INCREASING THE EFFICIENCY OF THE TREATMENT OF ENDOPARODONTAL LESIONS

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Relevance

In modern practical and scientific dentistry, special attention has always been paid to the study of the problem of the prevalence, etiology and pathogenesis of inflammatory periodontal diseases and apical periodontitis, as well as their individual accurate diagnosis and effective treatment [1 2]. But, in recent years, although the functional and anatomical commonality of endodonts and periodontitis determines a high degree of probability of their joint involvement in the inflammatory-destructive process, questions about the mechanism of pathogenetic interconnectedness and interdependence between the state of periapical tissues and periodontal, as well as questions concerning the clinic, diagnosis and basic therapy of combined lesions of these structural components of maxillofacial the facial areas are not sufficiently illuminated, and the problem itself remains very relevant and still unresolved [3, 4, 5].

Thus, the embryonic prerequisites necessary for the mutual exchange of infection and the presence of anatomical and physiological proximity cause the development of endoparodontal syndrome, that is, with pathological disorders, there is simultaneous damage to both the periodontal and other functional complex, that is, the endodontium, where odontogenic foci of chronic infection can occur, which are a source of microbial sensitization and often cause the development of general somatic pathology, which, in turn, complicates the choice of patient management tactics, requires timely diagnosis and a comprehensive approach to treatment [6, 7, 8, 9].

That is, the importance of the above issues is due to the fact that chronic inflammation in the periodontium, pulp and periodontium, through the pocket of which the infection can spread towards the tip of the root and cause retrograde development of the inflammatory process in the pulp and periapical tissues, is considered as an odontogenic focus.

Despite the achievements in the field of effective treatment of pathological inflammatory and destructive processes occurring in the endodontic area, as well as the optimization and improvement of diagnostic and therapeutic and preventive methods, some serious errors and shortcomings of endodontic treatment continue to form risk groups for the development of various nosological groups of endoparodontal complications, which, when the process is chronicled, lead to frequent loss of the affected tooth [10, 11, 12].

Objective: to study the condition of periodontal tissues, periodontitis in the presence of a periapical focus of infection and the dynamics of its changes in complex treatment.

Material and methods

This study, conducted from 2019 to 2022 on the basis of the Department of Therapeutic Dentistry of the Azerbaijan Medical University, included several clinical, instrumental stages. 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 endoperiodontal lesions (EPL) was carried out. 150 medical records of a dental patient were studied, among them a randomized controlled study of 100 patients with combined endodontic and periodontal lesions and 50 individuals not burdened with this pathology was also conducted.

At the next stage, a study of 41 patients with EPL 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 periodontal 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 EPL – 20 patients of the main group, who, along with standard treatment, were additionally treated with decontamination of CC and laser curettage with a dental diode laser (Picasso Life); II – with the diagnosis of EPL was 21 patients of the control group.

Root canal treatment: mechanical expansion with endodontic instruments, antiseptic treatment with 3% sodium hypochlorite solution, 17% EDTA solution. To remove dental deposits in the control group, scaling, curettage with Gracie curettes were performed, and an ultrasound device “Piezon Master 600™ EMS was used. Cleaning and polishing of the teeth surface was carried out with an abrasive paste. Patients of the main group were additionally treated with a diode laser. Patients of the control group did not undergo such a procedure.

Criteria for inclusion of individuals in the studied treatment groups:
1. Informed consent of the patient to participate in the study.
2. The age of patients is from 25 to 55 years.
3. Clinically and instrumentally confirmed diagnosis EPL.

The exclusion criteria served:
1. Refusal of the patient to participate in the study.
2. Pathological resorption of the tooth root (cement).
3. Severe somatic background.
4. Previously performed endodontic treatment.
5. Pronounced bone resorption of the alveolar process.

<table>
<thead>
<tr>
<th>Age</th>
<th>Main group (n=100)</th>
<th>Control group (n=50)</th>
<th>p (x2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abs.</td>
<td>%</td>
<td>Abs.</td>
</tr>
<tr>
<td>Less than 20 years</td>
<td>3</td>
<td>3,0</td>
<td>2</td>
</tr>
<tr>
<td>20-29 years old</td>
<td>12</td>
<td>12,0</td>
<td>3</td>
</tr>
<tr>
<td>30-39 years old</td>
<td>14</td>
<td>14,0</td>
<td>9</td>
</tr>
<tr>
<td>40-49 years old</td>
<td>52</td>
<td>52,0</td>
<td>23</td>
</tr>
<tr>
<td>50-59 years old</td>
<td>19</td>
<td>19,0</td>
<td>13</td>
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</tbody>
</table>

