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Original Article

Investigating Efficacy of the Phytoadaptogenic Cocktail "Biorithm-E" in Treating Odontogenic Inflammatory Conditions

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ABSTRACT

Odontogenic inflammatory illnesses, which make up 26% of all inflammatory diseases, have remained the most common type of proinflammatory disorders of the maxillofacial region (MFO) in Russia throughout the past few decades. Phlegmons and abscesses can cause a lot of serious problems, so the diagnosis and treatment of these diseases remain important issues. The study aimed to develop new strategies for the treatment of inflammatory diseases using phyto-adaptogenic, and the results showed that animals receiving classical antibacterial therapy in addition to an adaptogen experienced a significant decrease in the qualitative and quantitative composition of microflora and an improvement in clinical symptoms in the early stages. Thus, the use of adaptogens in the treatment of inflammatory illnesses is recommended. Therefore, the use of adaptogens in the treatment of inflammatory diseases of the maxillofacial region is beneficial because has been shown that they must be significant moderators of the body's reaction.

Keywords: Odontogenic inflammatory diseases, Phyto-cocktail, "Biorhythm-E", Antibacterial therapy

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Introduction

Odontogenic inflammatory illnesses have been the most prevalent type of proinflammatory disorders of the maxillofacial region (MFO) in Russia during the past few decades [1–5]. Infectious and inflammatory illnesses of the craniofacial area and neck of infectious origin currently account for 26% of patients who attend specialized hospitals [2, 3, 6-8]. One of the most urgent issues in the maxillofacial surgery clinic is the diagnosis and treatment of odontogenic illnesses of the maxillofacial region, of which phlegmon and abscesses are major. The number of people with this pathology has not only remained constant over the last 30 to 50 years but has increased [9-11]. The majority of authors claim that in addition to aggressive diffuse phlegmon and abscess forms with clinically noticeable intoxication syndrome, the percentage of patients with a slow course and eliminated clinical symptoms is increasing. This makes it very challenging to diagnose these diseases' complications [4, 12-14]. At the same time, complications of odontogenic inflammatory diseases are very dangerous and can be fatal [11, 15, 16].

One of the primary causes of this pathology's development is a shift in the microflora and its biological characteristics, namely a rise in the quantity of antibiotic-resistant microbial strains, which are the basis for several pathogenic associations [17, 18]. Both facultative anaerobic species, which are made up of two to three different types of microorganisms that work in concert, and non-spore-forming anaerobic bacteria can be found in associations [14, 17, 19]. This

situation leads to a notable decline in the disease's clinical manifestation and the appearance of resistant bacteria [20]. Representatives of the category *Bacteroides* spp. are the most prevalent (19–23%) anaerobic components in microbial associations in inflammatory processes of the maxillofacial region. According to Bernadsky [21], Propionibacteria, Veillonella, and Fusobacteria are less common, occurring in roughly 8% of cases [21]. A large number of unanswered concerns in the diagnosis and treatment of odontogenic inflammatory illnesses of the maxillofacial region remain relevant in the practice of maxillofacial surgeons and determine the ongoing focus of various researchers [20]. The problem of increasing the therapy's efficacy is still urgent. The use of natural remedies that mediate their therapeutic effect through the body's defense mechanisms is one example of the active incorporation of biotherapeutic methods to therapy into practical health care that is currently underway [22, 23]. The occurrence of proinflammatory disorders of the craniofacial region is known to fluctuate steadily and to be correlated with the patient's immune system and overall somatic status [24-26]. Polysaccharides, physiologically active compounds (alkaloids, triterpenes, glycosides), fatty acids (linolenic, octacedonic), vitamins, flavonoids, and essential oils are all components of phyto-adaptogens. These chemicals improve immunological parameters by acting on several systems. There was a noticeable direct impact on the cell membrane, which was accompanied by a shift in selective permeability and an increase in structural stability [27]. Haemostatic barriers are stabilized when peroxide compound formation is halted by phyto-adaptogens. Adaptogens stimulate the production of cytochrome p450 and free myrosomal oxidation, which increases tolerance to harmful effects [28, 29]. Eleutherococcus, ginseng, liquorice, lemongrass, aralia, and Rhodiola rosea are the most often used medications. They promote the development of a "state of nonspecifically increased resistance" are safe, and have a wide range of therapeutic uses [24, 30, 31].

