



ESTIMATION OF THE EFFECTIVENESS OF APPLICATION OF THE COMBINED METHOD OF TREATMENT OF CHRONIC UPPER CULAR PERIODONTITIS

Kh.Kh. Khozhiev

Bukhara State Medical Institute

Article history:	Abstract:
Received: August 22 nd 2021 Accepted: September 21 st 2021 Published: October 26 th 2021	The main role in the development of apical periodontitis belongs to pathogenic microflora. The inflammatory process in the apical periodontium develops as a consequence of pulp necrosis and is caused by the intake of the infectious toxic contents of the root canals of the teeth through the apical foramen. This article presents an analysis of microbiological studies of the effectiveness of the combined method of treatment of chronic apical periodontitis by the combined use of new methods of depot and apexphoresis with the combined use of the method of fluctuorization.
Keywords: Periodontitis, Depophoresis, Microflora	

The main role in the development of apical periodontitis belongs to the pathogenic microflora [Shaymbetova A.P., 2017]. The inflammatory process in the apical periodontium develops as a consequence of pulp necrosis and is caused by the intake of the infectious toxic contents of the root canals of the teeth through the apical foramen. Endotoxins (antigens), penetrating into the apical periodontium, lead to the launch of a whole cascade of reactions at the cellular, microcirculatory, immune levels, which results in the destruction of the apical periodontium and the adjacent bone [Mozgovaya LA, 2013]. The greatest danger to humans is represented by destructive forms of chronic apical periodontitis, which are potential foci of odontogenic infection and reduce the body's immunological defense [Mozgovaya LA, 2013]. With various forms of endodontic pathology, more than 400 species of microorganisms were isolated and identified from the detachable root canals [Bekzhanova OE, 2016].

The contents of the root canal are dominated by fungi of the genus *Candida*, β -hemolytic streptococci, facultative anaerobic, *Enterococcus faecalis*, etc. [Mamedova L.A., 2016].

Due to the complex structure of the contents of the root canal, the growth and reproduction of pathogenic microorganisms increases, complicating their instrumental and drug treatment. The presence of pathogenic microflora residues is possible even after clinically effective endodontic treatment. [Bayakhmetova A.A., 2015].

Thus, the most important tasks to be solved are analyzes of microbiological studies of the effectiveness of the combined method of treatment of chronic apical periodontitis. To solve these problems, the dissertation candidate was given the goal of analyzing microbiological evaluations of the effectiveness of the combined method of treating chronic apical periodontitis.

MATERIALS AND RESEARCH METHODS

The object of the study was 81 patients who applied to the scientific and practical dental center at the Bukhara Medical Institute for the period from 2019 to 2021. Diseases with granulating and granulomatous forms of chronic apical periodontitis were found in 81 (67.5%) patients. Of the 81 patients, 31 (38.3%) were men and 50 (61.7%) women.

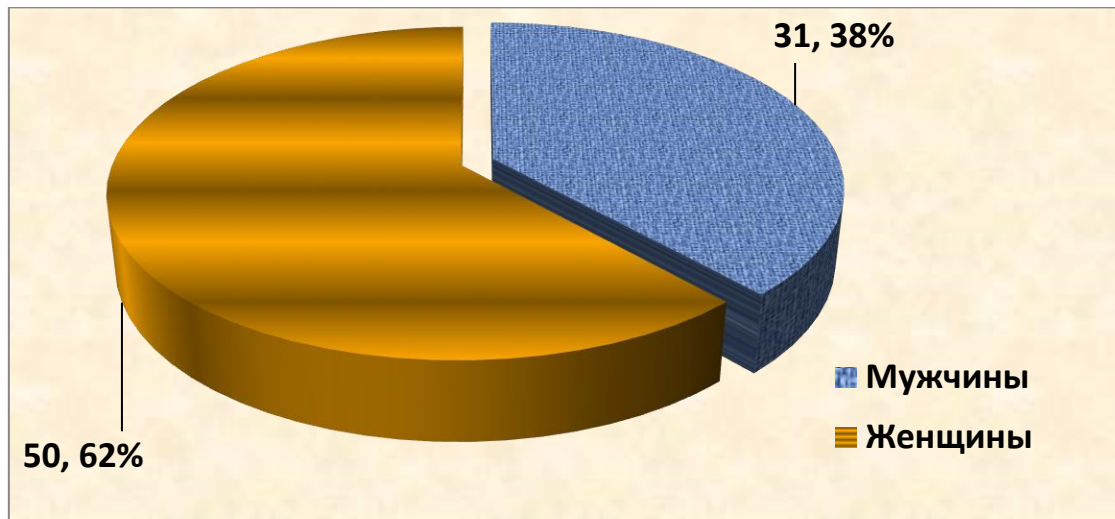


Fig. 1. Sex distribution of the examined patients.