Thus, the age indicators of the patients of the two groups most often varied within 40-49 years. The second most frequent was the age of the subjects, which was 50-59 years old. Burdened heredity for the combined pathology of endodontics and periodontitis among close relatives was found among patients of the main group in 38.0% of cases, and in the control group of patients with isolated dental pathology, the indicators were 26.0% (Table 2). It is necessary to note the pronounced pathogenetic effect on the occurrence and development of endo-periodontal complications, the presence of bad habits, for example, the abuse of tobacco products, against which there is gingival inflammation in the form of hyperemia, edema, bleeding, was noted by half of the patients in the control group and almost the same number of subjects in the main group – 48.0%, in whom pathological changes in the periapical area. When studying the degree of influence of factors of the production environment with irritating and general toxic properties on the frequency of occurrence of EPL, it was revealed that in the main group 14.0% of patients with this pathology have been working in such conditions for a long time. And in the control group, the number of people professionally burdened with inflammatory periodontal diseases with-
out signs of apical periodontitis was 16.0%. In the course of further analysis of the anamnestic data obtained, it was revealed that alcohol abuse occurred in the main group in 36.0% of cases, in the control group – in 24.0%. At the same time, it is important to note a certain range of dental diseases identified in these patients, the most typical among which were the presence of carious and non-carious lesions of the hard tissues of the teeth, often complicated by pulpitis and apical periodontitis [14]. At the same time, there are violations of the functional state of the salivary glands and chronic generalized periodontitis of moderate and severe degree with a significant loss of bone mineral density [15].

The results of our studies on the frequency of endoparodontal lesions in 100 somatic patients indicate a fairly high level of the total number of patients with endocrine pathology affected by EPL and their need for specialized dental care. During the registration of periodontological and periapical status before the start of therapeutic and preventive measures and at certain times after their completion, the degree of prevalence and severity of inflammatory and destructive changes in the parotid tissues was assessed by the value of the SBI index and by the depth of probing of periodontal pockets, PD.

When probing the dental sulcus, bleeding, swelling, hyperemia of the mucous membrane in the cervical region of the tooth is noted. The results of combined treatment of patients with moderate and severe chronic periodontitis with combined apical periodontitis were analyzed in two experimental groups - 21 patients (control group) and 20 patients (main group). The depth of periodontal pockets during probing before the start of the course of basic therapy in the two groups ranged from 5 to 6 mm and averaged: in the control group – 5.86± 0.221 mm, and in the main group – 5.90± 0.204 mm. At the same time, the difference in intergroup indicators was not significant (p=0.8875).

### Table 2

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Main group (n=100)</th>
<th>Control group (n=50)</th>
<th>p (x2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abs.</td>
<td>%</td>
<td>Abs.</td>
<td>%</td>
</tr>
<tr>
<td>Hereditary factor</td>
<td>38</td>
<td>38,0</td>
<td>13</td>
</tr>
<tr>
<td>Smoking</td>
<td>48</td>
<td>48,0</td>
<td>25</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>36</td>
<td>36,0</td>
<td>12</td>
</tr>
<tr>
<td>Occupational hazards</td>
<td>14</td>
<td>14,0</td>
<td>8</td>
</tr>
</tbody>
</table>

The depth of probing of periodontal pockets, PD, significantly decreased in the main group in 36.0% of cases, in the control group – in 24.0%. At the same time, the difference in intergroup indicators was not significant (p=0.8875).

<table>
<thead>
<tr>
<th>Stages of observation</th>
<th>Treatment method</th>
<th>Main group n=20</th>
<th>Control group=21</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before treatment</td>
<td>5.86±0.221</td>
<td>5.90±0.204</td>
<td>0.8875</td>
<td></td>
</tr>
<tr>
<td>After 6 months</td>
<td>4.05±0.176</td>
<td>3.30±0.147</td>
<td>0.0023</td>
<td></td>
</tr>
</tbody>
</table>

P – statistical significance of the difference between the groups (Mann-Whitney U-test); P before – statistical significance of the difference in the stages of observation (Wilcoxon criterion).

In patients with EPL in the main group, after using a diode laser in complex treatment, there was a relatively more pronounced improvement and stabilization of index indicators and there was a dynamic decrease in the depth of periodontal pockets by the final stage of the studies. The index of the depth of the periodontal pocket when probing after 6 months, from the beginning of treatment compared with the baseline data in this group decreased from 5.90±0.204 mm to 3.30± 0.147 mm 4.9±0.5 mm (p=0.0001). At the same time, statistically significant intergroup differences were revealed in the indicators recorded immediately after the completion of therapeutic and preventive measures (p=0.0023). According to the tabular data presented below, the complex treatment of endo-periodontal pathology contributed to a significant decrease in the indices of gingival sulcus bleeding index SBI at almost all stages of clinical trials (Table 3). After the completion of therapeutic measures, the condition of periapical tissues and periodontal significantly improved and the number of patients' complaints of bleeding decreased. The dynamics of this index in clinical groups of patients, when comparing the values of the indicator depending on the treatment methods used, showed that they were comparable in both groups before the start of treatment and 6 months after its start (p=0.0010 and p=0.0001, respectively, in the control and main groups). The evaluation of the periodontal-protective effectiveness of the proposed combination of therapeutic and prophylactic agents, calculated by determining the periodontal bleeding index, at the final stage of observations showed a significant weakening, but with different dynamics in patients of the two observation groups, of the intensity and prevalence of the inflammatory process in the parotid soft tissues.
So, if after 6 months the differences between the groups in the SBI indicators, as before treatment, were not significant (p=0.0238), then by the end of the observations, that is, 12 months after the end of treatment, bleeding in the main group had a more pronounced negative dynamics compared to the control group and stable significant reduction of index values throughout the entire study period: 1.76± 0.095 mm and 0.95± 0.114 mm, respectively, the indicators of the bleeding index detected after 12 months in the control and main groups (p=0.0001).