The purpose of the study is to empirically support the use of the phyto-adaptogenic cocktail "Biorhythm-E" in complex therapy for maxillofacial odontogenic inflammatory illnesses.

Materials and Methods

The work was performed on 42 male Wistar rats weighing 270-310 grams. Experiments on animals were carried out following the Federal Law "On the protection of animals from cruelty" (1.12.99) and the Declaration of Helsinki on the humane treatment of animals. During the experiment, the rats were on a standard diet and had free access to water and food at any time of the day. The light regime is natural. Animals were randomly divided into two groups: main (I) and control (II), with 21 animals in each, respectively. The evaluation of the study was carried out by clinical examination and microbiological diagnostics.

During the first stage, animals were infected under experimental conditions with a mixed virulent flora, including *Staphylococcus aureus*, *Streptococcus pyogenes*, representatives of the group *Bacteroides* spp. Under anesthesia with a 1.5% sodium thiopental solution (at a rate of 40 mg/kg), the rat oral mucosa was incised in the projection of the roots of the front teeth, 0.05 mm away from the marginal gums. Next, a portion of the microorganism and tamponade of the incision zone were introduced on the sterile pin. After 3-4 days, the clinical state of the studied animals was assessed and the bacteriological determination of the contents was carried out at the stage of the active phase of clinical manifestations.

Group I rats on the 4th day were treated with an antibacterial drug belonging to the group of cephalosporins - cefepimum 50 mg/kg. The treatment was carried out according to the classical method of intramuscular injection into the rat thigh muscle of 15 mg of the drug (taken into account in dilution in a 0.5% solution of Novocainum) 2 times a day at intervals of 12 hours for 7 days.

Individuals of group II, along with the classical antibacterial therapy described earlier, took phyto-cocktails in addition to the treatment [32, 33]. In this work, phyto-cocktails (FC) "Biorhythm-E" (BR-E) (trademark (TZ) No. 2010734191 of 18.10.2011) were used, which was made up of a mixture of alcohol extracts in certain proportions - Eleutherococcus prickly, Rhodiola rosea, licorice naked, elecampane high. The phyto-cocktail was created and tested in the laboratory of traditional medicine of the Institute for Biomedical Research [20]. During the week before using the phyto-cocktail, the daily water intake was measured in terms of 100 g of the rat's body weight. At a concentration calculated based on the average daily volume of consumed liquid, the phyto-cocktail was added to the drinkers. The dosage of adaptogens was calculated based on the recommendations in the instructions for the use of the drug-taking into account the coefficient (x10) for small laboratory animals and was 0.05 ml per 100 g of body weight per day (solvent - drinking water).

After the treatment, on the 7th day, the clinical condition of the objects of the study was assessed, as

well as the control microbiological study.

Material for bacteriological research was collected using a transport system containing Ames medium.

The technique of anaerobic cultivation included the isolation of pure cultures on a 5% blood heminagar using Himedia anaerostats (Great Britain) and subsequent identification by cultural and biochemical characteristics (API test system, France).

To identify the most significant in the diagnostic sense factors and to reduce the dimension of the array of features that make them up, the results of the study were processed by multivariate factor analysis using Statistica software from StatSoft Inc., USA, taking into account the representativeness of the Student's test, the values of $P \leq 0.05$.

Numerous kinds of bacteria were discovered during the bacteriological analysis of the confiscated material. It should be highlighted that several purulent inflammatory disorders are frequently caused by anaerobic species, including *Porphyromonas gingivalis*, *Prevotella melaninogenica*, *Fusobacterium nucleatum*, and *Peptostreptococcus anaerobius*.

Additionally, *Staphylococcus aureus*, *Streptococcus sanguis*, *Enterococcus* species, and *Staphylococcus epidermidis* were discovered to be facultative representatives of the anaerobic flora.