All patients before traditional treatment and treatment with depot, apexphoresis and the combined method of fluorization. conducted a study of the microflora of the root canals of the teeth.

In order to study the effect of treatment on the microflora of root canals, bacteriological examination was carried out twice - before and after the endodontic treatment course (before root canal filling). To do this, using a sterile paper absorber, the material was taken from the root canal of the tooth and placed in a semi-liquid Ames nutrient medium for subsequent transportation. Further bacteriological research was carried out in accordance with the generally accepted rules of clinical anaerobic microbiology: quantitative sectoral inoculation was carried out on media intended for the cultivation of oral bacteria under aerobic and anaerobic conditions. Pure cultures of obligate and facultative anaerobic bacteria under anaerobic conditions were obtained using 5% hemagar prepared on the basis of Difco Brain-Heart Infusion with the addition of hemin (5 mg / l) and menadione (0.1 mg / l) with mandatory placement of crops in anaerostats with an oxygen-free gas mixture containing 80% nitrogen, 10% hydrogen, 10% carbon dioxide. A palladium catalyst was used to reduce oxygen residues. With the help of a complex of morphological, cultural and biochemical characteristics, the species of the isolated bacteria was established. Biochemical identification of pure cultures of anaerobic bacteria, streptococci, staphylococci, and gram-negative bacteria was performed using test systems from API (France) and Roche (Germany).

Clinical strains of facultative anaerobic bacteria obtained from root canals of teeth were used to determine the optimal dosing parameters of apexphoresis, providing a pronounced antibacterial effect, namely: *Staphylococcus epidermidis*, *Streptococcus sanguis*, *Streptococcus mutans*, *Streptococcus Cloccus salivarius*, *Candherida Kruse spp.* For the cultivation of staphylococcus, streptococci and clostridia, 5% blood agar was used, *E. coli* - mesopatamia agar, for *Candida Krusei* - Sabouraud's medium.

In accordance with the existing recommendations, the study was carried out as follows: cultures of microorganisms at a concentration of 1 million cells / ml (according to the optical turbidity standard) were inoculated onto the surface of agar freshly prepared in Petri dishes using the "lawn" method, evenly distributing them over the agar surface using a sterile spatula. Then the Petri dish was divided into sectors. A silver-copper electrode was placed in one sector, which was connected to the plus of the current source, in the other, a similar electrode connected to the minus. Only the active working part of the electrodes was immersed in the agar. The devices Potok-1 and Elfor-prof were used as a direct current source. The procedures were dosed according to the amount of electricity (mA x min). To determine the optimal parameters, 3 exposure doses were investigated: 1.5 mA x min, 2.5 mA x min and 5 mA x min. After the completion of the procedure, the electrodes were removed from the agar, and the Petri dishes were placed in anaerostats with an oxygen-free gas mixture containing 80% nitrogen, 10% hydrogen, 10%



carbon dioxide. A palladium catalyst was used to reduce oxygen residues. The results were recorded after 7 days of incubation of Petri dishes in an anaerostat at 37 ° C. The count was carried out by measuring the diameter of the zone of growth inhibition of bacterial colonies (in millimeters) around the hole left by the electrode on the agar. Depending on the diameter of the growth inhibition zone, the antibacterial effect was assessed as weak (with a diameter of less than 5 mm), medium (with a diameter of 5-10 mm), and high (with a diameter of more than 10 mm).

RESEARCH RESULTS AND DISCUSSION

As the results of the conducted microbiological studies have shown, in the material taken before the beginning of various types of treatment from the root canals of the teeth, a variety of the microbial landscape in the form of obligate and facultative anaerobic bacteria was revealed. Streptococci and staphylococci were most often found in the studied material: *Str.sanguis* - in 52% of patients, *Str.mutans* - in 68%, *Str.salivarius* - in 52%, *St. epidermidis* - in 41%. In addition, in 38% of patients, *Peptostreptococcus anaerobius* was detected in the root canals, in 12% - *Clostridium spp*, and in 14% fungi of the genus *Candida albicans*. In the area of rarefaction, there is no pattern of bone trabeculae.

