

**COMPARATIVE EVALUATION OF PHOTODYNAMIC AND LASER TEETH WHITENING**

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**ABSTRACT**

It is known that a full-fledged personality and successful promotion on the career ladder, as well as the psyche - emotional state depends on the pleasant appearance of a person. The presence of certain cosmetic imperfections leads to a decrease in a person's self-confidence. One of these disadvantages is tooth discoloration. Elimination of such deficiencies is carried out by teeth whitening. However, after whitening, patients complain of increased tooth sensitivity and inflammation mucous membrane of the alveolar ridge.

In connection with this,

The scientific work studies the level of pro and anti-inflammatory cytokines of saliva before and after professional teeth whitening. Cytokine levels indicate that photodynamic whitening causes less inflammation than laser teeth whitening.

**TOPICALITY**

In recent years, special importance has been attached to cosmetic dentistry among the population of the Republic of Uzbekistan. In this regard, the color of the natural teeth plays a decisive role. To eliminate tooth discoloritis, whitening of the enamel cover of the teeth is used. Professional, laser and chemical whitening contributes to the destructive and inflammatory process of the mucous membrane of the alveolar ridge Uspenskaya O.A. (2020). In this regard, the timely determination of pro and anti-inflammatory cytokines in saliva is a diagnostic criterion for the dentist.

**OBJECTIVE**

Improving the effectiveness of teeth whitening and the state of mixed saliva cytokines after photodynamic and laser teeth whitening.

**MATERIAL AND METHODS**

A clinical and immunological study of the oral cavity was carried out after photodynamic and laser teeth whitening. 70 volunteers were examined. Patients are divided into two groups.

The first group consisted of 30 people (11 men and 19 women) who underwent photodynamic teeth whitening. The second group consisted of 30 people (10 men and 20 women) who underwent laser teeth whitening. All volunteer subjects were between the ages of 18 and 35. The third (control) group consisted of 10 people with normal tooth color who had not undergone teeth whitening.

Photodynamic teeth whitening. Fig. 1

For photodynamic whitening, the < Barva-Flex / SIC > apparatus with a wavelength of 470 nm with LED radiation of the Korobov photon matrix was used.

Rice. 1



The surface of the anterior teeth was treated with Amazing White Premium gel. Irradiation was carried out twice for 15 each. Uspenskaya O.A. et al. (2020); Rizayev, Zh.O. (2019); Zorina O.A. (2020).

Laser teeth whitening. Fig. 2

Laser whitening was carried out using the TOPAZ 3000 series CU-80 Amazing White Limited device.



Fig. 2

After treating the vestibular surfaces of the anterior teeth with the above-mentioned gel, they were irradiated with a laser beam for 15 minutes. This procedure was repeated 3 times. Makarova, I.E., Vinnikova, Y.A. (2017).

After professional whitening, teeth were remineralized.

Determination of cytokine spectrum of mixed saliva.

Saliva was collected in a special test tube with a tightly sealed stopper. Saliva collection was carried out during and after teeth whitening. In saliva, the content of interleukin-1 (IL-1) and interleukin-6 (IL-6) was determined on an automatic enzyme-linked immunosorbent analyzer / Biochem Analitte (USA). Immunological studies were carried out at the Institute of Human Genome Immunology of the Academy of Sciences. Ruth.

Visual assessment of teeth whitening and assessment of cytokine levels in saliva were performed before post-whitening and on day 7.

## RESULTS AND DISCUSSION

In the case of tooth discoloration, patients complain of unsatisfactory tooth color. Often, patients isolate themselves from society and become depressed. The presence of certain aesthetic deficiencies often leads to the emergence of not only psychological, but also psychosomatic problems (Uspenskaya O.A. et al.-2020).

After thorough oral hygiene, the color of the natural teeth was evaluated, often the teeth were yellow and sometimes brown before professional whitening. After whitening, the whiteness of the teeth was assessed using the VITA Bleached guide. Today, for a dentist who is engaged in teeth whitening, the VITA scale is a necessary attribute that helps to correctly determine the shade of the tooth. It is presented in the form of a table or palette, which depicts all possible shades of tooth enamel.

When determining the color of teeth, dentists use samples from this scale, applying them to the patient's teeth. Normally, snow-white teeth do not exist, they have a yellowish tint. In our case, patients in group 3 had the second or third color tone on the VITA scale. Before whitening, in the first and second groups, the color of the teeth varied between the fourth and sixth tones.

After photodynamic whitening, the color of the anterior teeth became lighter by two tones. After four-tone laser whitening.

In the first and second groups before whitening, the Green-Vermilion Oral Hygiene Index (OHI-S) was  $2.42 \pm 0.1$ . The periodontal index (Pi) was  $4.31 \pm 0.2$ , which was higher than the control level in the third group.

Hygienic indices after teeth whitening did not differ in both the first and second groups of the study.

Due to the fact that professional teeth whitening is widely used in practical dentistry, scientifically based conclusions about its effectiveness and safety are of great importance.

To date, a number of side effects of professional teeth whitening are known. Often, the scattering laser beams cause inflammation of the gum mucosa. Sometimes there is a pathology of the hard tissues of the teeth in the form of focal demineralization of the enamel. Makarova, E.I. (2017). In this regard, the study of the cytokine spectrum of saliva becomes relevant. Rabinovich O.F. (2019). The authors believe that interleukin (IL)-1 initiates the acute phase of inflammation response by inducing the expression of multiple inflammatory mediators, including IL-6. Pro and anti-inflammatory cytokines promote the migration of T-lymphocytes to this area, leading to clinical manifestations of inflammation. The presence of IL-6 in this zone characterizes the severity of pathological changes.

| Index |                           | Group 1   | Group 2   | Control   |
|-------|---------------------------|-----------|-----------|-----------|
| IL-1  | Before bleaching          | 140.1±2.1 | 141.2±3.1 | 130.1±0.1 |
|       | After bleaching           | 170±2.6   | 176±2.6   |           |
|       | After 7 days of whitening | 146±1.3   | 189±1.4   |           |
| IL-6  | Before bleaching          | 2.3±0.2   | 2.4±0.1   | 2.4±0.4   |
|       | After bleaching           | 4.2±0.31  | 7.4±0.4   |           |
|       | After 7 days of whitening | 3.0±0.34  | 4.6±0.3   |           |

As mentioned above, the level of cytokines was determined by enzyme immunoassay. The concentration of cytokines was determined by the calibration curve in pg/ml. Table -1.

As can be seen from Table-1, the level of IL-1 after photodynamic bleaching increases and tends to decrease after 7 days.

In the second group, where laser whitening was performed, the IL-1 level remained at high levels even after 7 days of follow-up.

The level of IL-6 in the first group after photodynamic whitening increases in saliva by two times, and after 7 days it decreases slightly.

After laser whitening in patients of the second group, the level of IL6 rises sharply and does not decrease after 7 days.

## FINDINGS

Based on the results obtained. It can be argued that photodynamic teeth whitening can be applied in practical dentistry. The Barvo-Flex / SIC device for photodynamic therapy can be locally directed to individual teeth due to its flexible wiring, without scattering it on the mucous membrane of the alveolar ridge.

## LITERATURE

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