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Assessment of Bleaching Treatments with the Ohip-14 Survey

Beyazlatma Tedavilerinin Ohip-14 Anketi ile Değerlendirilmesi

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ABSTRACT

Objective: The aim of this study is to evaluate the effect of teeth bleaching on oral health and quality of life (OHIP-14) in adults who have undergone office bleaching treatment.
Methods: One hundred patients who applied to our clinic for bleaching treatment between 2016-2021 and underwent bleaching treatment with Opalescence Boost 40% PF were included in the study. Pre-treatment color determination is routinely done for each patient in the clinic. They were divided into four different groups as follow-up patients in 3rd month for Group 1, 6th month for Group 2, 1st year for Group 3, and 2nd year follow-up patients for Group 4 (n=25). Shade guide unit (ΔSGU) values were calculated for the patients using the Vita Classic color scale. In addition, the OHIP-14 questionnaire was applied to each patient to evaluate the effect of bleaching on oral health and quality of life. Wilcoxon and Kruskal-Wallis tests were performed at *P.*<05.
Results: In evaluating OHIP-14 quality of life among patients, there was no significant difference was noticed for all times (*P.*>05). In terms of color change, no significant difference compared to baseline levels with the measurements made at the 3rd, 6th months, and 1st and 2nd years (*P.*>05, κ=0.81).
Conclusion: After the bleaching treatment, the color remained stable for two years. However, a positive psychosocial effect and improved self-perception occurred in the patients.
Keywords: Bleaching treatment, OHIP-14, quality of life

ÖZ

Amaç: Bu çalışmanın amacı ofis tipi beyazlatma tedavisi görmüş erişkinlerde diş beyazlatmanın ağız sağlığı ve yaşam kalitesine (OHIP-14) etkisini değerlendirmektir.
Gereç ve Yöntem: Çalışmaya 2016-2021 yılları arasında beyazlatma tedavisi için kliniğimize başvuran ve Opalescence Boost %40 PF ile beyazlatma tedavisi uygulanan 100 hasta dahil edildi. Klinikte her hasta için tedavi öncesi renk tespiti rutin olarak yapılmaktadır. Grup 1'e 3. ay, Grup 2'ye 6. ay, Grup 3'e 1. yıl, Grup 4'e 2. yıl takip hastaları (n=25) olmak üzere 4 farklı gruba ayrıldı. Vita Classic renk skalası kullanılarak hastalar için renk tonu kılavuzu birimi (ΔSGU) değerleri hesaplandı. Ayrıca beyazlatma işleminin ağız sağlığı ve yaşam kalitesine etkisini değerlendirmek amacıyla her hastaya OHIP-14 anketi uygulandı. Wilcoxon ve Kruskal-Wallis testleri *P.*<05'te yapıldı.
Bulgular: Hastalar arasında OHIP-14 yaşam kalitesinin değerlendirilmesinde tüm zamanlar için anlamlı bir fark saptanmadı (*P.*>05). Renk değişimi açısından ise 3., 6. ay, 1. ve 2. yılda yapılan ölçümlerde başlangıç değerlerine göre anlamlı farklılık saptanmadı (*P.*>05, κ=0.81).
Sonuç: Beyazlatma tedavisi sonrasında renk iki yıl boyunca stabil kaldı. Ancak hastalarda olumlu bir psikososyal etki ve gelişmiş benlik algısı oluştu.
Anahtar Kelimeler: Beyazlatma tedavisi, OHIP-14, yaşam kalitesi

INTRODUCTION

The aesthetic appearance and color of the teeth constitute an important part of the harmony of the person's facial structure.[1] In recent years, aesthetic treatments and applications made to meet the patients' expectations have become very significant within dentistry. Studies conducted in the USA and the United Kingdom revealed that 20% to 35% of the population, especially the young population, noticed the stain on their teeth and were not satisfied with its color[2,3] and increasing demand for teeth bleaching treatments was reported.[4] Teeth bleaching treatment, which is one of the methods used in the treatment of discoloration in the teeth, is the preferred procedure because it is minimally invasive, fast and effective, and does not wear out the tissue as in fixed prostheses.[5,6]

