

# USING LASER THERAPY IN ENDO-PERIODONTAL LESSIONS

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## ABSTRACT

The aim of the study was to analyze immune changes associated with the use of a treatment combination in patients with endodontic and periodontal lesions. The study was conducted from 2020 to 2023 at the Department of Therapeutic Dentistry of the Azerbaijan Medical University. The study consisted of two groups: Group 1- 20 patients diagnosed with endo-periodontal lesions (main group), who, in addition to standard treatment, underwent dental diode laser therapy (Picasso Lite, Italy); Group 2- 21 patients in the control group, where traditional treatment methods were used. During our final study, 12 month after completing the basic therapy course, we found statistically significant differences in quantitative indicators of the proinflammatory cytokine TNF- $\alpha$  and immunoglobulin IgA depending on the treatment method for endo-periodontal lesions. Moreover, the reduction in oral fluid levels was more pronounced in the main group after using a diode laser in complex treatment.

Keywords: endo-periodontal lesions, laser, TNF- $\alpha$ , IgA.

## MATERIALS AND METHODS

At the first stage of clinical research, an analysis of the modern world medical literature devoted to the problems of the level of prevalence, etiopathogenetic risk factors for the occurrence and development and treatment of endo-periodontal lesions was carried out.

At the next stage, a study of 41 patients with endo-periodontal lesions, not burdened with somatic pathology, was conducted, including a clinical and instrumental examination and a comparative assessment of therapeutic methods used in patients with combined endodontic and periodontal lesions. Radiation diagnostic methods, in particular orthopantomography and intraoral targeted radiographs, were carried out in both groups and in all patients in these groups before the start of therapeutic measures and 6 and 12 months after their completion. The selected groups of patients were practically comparable in gender and age composition (p>0.05).

The paper provides a comparative assessment of the state of the apical periodontal and periodontium after the proposed treatment protocols in dynamics. All persons with the same diagnosis, depending on the therapeutic method or treatment algorithm, were divided into two groups: I – with the diagnosis of endo-periodontal lesions – 20 patients of the main group, who, along with standard treatment, were additionally treated with decontamination of root canal and laser curettage with a dental diode laser (Picasso Lite); II – with the diagnosis of endo-periodontal lesions was 21 patients of the control group.

## RESULTS

As part of the radiographic phase of the study, densitometry was performed to assess the severity of the destructive process in the periodontium and in the apical part of the periodontium, and to determine the types of endo-periodontal relationships. The size of periapical destruction was measured using the "Measuring Lengths" program of the Sidexis (Sirona) operational system. When assessing the obtained bone density values, data obtained from the analysis of digital orthopantomograms using the SIDEXIS SIRONA radiovisiographic program were taken as approximate normal limits. These studies were supplemented by local densitometry. Pixel visualization of brightness in shades of gray made it possible to obtain informative curves of changes in bone density in horizontal and vertical projections, as well as to determine the average bone density in individual areas of the jaw. As a result, the distribution of bone density in the vertical cross-section, alveolar and deep intraosseous horizontal cross-sections was obtained. These curves were quantitatively characterized by the average bone density in these areas, as well as the average density variation, which reflected structural heterogeneity, for example, between dense and spongy bone. Using an electronic ruler, horizontal and vertical measurements were taken, and the resulting digital data was used to calculate the average value (mm), which characterized the condition of the periapical destruction site, as well as bone restoration within the destruction site during and after treatment. Periapical tissue condition was assessed using optical densitometry (%) data using the "Measuring Lengths" program of the Sidexis (Sirona) surgical system before treatment and immediately before permanent root canal obturation based on digital intraoral radiographic data. A comparative analysis of densitometry data indicates a more pronounced favorable condition of the periapical tissues in the main study group. This is evidenced by the fact that over the entire period of treatment in this group, there was a more significant improvement in bone density from 37.1 $\pm$ 1.77% to 54.2 $\pm$ 1.46%, the improvement in bone density was almost 17%; as for the control group, in the same time period after the completion of treatment and preventive measures in the group, an improvement in bone density was recorded in values from 42.2 $\pm$ 2.48% to 49.1 $\pm$ 2.60% (p<0.05), and the difference in the indicators characterizing the degree of improvement in bone density was only 7% .