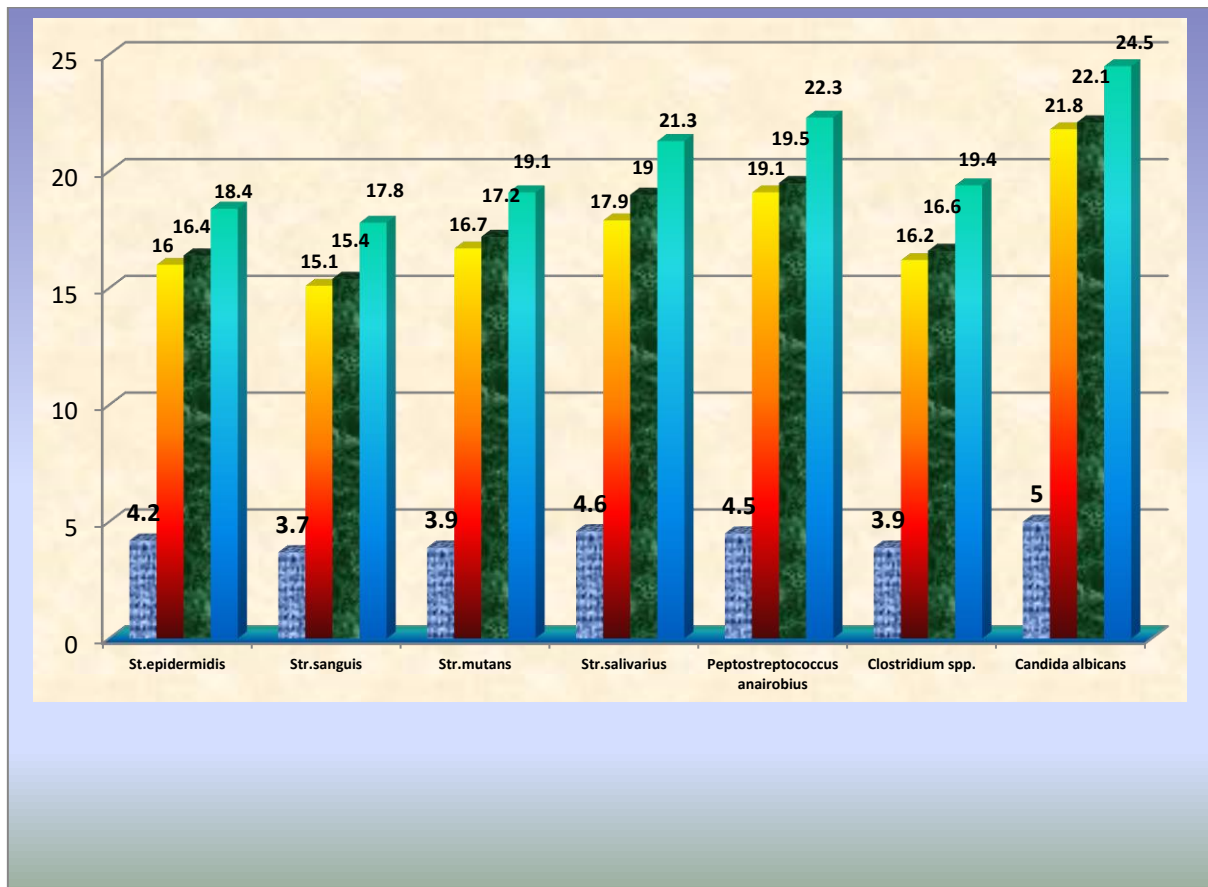
The study of strains of anaerobic bacteria obtained from the root canals of teeth before treatment showed that with traditional therapy of chronic apical periodontitis, all strains of facultative anaerobic bacteria had growth inhibition zones less than 5.1 (3.7-5.0 mm). With depophoresis with copper-calcium hydroxide at a current of 1.5 mA x min - 4.9 (3.5-4.8 mm). In accordance with the existing criteria for evaluating antibacterial activity, such values of inhibition of the growth of test cultures can be regarded as a weak antibacterial effect of traditional treatment and depophoresis at a dose of 1.5 mA x min.

In cases where the amount of electricity during depophoresis was 2.5 mA x min, the

diameter of the growth inhibition zones corresponded to a moderately pronounced antibacterial effect (growth inhibition zones - 6.8-9.3 mm). The most pronounced antibacterial effect appeared when the dose of depophoresis was 5 mA x min. The diameter of the zones of growth retardation of the colonies of all studied bacteria was more than 15.1 mm (15.1-21.8 mm). Therefore, the optimal doses of depophoresis that have an antibacterial effect are 2.5-5 mA x min. In the treatment of chronic apical periodontitis with apex-phoresis using a silver-copper electrode, the growth inhibition zones of all strains of the studied facultative anaerobic bacteria were 5.1 mm (3.9-5.0 mm), at a dose of 1.5 mA x min, which is regarded as a weak antibacterial effect of this dose of apex-phoresis. While the current strength increases during the procedure to 2.5 mA x min, the diameter of the growth retardation zones is 8.6-9.6 mm, which corresponds to a moderately pronounced antibacterial effect. The most pronounced antibacterial effect was detected at a dose of apexphoresis of 5 mA x min, that is, the diameter of the zones of growth retardation of the colonies of the studied bacteria was more than 15.4 mm (15.4-22.4 mm) (Fig. 1).