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The discoloration seen in the teeth can be examined in two ways as the external and internal origin. Extrinsic discoloration from these discolorations can usually be caused by ingested food and drink, tobacco products, poor oral hygiene, or long-term use of some oral hygiene products.[7] External discolorations usually occur in the tooth surface's gingival margin and interproximal areas, where cleaning cannot be done with ease. In addition, internal discoloration may occur due to many different causes, such as before the eruption as in tetracycline use and discoloration and fluorosis, or after the eruption as in trauma, pulpal hemorrhage and improper root canal treatments.[8]

Bleaching is the name given to the lightening of the tooth color as a result of the oxidation of organic pigments in the dental tissue by the whitening gels applied to the discolored teeth.[9] Whitening systems can be performed at home (home bleaching), in the clinic under dentist control (in-office bleaching), or a combination of both.[5,10] A study has shown that bleaching treatment of vital teeth is effective, long-lasting, and safe.[11]

Oral Health-Related Quality of Life (OHRQoL), which was developed by modeling the questions about the "structure, function, competence, participation" revealed by the World Health Organization (WHO), about the positive and/or negative effects of oral health on general health, demonstrate their knowledge, skills and perceptions.[12,13] OHRQoL is used within studies in the field of oral health, for purposes such as evaluating the data obtained after clinical studies or clinical practice, and determining the appropriate treatment method. OHRQoL can be evaluated with many multifaceted scales that question symptoms and mental states. For this purpose, the Oral Health Impact Profile (OHIP) scale is generally used.

Developed in Australia and accepted by WHO, the OHIP scale is the most comprehensive and subjective tool used in the measurement and assessment of oral health.[14,15] The oral health model developed by Locker was taken as an example to define the dimensions covered by the questionnaire in the OHIP scale. The questions in the scale consist of 7 different areas such as functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap, and a total of 49 questions. The answers in the scale are a 5-point Likert scale with categories ranging between “very often” and “never” and it is applied to adult individuals.[16] This original scale with 49 questions was reduced to 14 questions by Slade and the Oral Health Impact Profile-14 (OHIP-14) was created.[17] The OHIP–14 scale was developed by Slade ve Spencer[18] to comprehensively measure the quality of life of oral and dental problems, injuries, and disabilities. As a result of the comparison of this newly obtained scale with the original form, it was reported that it was sufficient to measure oral and dental health-related quality of life and its validity reached 94%.[19] There are 7 dimensions in the OHIP-14 scale, as in the original scale, and two questions are asked for each dimension. Scoring can be done by giving 0 for never, 1 for hardly ever, 2 for occasionally, 3 for fairly often, and 4 for very often. At the end of the scale, the scores obtained according to the dimensions and the sum of the scale are summed. According to the scoring to be made according to the answers to be given in the OHIP-14 scale, the lowest score is 0, while the highest score is 56. The zero score to be obtained as a result of answering all of the questions as "never" indicates that the quality of life regarding oral and dental health is very good, nevertheless all questions are answered "very often", the score to be obtained is 56, indicating that the quality of life related to oral and dental health is very poor.[16] The OHIP-14 scale was adapted into Turkish by Mumcu ve ark.[20], and as a result of validity and reliability studies, it was stated that it is a valid and reliable scale for determining the quality of life related to oral and dental health.

Measurement and recording of tooth color in clinical conditions is determined by color measurement devices or using dental color scales, where the color is mostly visually standardized.[21] The classic Vita Lumin - Vacuum dental color scale (Vita Zahnfabrik) is a widely accepted color scale that has been used for many years to determine the color of restorative materials.[22] According to this scale, there are four different color series (A, B, C and D). The four different color series in this scale correspond to the primary colors brown, yellow, gray and red, respectively. While the color bars in each letter series correspond to the same primary color, the bars in the main color group are ordered according to increasing saturation (chroma) and decreasing brightness (value) expressed in numbers (A1, A2, A3, A3,5 etc).[23]

In this study, it was aimed to examine the color changes of patients who underwent long-term color follow-up after bleaching treatment and the effect of bleaching treatment on quality of life. Although there are many studies evaluating the quality of life after bleaching in the literature, there is no study in which the quality of life obtained from bleaching is followed over different times for different patients. The null hypothesis of the study is that the efficacy obtained from the bleaching treatment will not change at different times as the main outcome.