The average lg value **(Figure 1)** was used to express the quantitative markers of the discovered microorganisms; the frequency of occurrence for each species was calculated as a percentage **(Figure 2)**.

Results and Discussion

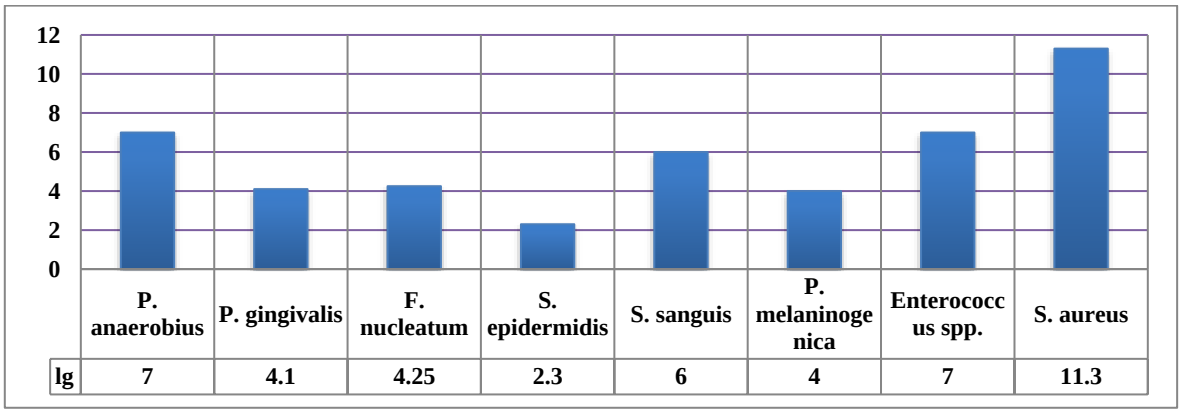


Figure 1. Quantitative indicators of bacterial species in purulent exudate in animals on the 3rd day in the active phase of inflammation.

The emergence of purulent discharge from the infection zone, an elevation in rectal temperature to 42-43.7 °C, and abnormal behavior were seen on the third day, which is when the clinical symptoms typical of an inflammatory reaction first appeared.

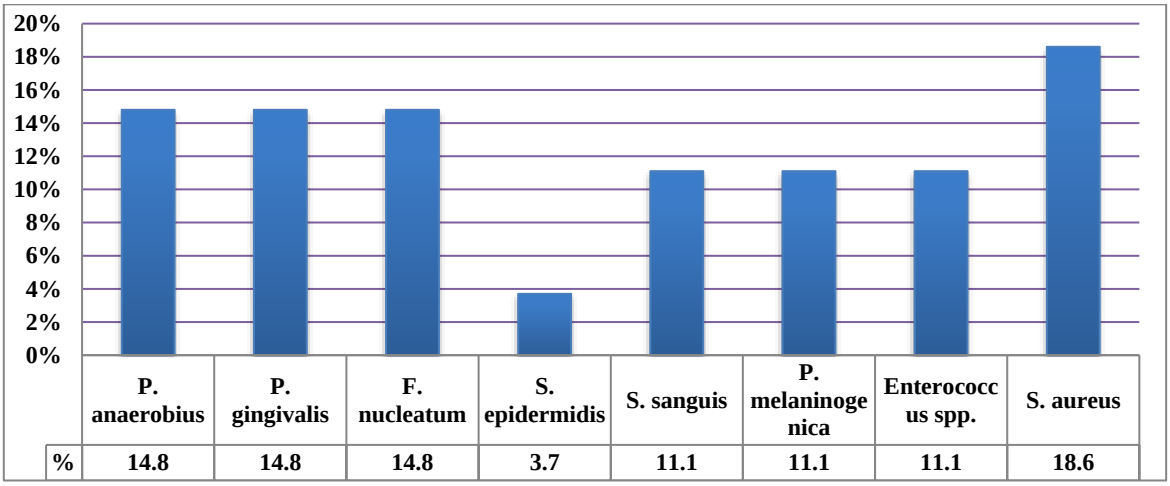
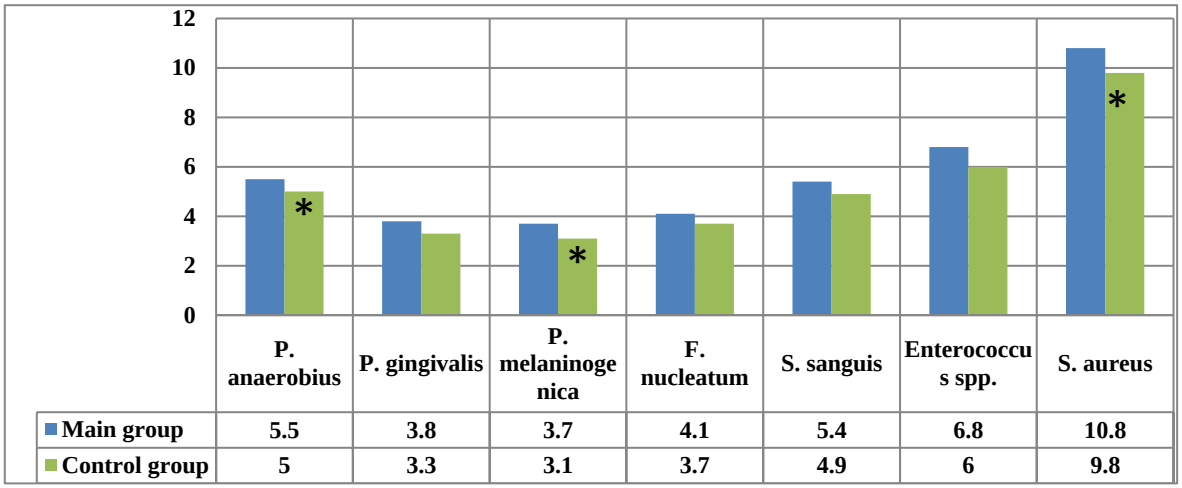