Thus, the optimal doses of apex-phoresis that have an antibacterial effect are also 2.5-5 mA x min.

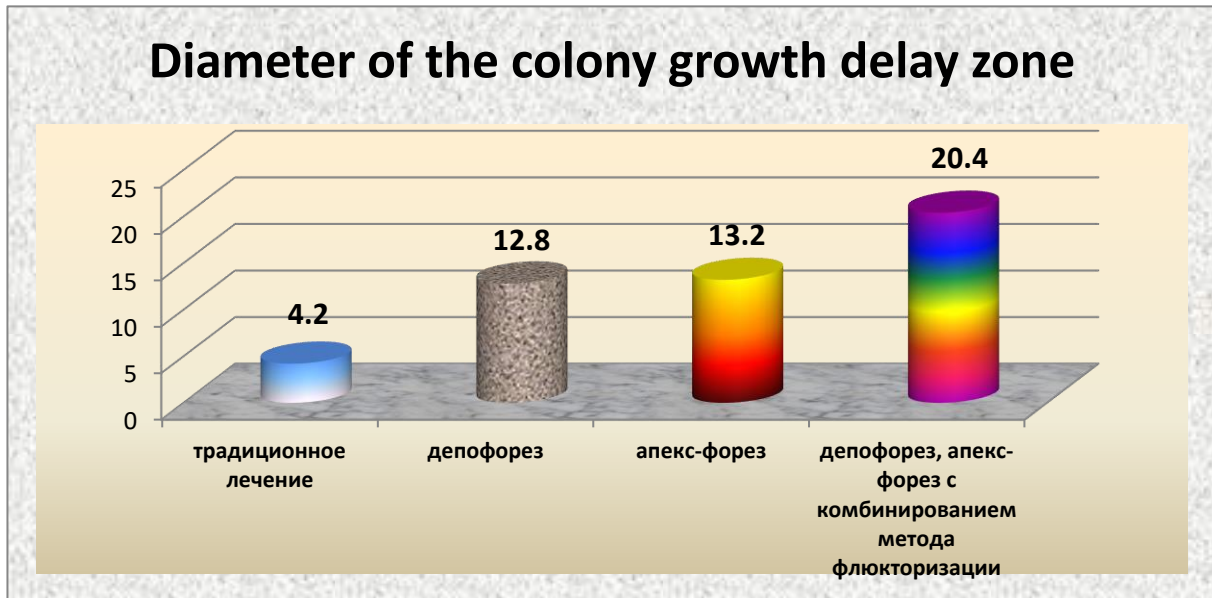
In the combined endodontic treatment of chronic apical periodontitis with the use of depot, apexphoresis and the method of fluorization, even more pronounced antibacterial effects are observed than their use separately. Thus, the diameter of the zones of growth retardation of the strains of the studied anaerobic bacteria with the combined use of depot, apexphoresis and the method of fluorization is equal to on average by 20.4 mm (17.8-24.5 mm), which is 4.8 times more antibacterial than traditional treatment. This is 4.2 mm, respectively, 1.6 times more than depophoresis (12.8 mm, respectively) and 1.5 times more than apex-phoresis (13.2 mm, respectively).



Rice. 1. Diameter (in mm) of the zone of inhibition of the growth of colonies of anaerobic bacteria, depending on the type of endodontic treatment used at a dose of 5 mA/min.

Thus, the combined endodontic treatment of chronic apical periodontitis using depopulation of copper-calcium hydroxide, apexphoresis of a silver-copper electrode with a combination of the fluoridation method has a more pronounced antibacterial effect than the use of these methods of treatment separately (Fig. 2). It should be noted that the detection of only one form of bacteria in the root canals of teeth was detected only in 6 (7.4%) individuals with chronic granulating periodontitis out of 81 examined, in most cases (92.6%) associations of

pathogens were observed, including from 2 to 6 types of microbes. So, for example, from the material obtained from patients with chronic granulating periodontitis, the largest spectrum of microflora was isolated, and in patients with chronic granulomatous periodontitis, monoinfection did not occur at all. In all forms of the disease, Streptococcus and fungi of the genus Candida were present in patients before treatment, and streptococcal microflora dominated in the composition of the associations.