METHODS

Patients who had bleaching treatment and were followed up in our clinic between 2016-2021 were included in the study.

General exclusion criteria include pregnant or breastfeeding patients in our clinic, patients with moderate or severe fluorosis, severe tetracycline stains, orthodontic treatment, individuals with periodontal disease or orofacial tumors, patients with bruxism or tooth sensitivity, trauma or dental malformations. It was questioned that the patients do not have any systemic diseases, and bleaching treatment is not applied to the patients who use cigarettes, tobacco, etc., and/or do not have adequate oral hygiene.

General inclusion criteria included patients over 18 years of age, of both sexes, and without any systemic disease.

Necessary oral care procedures after the procedure are explained to each patient undergoing bleaching treatment, and it is reported that patients should comply with this in order for the color obtained to be permanent for a longer period of time. In our clinic, the conditions that require treatment and attention to our patients after bleaching is explained both orally and in writing.

Sample Size

Sample size calculation was considered at (1-β) 0.80 with 5% (α=0.05) significance level by using G*Power software. The minimum sample size in each group was found as 20. Assuming any discontinuing patient during follow-up, 5 drop-out subjects were added to each group.

Study Design

In our clinic, consent forms are routinely obtained from all patients before the bleaching treatment, and color determination is also performed during the anamnesis. The study included 100 participants performed to our clinic for bleaching treatment between 2016 and 2021 and were then reached (n=25). The design is demonstrated in Fig 1. The participant were divided into four different groups: Group 1, 3rd month follow-up patients; Group 2, 6th month follow-up patients; Group 3, 1st year follow-up patients; Group 4, 2nd year follow-up patients. The existing tooth color to be taken from the patients who were called for control was measured with Classic Vita (Classic Vita, Vita Zahnfabrik, Shade guide unit (ΔSGU)) and the Turkish version of the OHIP-14 questionnaire was applied to determine the effect on quality of life.

