not present normal distribution (Shapiro-Wilk) and were analyzed by Wilcoxon Signed Rank Test. ¥ - Indicate statistical difference between the patient's age for the observed effect (p < 0.05). PIDAQ – Psychosocial Impact of Dental Aesthetics Questionnaire

**Table 7.** Means (standard deviations) of responses for each question of the OES questionnaire measured at baseline and after combined tooth bleaching.

| Questions                                                          | Baseline           | After bleaching   | P-value <sup>1</sup>          | Observed effect    | Effect size |
|--------------------------------------------------------------------|--------------------|-------------------|-------------------------------|--------------------|-------------|
| <b>Younger subjects</b>                                            |                    |                   |                               |                    |             |
| Your facial appearance                                             | 7.0 (2.3)          | 8.8 (1.1)         | < 0.001 <sup>2</sup>          | 1.8 (2.3)          | 0.25        |
| Appearance of your facial profile                                  | 6.6 (2.2)          | 8.2 (1.3)         | < 0.001 <sup>2</sup>          | 1.6 (2.3)          | 0.24        |
| You mouth's appearance                                             | 6.6 (2.3)          | 8.7 (1.6)         | < 0.001 <sup>2</sup>          | 2.1 (1.9)          | 0.31        |
| Appearance of your row of teeth                                    | 6.6 (2.4)          | 8.2 (1.8)         | < 0.001 <sup>2</sup>          | 1.6 (2.1)          | 0.24        |
| Shape/form of your teeth                                           | 7.2 (2.1)          | 8.8 (1.2)         | < 0.001 <sup>2</sup>          | 1.5 (1.9)          | 0.21        |
| Color of your teeth                                                | 5.1 (2.1)          | 9.6 (0.7)         | < 0.001 <sup>2</sup>          | 4.5 (2.1)          | 0.88        |
| Your gum's appearance                                              | 6.8 (1.9)          | 8.7 (1.1)         | < 0.001 <sup>2</sup>          | 1.9 (1.5)          | 0.28        |
| Overall, how do you feel about you face, your mouth and your teeth | 7.5 (2.4)          | 9.0 (1.4)         | < 0.001 <sup>2</sup>          | 1.6 (2.3)          | 0.21        |
| <b>OES total score</b>                                             | <b>53.5 (14.6)</b> | <b>70.0 (7.8)</b> | <b>&lt; 0.001<sup>2</sup></b> | <b>16.5 (12.6)</b> | <b>0.31</b> |
| <b>Older subjects</b>                                              |                    |                   |                               |                    |             |
| Your facial appearance                                             | 7.1 (2.0)          | 7.7 (1.8)         | 0.107 <sup>2</sup>            | 0.6 (2.5)          | 0.08        |
| Appearance of your facial profile                                  | 6.9 (1.9)          | 7.6 (1.8)         | 0.048 <sup>2</sup>            | 0.7 (2.5)          | 0.11        |
| You mouth's appearance                                             | 6.5 (2.2)          | 8.2 (1.1)         | < 0.001 <sup>2</sup>          | 1.7 (2.0)          | 0.26        |
| Appearance of your row of teeth                                    | 6.6 (2.4)          | 7.8 (1.6)         | 0.005 <sup>2</sup>            | 1.3 (2.3)          | 0.19        |
| Shape/form of your teeth                                           | 7.0 (2.2)          | 7.9 (1.6)         | 0.022 <sup>2</sup>            | 0.9 (2.1)          | 0.13        |
| Color of your teeth                                                | 5.4 (1.9)          | 8.8 (1.4)         | < 0.001                       | 3.4 (2.1)          | 0.62        |
| Your gum's appearance                                              | 6.9 (2.1)          | 8.3 (1.2)         | 0.005 <sup>2</sup>            | 1.4 (2.4)          | 0.20        |
| Overall, how do you feel about you face, your mouth and your teeth | 6.8 (2.4)          | 8.5 (1.4)         | 0.002 <sup>2</sup>            | 1.7 (2.6)          | 0.25        |
| <b>OES total score</b>                                             | <b>53.0 (14.7)</b> | <b>64.7 (9.0)</b> | <b>&lt;0.001<sup>2</sup></b>  | <b>11.7 (13.1)</b> | <b>0.22</b> |

1. T-test; \*\* Data did not present normal distribution (Shapiro-Wilk) and were analyzed by Wilcoxon Signed Rank Test. OES – Orofacial Esthetic Scale.