### Table 4
Dynamics of the SBI index in patients in the main and control groups, scores (M±m)

<table>
<thead>
<tr>
<th>Stages of observation</th>
<th>Treatment method</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard Treatment n=21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before treatment</td>
<td>2.81±0.148</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 6</td>
<td>2.10±0.136</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P before</td>
<td>0.0010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 12</td>
<td>1.76±0.095</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P before</td>
<td>0.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P After 6</td>
<td>0.0527</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P – statistical significance of the difference between the groups (Mann-Whitney U-test); $R_{before, After 6}$ - statistical significance of the difference in the stages of observation (Wilcoxon criterion).

Thus, according to the results of the clinical study, the values of the indices, PD and SBI before treatment were comparable in both groups.

### Conclusion
At certain follow-up periods, statistically significant distinctive intergroup signs were clearly expressed 6 months after the completion of therapeutic and preventive measures, and this trend in a sharp and significant decrease in gum bleeding from the depth of periodontal pockets persisted by the end of observations in the main group when using a laser.

### Authors’ contribution statement
The authors confirm contribution to the paper as follows: study conception and design: Ahmedbeyli Ramiz Mursal; data collection: Ahmedbeyli Ramiz Mursal, Bayramova Vusalya Mirsahib kizi, Mammadov Fuad Yusir oglu; analysis and interpretation of results: Ahmedbeyli Ramiz Mursal, Bayramova Vusalya Mirsahib kizi, Mammadov Fuad Yusir oglu; draft manuscript preparation: Ahmedbeyli Ramiz Mursal, Bayramova Vusalya Mirsahib kizi, Mammadov Fuad Yusir oglu. All authors reviewed the results and approved the final version of the manuscript.

### Conflict of interests
The authors declare that there is no conflict of interest.

### Literature
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References


Summary
Chronic inflammation in the periodontium, pulp and periodontium, through the pocket of which the infection can spread towards the root apex and cause a retrograde development of the inflammatory process in the pulp and periapical tissues, is considered as an odontogenic focus.

Aim: to study the state of periodontal tissues, periodontitis in the presence of a periapical focus of infection and the dynamics of its change in complex treatment.

Material and methods. 150 medical records of a dental patient were studied, among them a randomized controlled study of 100 patients with combined endodontic and periodontal lesions and 50 individuals not burdened by this pathology was also conducted. At the next stage a study of 41 patients with EPL was conducted. The patients were divided into two groups depending on the treatment algorithm: I – with a diagnosis of EPL-20 patients of the main group, who, along with standard treatment, received additional therapy with decontamination of CC and laser curettage with a dental diode laser (Picasso Life); II - with a diagnosis of EPL - 21 patients in the control group with traditional treatment. Evaluation of the effectiveness of tradi-
tional and proposed methods of treatment of endoperiodontal lesions was carried out by assessing the degree of gingival bleeding (SBI index (Muhlemann H.R. modified by Cowell I., 1975)) and probing depth (PD).

Results. The age indicators for patients of two groups most often varied within 40-49 years. The second most frequent was the age of the subjects, which amounted to 50-59 years. When studying the influence degree of industrial environment factors with irritating and general toxic properties on the frequency of occurrence of EPI, it was found that in the main group 14.0% of patients with this pathology have been working in such conditions for a long time. In addition, in the control group, the number of persons professionally burdened with inflammatory periodontal diseases without signs of apical periodontitis was 16.0%. In the course of further analysis of the obtained anamnestic data, it was revealed that alcohol abuse occurred in the main group in 36.0% of cases, in the control group - 24.0%. Abuse of tobacco products, against the background of which there is inflammation of the gums in the form of hyperemia, edema, bleeding, was noted by half of the patients in the control group and almost the same number of patients in the main group - 48.0%, in whom pathological changes in the periapical region were detected in parallel.

Conclusion. At certain periods of observation, statistically significant distinguishing intergroup signs were clearly expressed 6 months after the completion of therapeutic and preventive measures, and this trend in a sharp and significant decrease in gum bleeding and periodontal pocket depth continued by the end of observations in the main group when using a laser.

Key words: endoperiodontal lesions, risk factors, laser therapy.