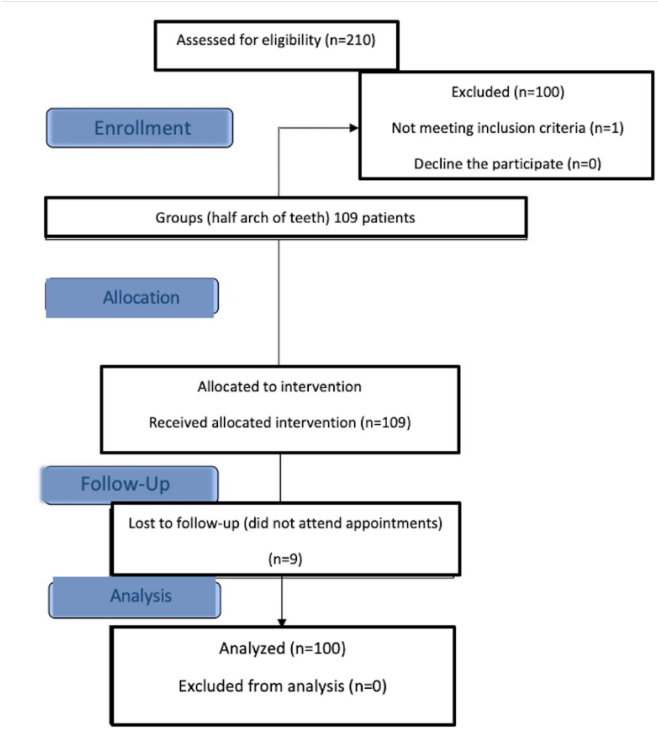

Figure 1. Flow diagram

Application of Bleaching Treatment

Before the bleaching treatment, each patient is measured using a color scale and recorded in the patient's file. Afterwards, the bleaching process is performed by dentists who are experts in their field (restorative dental treatment). In our clinic, Opalescence Boost 40% PF (Ultradent, South Jordan, UT, USA) as a bleaching agent is applied in accordance with the manufacturer's instructions, for a maximum of 2 x 20 minutes in a single session for each patient. Gingival barrier was applied continuously along the gingival margin, overlapping approximately 0.5mm onto the enamel to completely seal and cover exposed papilla. The whitening gel was applied evenly on the exposed enamel surface in a 0.5-1-mm thick layer with a spatula for 10 min. The gel was left on the surface undisturbed and then removed by using a damp cotton. Then, the teeth were rinsed under running water and dried with a gentle blast of air. This whitening procedure was repeated two times. The authors used the same method throughout the bleaching treatment.

Color Evaluation

Color measurements were evaluated on the vestibule surfaces of the maxillary central incisors of the individuals in each study group. The Vita color scale is ordered from left to right (16 different shades), from the lightest to the darkest. At least two consistent results from 3 different determinations made by each observer were recorded as the color value of the tooth measured for that observer. During the determination of the color, the patient was positioned to sit at the same eye level as the physician, and the Vita color scale was positioned at an arm's length from the observer's eye. While the lower and upper teeth were in full contact with each other, the incisor edge of the maxillary central tooth to be measured with the cutting edge of the tooth-shaped color sample on the scales was placed side by side, and the tooth color was determined within the first 5 seconds. The color evaluation was performed by two physicians and calibrated on 100 patients. Cohen's Kappa coefficient was used to make the clinical evaluation among the physicians. As a result of the examination, the Kappa coefficient for reliability was 0.72 for all variables and the Kappa coefficient for repeatability was 0.81.

OHIP-14 Questionnaire

The questions in the questionnaire were asked to the follow-up patients registered in the system who underwent bleaching treatment. It was recorded by scoring between 0 and 56 according to the answers given by the patients. Satisfaction effect was measured using the OHIP-14 questionnaire validated and reliability in Turkish version. The questionnaire was performed by researchers due to different groups at 3-month, 6-month, 1 year and 2 years after bleaching. Each statement was accompanied by a Likert-type scale, which generated a score ranging from 4 to 0 (very often = 4, fairly often = 3, occasionally = 2, hardly ever = 1, never = 0). It was recorded by scoring between 0 (minimum) and 56 (maximum) according to the answers given by the patients. The outcomes were considered the sum of the OHIP-14 and dimension scores, the internal consistency was evaluated using the Cronbach's Alpha test.

Statistical analysis

The findings were analyzed using the IBM SPSS 22.0 package program (IBM SPSS Statistics 22, SPSS inc., an IBM Co., Armonk, New York). Significance was accepted as $p < 0.05$. During the evaluation of color change, Cohen's kappa coefficient was calculated among researchers. In addition, Wilcoxon and Kruskal-Wallis tests were performed to evaluate the between-group and within-group differences of non-parametric findings.

RESULTS

The sample consisted of 62 women (62%) and 38 men (38%) with average ages of 28.98 ± 6.1 years for men and 27.35 ± 5.12 years for women. There were no differences between the two groups in terms of the characteristics of the baseline color (*P.*>05). (Table 1)

Color Change Values

No statistically significant difference was found for color change according to the baseline values for the patients according to the measurements made at the 3rd, 6th months, and 1st and 2nd years (*P.*>05) (Table 3). The highest ΔSGU change value from baseline was observed in Group 4, which included the measurements made in the 2nd year (*p*=.09, 5.19± 3.74); the lowest ΔSGU value was found in Group 1, which included measurements followed for three months after bleaching (*P*=.80, 1.98± 2.1).

Table 1. Baseline demographics features of participants.

	n	%	Mean (± SD)	*P*
Male	38	38	28.98 ± 6.1	>.050
Female	62	62	27.35 ± 5.12	
Total	100	100	27.37 ± 5.93	

OHIP-14 Questionnaire Values

According to the evaluation made in terms of quality of life among the patients, no statistically significant difference was found between the groups for all times (OHIP-14, *P.*>05) (Table 2 and 4). When the OHIP-14 questionnaire was evaluated in terms of 7 different sections, including functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap, no significant difference was observed (*P.*>05).