### ESCALA ESTÉTICA OROFACIAL (EEO)

| Como você se sente sobre a aparência de sua face, de sua boca, de seus dentes e sobre o resultado final do clareamento dentário? Para cada declaração, selecione a melhor opção que corresponde à sua experiência. Marque um "NA" (Não aplicável) se você acha que a instrução não se aplica a você. |    |                    |   |   |   |   |   |   |   |   |   |    |                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|---|---|---|---|---|---|---|---|---|----|------------------|
| 1. A sua aparência facial                                                                                                                                                                                                                                                                            | NA | Muito insatisfeito | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Muito Satisfeito |
| 2. Aparência do seu perfil facial                                                                                                                                                                                                                                                                    | NA |                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                  |
| 3. Aspectos da sua boca (sorriso, lábio e dentes visíveis)                                                                                                                                                                                                                                           | NA |                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                  |
| 4. Aspectos das suas arcadas de dentes                                                                                                                                                                                                                                                               | NA |                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                  |
| 5. Forma dos seus dentes                                                                                                                                                                                                                                                                             | NA |                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                  |
| 6. Cor dos dentes                                                                                                                                                                                                                                                                                    | NA |                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                  |
| 7. Como você se sente com o aspecto da sua gengiva                                                                                                                                                                                                                                                   | NA |                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                  |
| 8. Em geral, como você se sente sobre seu rosto, sua boca e seus dentes.                                                                                                                                                                                                                             | NA |                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |                  |

## QUESTIONÁRIO DE AUTO PERCEPÇÃO DE ESTÉTICA (PIDAQ)

As seguintes afirmativas descrevem como as pessoas podem se sentir em relação à aparência dos seus dentes no seu dia-a-dia. Por favor, leia cada sentença e indique sua opinião marcando com um X no espaço apropriado. Responda espontaneamente, sem pensar muito.

|                                                                                                               |              |                   |                        |                |                     |
|---------------------------------------------------------------------------------------------------------------|--------------|-------------------|------------------------|----------------|---------------------|
| 1. Eu não gosto de ver meus dentes no espelho.                                                                | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 2. Eu escondo meus dentes quando sorrio; assim, meus dentes não aparecem muito.                               | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 3. Eu sinto inveja dos dentes bonitos das outras pessoas.                                                     | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 4. Eu tenho orgulho dos meus dentes                                                                           | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 5. Se eu não conheço bem as pessoas, algumas vezes eu me preocupo com o que elas podem achar dos meus dentes. | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 6. Fico um pouco incomodado quando vejo os dentes de outras pessoas                                           | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 7. Eu gosto de mostrar meus dentes quando eu sorrio.                                                          | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 8. Eu gosto de ver meus dentes em fotos.                                                                      | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 9. Eu tenho receio de que outras pessoas possam fazer observações desagradáveis sobre os meus dentes          | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 10. Às vezes eu fico um pouco triste com a aparência dos meus dentes.                                         | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 11. Eu acho que a maioria das pessoas que eu conheço tem dentes melhores que os meus.                         | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 12. Eu fico contente quando eu vejo meus dentes no espelho                                                    | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 13. Às vezes eu acho que as pessoas estão olhando fixamente para meus dentes.                                 | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 14. De alguma forma eu fico inibido nos encontros sociais por causa dos meus dentes.                          | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 15. Eu às vezes me pego colocando minha mão na frente da minha boca para esconder meus dentes.                | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 16. Eu me sinto mal quando eu penso na aparência dos meus dentes                                              | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 17. As pessoas acham meus dentes bonitos                                                                      | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 18. Eu não gosto de ver meus dentes quando eu vejo um vídeo em que eu apareço.                                | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 19. Comentários sobre os meus dentes me irritam mesmo que seja de brincadeira.                                | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 20. Eu gostaria que meus dentes tivessem uma aparência melhor.                                                | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 21. Eu estou satisfeito com a aparência dos meus dentes.                                                      | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 22. Eu às vezes me preocupo com o que as pessoas do outro sexo pensam sobre meus dentes.                      | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |
| 23. Eu acho a posição dos meus dentes muito boa.                                                              | Não concordo | Concordo um pouco | Concordo mais ou menos | Concordo muito | Concordo Totalmente |

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