Figure 2. The frequency of occurrence of various types of microorganisms in purulent exudate in animals on the 3rd day in the active phase of inflammation.

Based on the treatment outcomes, the heads of group I showed a decrease in clinical symptoms on the eighth day. *P. anaerobius* was found to be 5.5 ± 0.21, *P. gingivalis* was found to be 3.8 ± 0.20, *P. melaninogenica* was found to be 3.7 ± 0.20, *S. Sanguis* was found to be 5.4 ± 0.20, and *S. aureus* was found to be 10.8 ± 0.20.

The control group showed a substantial difference in the therapy's signs. Therefore, on the sixth day, there was an improvement in the animals' indications of the organism's protective components. In contrast to the main group's conclusions, the microbiological study found a substantial correlation between the quantitative indicators of the flora **(Figure 3)**.



	P. anaerobius	P. gingivalis	P. melaninogenica	F. nucleatum	S. sanguis	Enterococcus spp.	S. aureus
Main group	5.5	3.8	3.7	4.1	5.4	6.8	10.8
Control group	5	3.3	3.1	3.7	4.9	6	9.8

Figure 3. Comparative indicators of changes in the quantitative composition of microflora in experimental animals.

Conclusion

Consequently, several conclusions are drawn from the analysis of the data, showing that the combination of drug therapy and the phyto-adaptogenic complex "Biorhythm-E" enhances the quality of the therapeutic measures. This is made possible by the corrective effect on the primary mechanisms of neurodegeneration, which strengthens the body's resistance to bacteria. The overall strengthening impact is mediated by flora. To effectively treat inflammatory illnesses of the craniofacial region, adaptogens must be strong modulators of the body's responsiveness.

