

**MICROBIOLOGICAL EVALUATION OF THE EFFICACY OF BIOACTIVE GLASS PASTE IN THE TREATMENT OF CHRONIC APICAL PERIODONTITIS**Akbarov A.N.<sup>1</sup>Zhuraeva N.I.<sup>2</sup>

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**Introduction**

The modern concept of dental care prioritizes organ-preserving approaches. At the same time, choosing an effective method for the conservative treatment of apical periodontitis remains a challenging task. The emergence of an inflammatory reaction in the periapical region of the tooth is closely linked to microbial contamination of the root canals and infection of the root dentinal tubules.

It has been shown that the microbial ecology of the canals in primary and secondary apical periodontitis differs significantly, which carries important implications for the clinician. A pressing task in modern dentistry is to conduct clinical and experimental studies aimed at investigating the specific features of using osteoplastic materials, taking into account their microbial action, as well as developing clear clinical recommendations and optimizing the protocols for their use in endodontics.

**Aim of the Study**

Microbiological evaluation of the efficacy of treating chronic apical periodontitis using a paste based on the domestic osteoplastic material "Bioactive Glass".

**Materials and Methods**

The study involved 90 patients aged 18 to 60 with destructive forms of apical periodontitis, including 42 (46.7%) men and 48 (53.3%) women. A total of 117 teeth were treated throughout the study period. The majority of teeth (52.7%) with periapical periodontitis were multi-rooted (3–4 root canals), the percentage of teeth with 2 canals was 27.2%, and 20.1% were single-rooted teeth with 1 canal.

Patients were divided into 2 comparison groups with an equal number of subjects depending on the proposed treatment method:

**Group I:** Patients underwent an endodontic method involving the delivery of the domestic osteotropic obturation material "Bioactive Glass" beyond the apex into the periapical destructive lesion.

**Subgroup a:** "Bioactive Glass" was used in combination with a sterile 0.9% sodium chloride (NaCl) solution (n = 30).

**Subgroup b:** "Bioactive Glass" was used in combination with autologous platelet-rich plasma (PRP) (n = 30).

**Group II:** Patients underwent a multi-visit endodontic treatment method using a calcium hydroxide and iodoform-based paste, "Metapex" (USA).

At the baseline diagnostic stage, we determined the microbial composition of cultures obtained from the root canals of the studied patients prior to treatment. The results of the microbiological examination of the root canal contents in patients of Subgroups Ia and Ib before and after treatment demonstrated the pronounced antimicrobial efficacy of the therapy utilizing the osteotropic material "Bioactive Glass".

Prior to treatment, a high level of root canal contamination with opportunistic and pathogenic microflora was observed across all groups. The number of colony-forming units (CFU) averaged from 4.01  $\times 10^2$  to 5.31  $\times 10^5$  CFU/ml, indicating an active infectious process in the periapical tissues.

The microbiological findings of the root canal contents in Subgroup Ib patients (application of the osteotropic material "Bioactive Glass" combined with autologous platelet-rich plasma – PRP) confirmed the high antimicrobial activity of this technique.

Microbiological examination of the root canal contents in Group II patients (traditional treatment with the calcium hydroxide and iodoform-based paste "Metapex") revealed a noticeable reduction in bacterial contamination levels after the course of therapy; however, its efficacy was lower compared to the groups treated with the osteotropic material "Bioactive Glass".

### Results

Thus, the microbiological data demonstrated the highest treatment efficacy when using "Bioactive Glass" in combination with PRP, which is associated with enhanced local regeneration, improved blood supply, and stimulation of the immune response.

### Conclusions

1. The microbiological study demonstrated a significant reduction in the count of pathogenic and opportunistic microflora (by 65–78%) in patients treated with "Bioactive Glass".
2. The application of PRP additionally potentiates the antiseptic effect, ensuring a reduction in the levels of *E. coli*, *Enterococcus* spp., and *Candida albicans* to minimal values.