Table 2. Mean ± standard deviation (SD) of 7 different domains and OHIP-14 total scores for groups

	Group 1 (3rd month (T_1))	Group 2 (6th month (T_2))	Group 3 (1st year (T_3))	Group 4 (2nd year(T_4))
Functional limitation	3.42 ± 0.75[a]	3.58 ± 0.70[a]	3.62 ± 0.86[a]	3.68 ± 0.77[a]
Physical pain	1.38 ± 1.25[a]	1.42 ± 1.17[a]	1.50 ±1.25[a]	1.62 ± 1.58[a]
Psychological discomfort	1.04 ± 0.97[a]	1.10 ± 0.95[a]	1.12 ± 1.01[a]	1.21 ± 1.02[a]
Physical disability	3.32 ± 0.76[a]	3.3 ± 0.84[a]	3.62 ± 0.51[a]	3.72 ± 0.62[a]
Psychological disability	2.42 ± 1.31[a]	2.56 ± 1.25[a]	2.67 ± 1.52[a]	2.74 ± 1.32[a]
Social disability	3.12 ± 0.82[a]	3.37 ± 0.49[a]	4.10 ± 0.46[a]	4.82 ± 0.32[a]
Handicap	2.52 ± 1.14[a]	2.55 ± 1.40[a]	2.55 ± 1.47[a]	2.59 ± 1.43[a]
OHIP – 14 TOTAL	16.5 ± 2.32[a]	19.0 ± 2.87[a]	20.0 ± 2.10[a]	21.4 ± 2.31[a]

Small letters in each line indicate the statistical difference between groups. It was considered statistically significant for *P.*<05.

Table 3. ΔSGU mean± standard deviation and p values for groups

	ΔSUG ± SD	*P*
Initial - Group 1 (3rd month)	1.98 ± 2.1	.8
Initial - Group 2 (6th month)	2.35 ± 3.12	.43
Initial - Group 3 (1st year)	3.37 ± 2.12	.34
Initial - Group 4 (2nd year)	**5.19 ± 3.74**	**.09**

* It was considered statistically significant for *P.*<05.

Table 4. OHIP-14 scale scores and p values between groups

	P
Group 1 (3rd month) - Group 2 (6th month)	.602
Group 1 (3rd month) - Group 3 (1st year)	.281
Group 1 (3rd month) - Group 4 (2nd year)	.065
Group 2 (6th month) - Group 3 (1st year)	.074
Group 2 (6th month) - Group 4 (2nd year)	.089
Group 3 (1st year) - Group 4 (2nd year)	.391

*It was considered statistically significant for *P.*<05.

As a result of the evaluation of all OHIP-14 scale total scores, no significant difference was found between the data obtained at the 3rd month (T_1), 6th month (T_2), 1st year (T_3), and 2nd year (T_4) (*P.*>05).

When we evaluate the questions within the classification;