Rice. 2. Diameter of the zone of growth inhibition of colonies of the studied anaerobic bacteria, depending on the type of endodontic treatment used

The normality of the distribution of indicators in each of the compared groups was assessed using the Shapiro-Wilk test (for $n < 50$). For comparison of indicators, the distribution of which differs from the normal *St. epidermidis* ($p = 0.017$), *Clostridium* spp. ($p = 0.029$), the nonparametric Kruskal-Wallis test was used. The statistical significance of the differences in indicators was assessed by comparing the calculated value of the Kruskal-Wallis test with the critical ones, by determining the level of significance p using the SPSS statistical program.

When identifying differences between the compared groups before treatment using the Kruskal-Wallis test, the differences were insignificant for *St. epidermidis* ($p = 0.981$), *Str.sanguis* ($p = 0.097$), *Str.mutans* ($p = 0.752$), *Str.salivarius* ($p = 0.702$), *Peptostreptococcus anaerobius* ($p = 0.724$), *Clostridium* spp. ($p = 0.752$), *Candida albicans* ($p = 0.507$). Data on the quantitative and qualitative composition of the microflora of the root canals of teeth before therapy with various types of endodontic treatment are given in Table 1.

When comparing the data on the quantitative and qualitative composition of the microflora of the root canals of teeth after therapy with various types of endodontic treatment, a significant decrease in the amount of microflora was noted, depending on the type of application. In patients with chronic apical periodontitis who received traditional treatment, root canal contamination,

although it tends to decrease, in most cases does not have significant differences ($P > 0.05$). When using root canal depophoresis with copper-calcium hydroxide after the course of treatment, the amount of microflora decreased from 7.6-9.8 Lg KOE / ml to 2.8-6.3 Lg KOE / ml, that is, almost 2 times. At the same time, complete decontamination (microbial growth was absent) was observed in 57.8% of cases, in the rest - the contamination significantly ($P < 0.05-0.01$) decreased.

Endodontic treatment of teeth with apex-phoresis using a silver-copper conductor led to a significant ($P < 0.05-0.01$) 3.3 different decrease in all types of microflora from 7.5-12.1 Lg KOE / ml to 1.9 - 4.1 Lg KOE / ml, this is especially clearly seen in relation to *Str.sanguis*, *Str.mutans*, *Str.salivarius* and *Clostridium* spp. (fig. 3.3). Complete decontamination was observed in 66.8% of patients. In other words, the treatment of chronic apical periodontitis using apex-phoresis has 1.3 times more antibacterial effect than root canal depophoresis. With the combined use of depophoresis, apexphoresis and the method of fluoridation, a significant ($P < 0.001$) decrease in the amount of microflora of the root canal of the teeth was noted than depophoresis (2.5 times) and apex-phoresis (1.5 times). Moreover, in most cases (71.5%) there was a complete disappearance of *St. epidermidis*, *Str.sanguis*, *Peptostreptococcus anaerobius*, *Clostridium* spp. and *Candida albicans*.



Table 1.

Bacterial contamination of the root canals of teeth in patients with chronic apical periodontitis before treatment with various methods (in Lg KOE / ml)

Microorganism strains	Treatment type					
	Traditional treatment method	Depophoresis	Apex-phoresis	Depophoresis + apex-phoresis + fluctorization	Kruskal-Wallis index χ^2	P
St.epidermidis	9,2±0,38	9,1±0,40	9,3±0,44	9,2±0,37	0,178	0,981
Str.sanguis	10,4±0,39	9,8±0,34	10,1±0,39	11,2±0,46	6,326	0,097
Str.mutans	12,3±0,49	11,8±0,52	12,1±0,57	12,4±0,52	1,206	0,752
Str.salivarius	11,2±0,46	10,9±0,45	11,4±0,42	11,5±0,46	1,415	0,702
Peptostreptococcus anaerobius	8,2±0,25	8,4±0,26	8,6±0,27	8,6±0,34	1,323	0,724
Clostridium spp.	7,8±0,23	7,6±0,25	7,5±0,28	7,7±0,22	1,203	0,752
Candida albicans	8,6±0,21	8,4±0,24	8,5±0,42	8,8±0,22	2,329	0,507

CONCLUSIONS:

Thus, the obtained data confirmed the antibacterial efficacy of new methods of treatment of copper-calcium hydroxide depophoresis, apexphoresis of a silver-copper conductor with a combination of the fluctorization method in relation to facultative anaerobic microbes, both most common in periodontitis and having significant resistance to antimicrobial effects ... At the same time, the most pronounced (1.5-2.5 times more) antibacterial effect is possessed by the combined use of depot, apexphoresis and the method of fluctorization than their use separately.

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