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Ethics Statement: None

References

1. Hite GJ, Mishvelov AE, Melchenko EA, Vlasov AA, Anfinogenova OI, Nuzhnaya CV, et al. Holodoctor planning software real-time surgical intervention. Pharmacophore. 2019;10(3):57-60.
2. Blinov AV, Yasnaya MA, Blinova AA, Shevchenko IM, Momot EV, Gvozdenko AA, et al. Computer quantum-chemical simulation of polymeric stabilization of silver nanoparticles. Phys chem aspects of the study of clusters nanostructures and nanomaterials. 2019;11:414-21.
3. Galabueva AI, Biragova AK, Kotsoyeva GA, Borukayeva ZK, Yesiev RK, Dzgoeva ZG et al. Optimization of modern methods of treating chronic generalized periodontitis of mild severity. Pharmacophore. 2020;11(1):47-51.
4. Sadovoy VV, Selimov MA, Slichedrina TV, Nagdalian AA. Usage of biological active supplements in technology of prophilactic meat products. Res J Pharm Biol Chem Sci. 2016;7(5):1861-5.
5. Salins SS, Siddiqui SA, Reddy SVK, Kumar S. Parametric analysis for varying packing materials and water temperatures in a humidifier. In: Proceedings of the 7th International Conference on Fluid Flow, Heat and Mass Transfer (FFHMT'20) [conference proceedings on the Internet]; 2020 Nov 15-17; Niagara Falls, Canada. Canada: FFHMT; 2020. p. 196(1)-196(11).

6. Arieva GT, Soloviev MM, Aryev AL. Ksefokam with odontogenic periostitis in elderly and senile patients. Clin Gerontol. 2008;7:22-9.
7. Selimov MA, Nagdalian AA, Povetkin SN, Statsenko EN, Kulumbekova IR, Kulumbekov GR, et al. Investigation of CdCl2 influence on red blood cell morphology. Int J Pharm Phytopharmacol Res. 2019;9(5):8-13.
8. Blinova A, Blinov A, Baklanova O, Yasnaya M, Baklanov I, Siddiqui A, et al. Study of wound-healing ointment composition based on highly dispersed zinc oxide modified with nanoscale silver. Int J Pharm Phytopharmacol Res. 2020;10(6):237-45. doi:10.51847/Cu6KX0JDE322
9. Demchenkov EL, Nagdalian AA, Budkevich RO, Oboturova NP, Okolelova AI. Usage of atomic force microscopy for detection of the damaging effect of CdCl2 on red blood cell membrane. Ecotoxicol Environ Saf. 2021;208:111683.
10. Pushkin SV, Tsymbal BM, Nagdalian AA, Nuzhnaya KV, Sutaeva AN, Ramazanova SZ, et al. The use of model groups of necrobiont beetles (coleoptera) for the diagnosis of time and place of death. Entomol Appl Sci Lett. 2019;6(2):46-56.
11. Nagdalian AA, Oboturova NP, Povetkin SN, Ahmadov V, Karatunov VT, Gubachikov VA, et al. Insect's biomass as a livestock feed study of the impact of insectoprotein on the livestock vitals. Pharmacophore. 2020;11(1):27.
12. Areshidze DA, Mischenko DV, Makartseva LA, Rzhepakovsky IV, Nagdalian AA. Some functional measures of the organism of rats at modeling of ischemic heart disease in two different ways. Entomol Appl Sci. 2018;5(4):2349-864.
13. Luneva A, Koshchayev A, Nesterenko A, Volobueva E, Boyko A. Probiotic potential of microorganisms obtained from the intestines of wild birds. Int Trans J Eng Manag Appl Sci Technol. 2020;11(12):11A12E.
14. Hight GY, Mishvelov AE, Melchenko EA, Nuzhnaya CV, Epanov VA, Dolgalev AA, et al. New image modeling features for planning surgical interventions. Res J Pharm Biol Chem Sci. 2019;10(1):140-3.
15. Akhmedov GD, Tsareva TV. Correction of violations of the cytokine status in infectious and inflammatory complications of surgical interventions in the oral cavity. Inst Dent. 2012:17-21.
16. Nagdalian AA, Pushkin SV, Povetkin S, Nikolaevich K, Egorovna M, Marinicheva MP, et al. Migalomorphic spiders venom: extraction and investigation of biological activity. Entomol Appl Sci Lett. 2018;5(3):60-70.
17. Tsarev VN, Ushakov RV. The use of antimicrobial drugs in dental and maxillofacial surgery. Ed. A.A. Kulakova, T.G. Robustova, A.I. Nerobeeva. In the book: surgical dentistry and maxillofacial surgery. National leadership. M: GEOTAR-Media; 2010. 916 p.
18. Poeschl PW, Spusta L, Russmueller G, Seemann R, Hirschl A, Poeschl E, et al. Antibiotic susceptibility and resistance of the odontogenic microbiological spectrum and its clinical impact on severe deep space head and neck infections. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010;110(2):151-6.
19. Al-Qamachi LH, Aga H, McMahon J, Leanord A, Hammersley N. Microbiology of odontogenic infections in deep neck spaces: a retrospective study. Br J Oral Maxillofac Surg. 2010;48(1):37-9.
20. Osipchuk GV, Povetkin SN, Ashotovich A, Nagdalian IA, Rodin MI, Vladimirovna I, et al. The issue of therapy postpartum endometritis in sows using environmentally friendly remedies. Pharmacophore. 2019;10(2):82-4.
21. Bernadsky YI. Fundamentals of maxillofacial surgery and surgical dentistry. Med Lit. 2000;406.
22. Nagdalyan AA, Oboturova NP, Povetkin SN, Ziruk IV, Egunova A, Simonov AN, et al. Adaptogens instead restricted drugs research for an alternative items to doping in sport. Res J Pharm Biol Chem Sci. 2018;9(2):1111-6.
23. Bledzhyants GA, Mishvelov AE, Nuzhnaya KV, Anfinogenova OI, Isakova JA, Melkonyan RS. The effectiveness of the medical decision-making support system "electronic clinical pharmacologist" in the management of patients therapeutic profile. Pharmacophore. 2019;10(2):76-81.
24. Datieva FS. Complex study of the influence of phytoadaptogens on the macro-and microhemodynamic system of hemostasis and thromboresistance of the vascular wall in the experiment. Vladikavkaz. Honey. Biol Bull. 2010;11(18):50-6.
25. Blinov AV, Kravtsov AA, Krandievskii SO, Timchenko V, Gvozdenko AA, Blinova A. Synthesis of MnO2 nanoparticles stabilized by methionine. Russ J Gen Chem. 2020;90(2):283-6.
26. Nagdalian AA, Rzhepakovsky IV, Siddiqui SA, Piskov SI, Oboturova NP, Timchenko LD, et al.