1. No significant difference determined between all groups in questions about functional limitation (Q_1) (Q_1T_1- Q_1T_2, Q_1T_1-Q_1T_3, Q_1T_1-Q_1T_4, Q_1T_2- Q_1T_3, Q_1T_2-Q_1T_4, Q_1T_3-Q_1T_4; *P.*>05).
2. No significant difference determined between all groups in questions about physical pain (Q_2) (Q_2T_1- Q_2T_2, Q_2T_1-Q_2T_3, Q_2T_1-Q_2T_4, Q_2T_2- Q_2T_3, Q_2T_2-Q_2T_4, Q_2T_3-Q_2T_4; *P.*>05).
3. No significant difference determined between all groups in questions about psychological discomfort (Q_3) (Q_3T_1- Q_3T_2, Q_3T_1-Q_3T_3, Q_3T_1-Q_3T_4, Q_3T_2- Q_3T_3, Q_3T_2-Q_3T_4, Q_3T_3-Q_3T_4; *P.*>05).
4. No significant difference determined between all groups in questions about physical disability (Q_4) (Q_4T_1- Q_4T_2, Q_4T_1-Q_4T_3, Q_4T_1-Q_4T_4, Q_4T_2- Q_4T_3, Q_4T_2-Q_4T_4, Q_4T_3-Q_4T_4; *P.*>05).
5. No significant difference determined between all groups in questions about psychological disability (Q_5) (Q_5T_1- Q_5T_2, Q_5T_1-Q_5T_3, Q_5T_1-Q_5T_4, Q_5T_2- Q_5T_3, Q_5T_2-Q_5T_4, Q_5T_3-Q_5T_4; *P.*>05).
6. No significant difference determined between all groups in questions about social disability (Q_6) (Q_6T_1- Q_6T_2, Q_6T_1-Q_6T_3, Q_6T_1-Q_6T_4, Q_6T_2- Q_6T_3, Q_6T_2-Q_6T_4, Q_6T_3-Q_1T_4; *P.*>05).
7. No significant difference was found between all groups in questions about handicap (Q_7) (Q_7T_1- Q_7T_2, Q_7T_1-Q_7T_3, Q_7T_1-Q_7T_4, Q_7T_2-Q_7T_3, Q_7T_2-Q_7T_4, Q_7T_3-Q_7T_4; *P.*>05).

DISCUSSION

Due to the importance of aesthetics over the years, patients have started to apply to dentists for treating aesthetic problems. Teeth bleaching treatment, which is one of these aesthetic treatments, increases the frequency of patients who are disturbed by their tooth color to apply to dentists day by day. This study aimed to evaluate the results obtained from teeth bleaching treatment, an aesthetic intervention in dentistry, with the OHIP-14 questionnaire.

There are three different bleaching techniques today: office bleaching (professional application), home bleaching (individual application), and combining both methods.[5,10] Although these different techniques usually vary according to the patients' aesthetic expectations and treatment needs; both methods have advantages and disadvantages. The most significant disadvantage of at-home bleaching is that it requires a long time and cannot be easily controlled by the participants during treatments. In-office bleaching treatments, on the other hand, compared to at-home bleaching, it is more preferred because of faster results, no plaque use, ingestion of the bleaching agent due to its application in the clinic by the physician, and the risk of burning and irritation by leaking into the soft tissue.[24] In our study, the follow-ups of in-office type bleaching treatments, which are more frequently applied due to the reasons mentioned, were evaluated.

Depending on the many different bleaching agents and treatment techniques used, adequate aesthetics and patient satisfaction are provided after the bleaching application. It is known that the bleaching application of vital teeth has a long-term effect and is safe.[11] There are many methods and questionnaires used to evaluate patient satisfaction during dental practice.[25-27] OHIP-14, OHQoL-UK, PIDAQ scales can be given as examples. Teeth discoloration can affect social relationships between people and lead to a negative image.[4] Questionnaires were administered at 3, 6, 12, and 24 months post-bleaching to see the results of the bleaching process and the continuation of its effects. The aesthetic component measured by OHIP-14 probably did not lead to a significant difference in months measured for bleaching efficacy. OHIP-14 is an scale used to scored aesthetic perception.[28] A higher score indicates that the patient has a poor self-perception regarding cosmetic dentistry. The low OHIP-14 scores after teeth bleaching support the suggestion that self-perception in dental aesthetics may be strong. To experience any positive change after bleaching treatment, patients need to interact with their social environment.[29] In the current study, outcomes were determined after treatment. In addition, all dimensions in OHIP-14 measured two years after bleaching showed no significant change compared to measurements at 3 months, suggesting that the psychosocial outcomes achieved not only have a long-term effect at 3 months, but also have a long-term effect.