Densitometry data before and after treatment in the observation groups

	Control group (n=21)		Main group (n=20)	
	Before, %	After, %	Before, %	After, %
Mean	42,2 $\pm$ 2,48	49,1 $\pm$ 2,60	37,1 $\pm$ 1,77	54,2 $\pm$ 1,46
SD	(27 – 69)	(33 – 76)	(20 – 55)	(39 – 64)
P-value		0,0000		0,0000
t		8,23		8,24
P-value		0,1053		0,1010
t		1,66		1,68

## Discussion

The high frequency of occurrence of combined periodontal and endodontic tissue diseases in male and female individuals, as well as the increase in their prevalence with age, which is confirmed by the results of foreign authors, as well as certain difficulties in the diagnosis and treatment of endo-periodontal lesions, causes constant and increased interest in this problem .

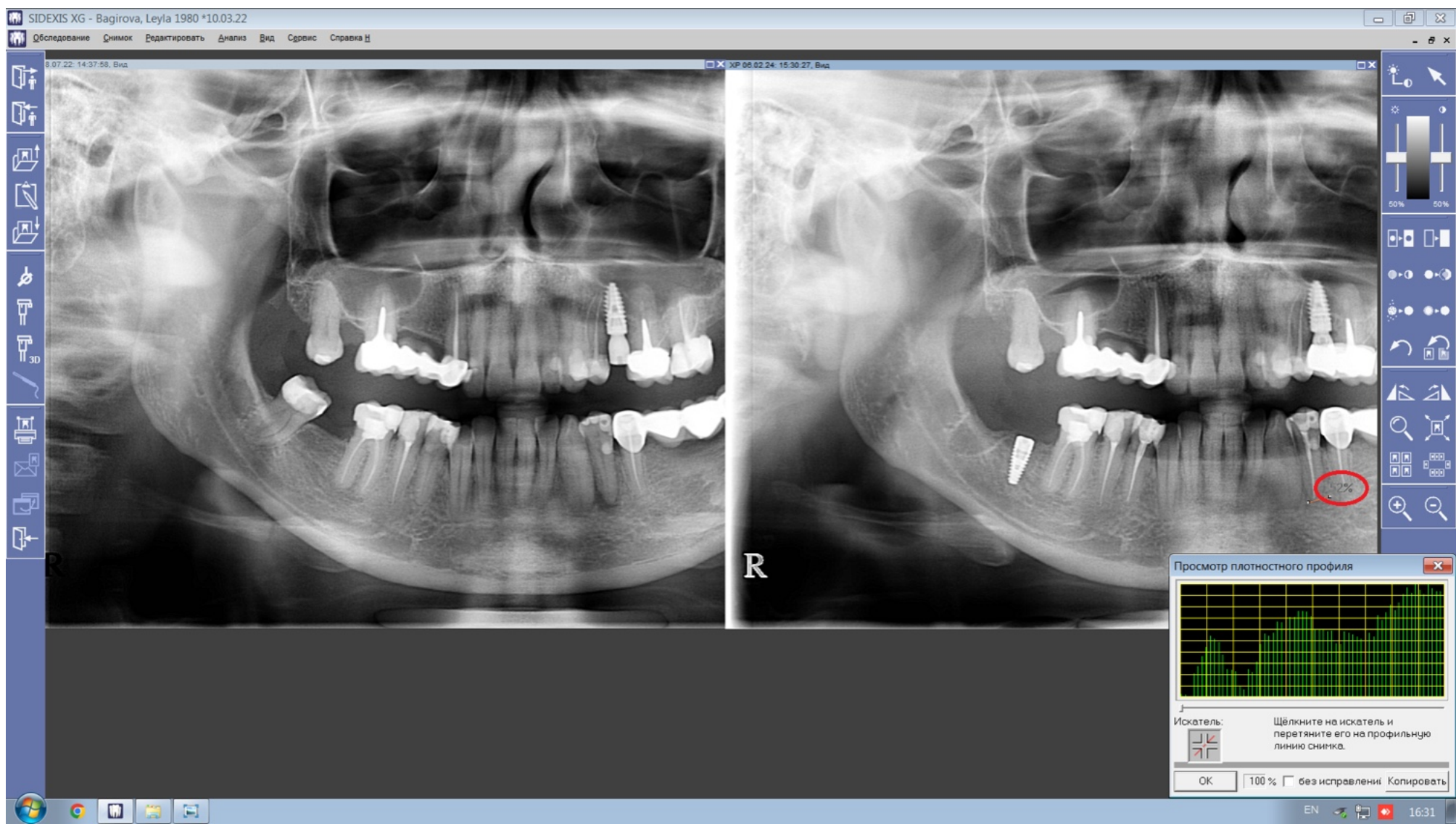
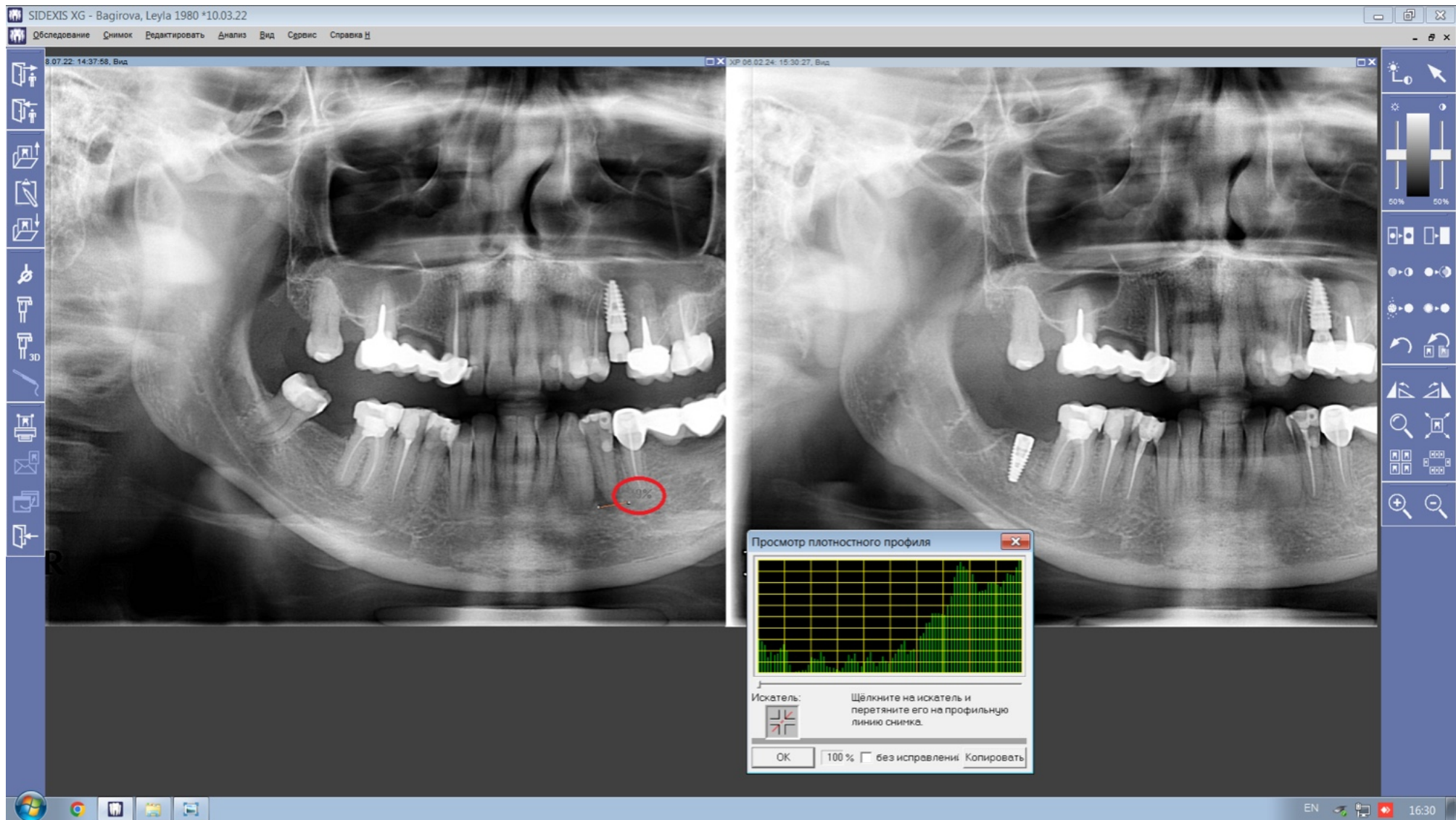
The results of the index evaluation showed pronounced anti-inflammatory and stimulating bone tissue repair properties of laser therapy, which was previously revealed by clinical studies conducted by Giannelli M. et al., which proved an improvement in the condition of periodontal tissues and stimulation of reparative processes against the background of periodontitis treatment using a diode laser.

## Conclusion

The method of treatment of endo-periodontal complications with the use of a diode laser significantly reduced the focus of destruction of bone tissue in the periapical region; contributed to the improvement of oral hygiene and the condition of periodontal tissues. The high efficiency of the proposed combined method of endo-periodontal lesions treatment allows us to recommend it for wide application in practical dentistry.

## Perspectives of further research

Further studies may be aimed at assessing the feasibility and effectiveness of using a diode laser (Picasso Lite, Italy, wavelength 810  $\pm$  10 nm; average power ~1,2–1,4 W) to improve the results of treatment of severe forms of inflammatory and destructive periodontal diseases and periapical periodontitis as part of basic therapy.



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