Analysis of the content of mechanically separated poultry meat in sausage using computing microtomography. J Food Compost Anal. 2021;100(4):103918.

27. Botoeva NK. Pathogenetic substantiation of the use of chronotherapeutic restorative technologies in the prevention of mental and physical fatigue in young people. Bull RUDN. 2008;7:717-21.
28. Barabanov PV, Gerasimov AV, Blinov AV, Kravtsov AA, Kravtsov VA. Influence of nanosilver on the efficiency of pisum sativum crops germination. Ecotoxicol Environ Saf. 2018;147:715-9.
29. Nuzhnaya KV, Mishvelov AE, Osadchiy SS, Tsoma MV, AM RS KK, Rodin IA, et al. Computer simulation and navigation in surgical operations. Pharmacophore. 2019;10(4):46-52.
30. Salins SS, Siddiqui SA, Reddy SVK, Kumar S. Experimental investigation on the performance parameters of a helical coil dehumidifier test rig. Energy Sources A: Recovery Util Environ Eff. 2021;43(1):35-53.
31. Yaremenko KV. The teachings of N.V. lazarev on SNPS and adaptogens as a basic theory of preventive medicine. Psychopharmacol Biol Narcol. 2005;5(4):1086-91.
32. Choudhary NK, Mallya R. Phytochemical investigation and antibacterial activity of a medicinal plant. Int J Pharm Phytopharmacol Res. 2019;9(4):53-8.
33. Mirza AS, Baig MT, Huma A, Ibrahim S, Shahid U, Jabeen A, et al. Antibacterial activity of methanol extract of capparis decidua edgew (forssk.) against staphylococcus aureus, bacillus cereus, salmonella typhi, and Escherichia coli. Pharmacophore. 2020;11(4):46-50.