In OHRQoL studies performed after bleaching treatment, contradictory results were found.[30,31] In their study, Meireles et al.[31] investigated the effect of at-home vital bleaching treatment using bleaching agents containing carbamide peroxide (CP) and observed positive effects. However, it has been reported that patients have difficulties in maintaining oral hygiene. n another study, the effects of bleaching treatment were evaluated among university students and it was shown that bleaching positively affected OHRQoL in OHIP subscales.[30] In contrast to these studies, Bruhn et al.[32] reported that bleaching treatment in 30-year-old adults had no effect on OHIP subscales. Another study evaluating in-office bleaching treatments also observed the lack of effect of vital bleaching on quality of life.[33] A systematic review concluded that vital bleaching was not associated with improvements in overall OHRQoL. Bleaching may affect the quality of life positively or negatively in some areas.[34] The most well-known

problem with bleaching treatment is the small sample size, as discussed in different studies.[34,35] In our study, the OHIP-14 scale was preferred among these questionnaires to evaluate the quality of life in patients.

Color selection methods in dentistry are examined in two different categories, visual and instrumental.[36] Visual color selection, which is one of these methods, is one of the most frequently preferred methods by dentists because it is easy to access in the clinic.[37-40] However, the biggest disadvantage of this type of scales based on subjective evaluation, such as the Vita Classic, is that the subjective results measured with the SGU (shade guide unit) unit cannot fully overlap with the objective findings and remain inconsistent.[41] The difference in the measurement of two adjacent teeth by different observer groups in color determination and the resulting low reliability explains this situation. In our study, Vita Classic color scale, which is frequently preferred for color measurement after bleaching treatment, was used.

There is limited article on awareness of the aesthetic and psychosocial effect of teeth bleaching treatment applied to meet aesthetic expectations in the literature.[25,27,42] In the study of Bersezio et al.[25] using 35% hydrogen peroxide (HP) and 37% CP, intracoronal bleaching treatment was performed and the effect of whitening treatment on quality of life was evaluated. It was reported that both gels used in the study were effective in the bleaching treatment and the color remained stable in the 3rd month after the procedure. In addition, a statistically significant decrease was observed in the OHIP questionnaire scores at the 3rd month compared to the results obtained. Although this study and our OHIP-14 scale scores are not compatible, the findings obtained for color assessment are compatible. It has been estimated that the reason for obtaining different results regarding OHIP-14 scores may be related to the bleaching method.

In another study, Bersezio et al.[43] the effect of bleaching on the quality of life of patients who underwent bleaching with 6% HP was evaluated and followed for 2 years. In the study, it was observed that the total score of OHIP values decreased in the 24-month follow-up period. In our study, the scores decreased during the 2-year follow-up period but were not statistically significant. This situation was thought to be due to the good oral hygiene of the patients or the use of bleaching paste after the treatment.

According to study of Estay et al.[28], after the bleaching treatment with 37.5% and 6% HP, the color did not change for 1 and 6 months. In our study, 40% HP was used, and, in the results we obtained, a decrease in color values occurred in the 2-year follow-up, but it was not found statistically significant. In the OHIP questionnaire, at the end of 24 months, although a decrease was detected in all evaluation areas, such as functional, physiological, and social, compared to the initial measurements, a significant difference was noticed.

According to the results of our study, bleaching continued for 24 months, the effect on the quality of life was preserved in the second year, and the OHIP-14 questionnaire proved these results. OHIP-14 scale questions were not asked of the patients before bleaching. This finding shows that patients will experience positive psychological, social and functional effects as long as the teeth bleaching effect durability. Smiling, which plays an important role in facial aesthetics, undoubtedly contributes to the increase of self-esteem in individuals.[29] Appearance is one of the most important factors that determine and affect the self-esteem of individuals, their social communication with other people, their adaptation to the environment and their quality of life.[44] According to the results of the study, it has been shown that vital tooth bleaching treatment causes an increase in self-confidence in individuals and this increase continues over time. The null hypothesis was accepted because the rebound of color change was insignificant in assessments.

One of the limitations of our study is the preference of visual color scales instead of color-measuring devices that can give more objective results. Studies in the literature also support this view, and more studies are needed on this subject.

CONCLUSION

In present study, the bleaching obtained from the bleaching treatment can affect the positive effect on psychosocial and self-perception. Patients were generally satisfied with this treatment, despite the evaluation time differences between all groups.

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Hakem Değerlendirmesi: Dış bağımsız.
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