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THE CLINICAL EFFICACY OF NBF GINGIVAL GEL IN TREATMENT OF PATIENTS WITH CHRONIC CATARRHAL GINGIVITIS

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Inflammatory diseases of periodontal tissue occupy one of the leading placesamong the actual problems of modern dentistry. According to the literature, the prevalence of periodontal disease is 98-100% [17, 26]. Most often children, adolescents and adult persons older than 35 years have gingivitis recently. Besides, it has a tendency to progress and transformed into Periodontitis [17, 23]. Urgency of the problem is caused byhigh frequency detectionof disease, untimely appeal for help young people and resulting in the occurrence of a chronic infection,reduce emotional status and working ability.

Natural and synthetic antiseptics and nonsteroidal antiinflammatory drugsare traditionally used for catarrhal gingivitis treatment.There are a large number of scientific publications about the problems of periodontal disease but the effectiveness of chronic catarrhal gingivitis treatment needs improvement. Local therapy with medications which are devoid of the disadvantages of synthetic substances is leading intreatment of periodontal tissue. They have the same type of action but have fewer side effects and rarely cause an allergic reactions. Therefore,searching of newmedications based on modern technologies remains the actual. Consequently, it is important to compare the effectiveness of different medications.

The preparation NBF Gingival Gel manufacturingby Nano Cure Tech Ltd (South Korea) is certified in Ukraine. It is a multifunctional gel created

bycontemporary Nano-Bio Fusion technology for extra protection of the gums and oral mucosa. It is also used against the plaque formation and halitosis. After applying the gel is rapidly absorbed on the mucous membrane and covers mucosa by bioactive film. Propolis extract and vitamin C and E in the nano-formareactive components of the gel.

The oral cavity is a wet environment, so the time of the active components of therapeutic medications contact with mucous membrane is limited. It is reduces the efficiency of medical preparations and reduces the possibility of local therapy. But NBF Gingival gel included nanoparticles quickly penetrates into the cells compared with their conventional size analogs. Besides, thanks to the patented technology, the gel is formthe bioactive nano-film on the mucous membrane of oral cavity which contains antioxidants. It increases the absorption of nutrients that contained in the gel, which improves tissue nutrition and the restoration of the epithelium. Thus, the gel produces a protective effect for the mucous membrane of oral cavity.

Gingival Gel has some advantages, so we can use it for applications on the mucous membrane of the mouth, to rinse and as a toothpaste. It can be used by patients with diabetes and high blood pressure.However, it should be used with caution in patients which have allergic reactions to bee products.

Considering all the above, the purpose of our study was to evaluate the efficacy of NBF Gingival Gel in patients with chronic catarrhal gingivitis.

Following tasks has been resolved to achieve this purpose:

1. Explore the antimicrobial activity of the NBF Gingival Gel.
2. Compare the antimicrobial effect of NBF Gingival Gel with other dental gels.
3. Study the NBF Gingival Gel clinical efficacy in patients with chronic catarrhal gingivitis.
4. Develop practical recommendations for use of NBF Gingival Gel in the treatment of patientswhith periodontal diseases.

Clinical and microbiological researches in 48 patients aged 20 to 25 yearsold

has been conductedaccording to the task.27 men and 21 womenwere among the patients.

Clinical examination of patients included detection of complaints to the presence of painand swelling of the gums, bad odor from the mouth and bleeding gums.In anamnesis of the disease, special attention was paid to its duration, flow characteristics, the character of the treatment which was conducted earlier and its effectiveness.During the anamnesis gathering, attention was drawn tothe presence of an allergic reaction to all kinds of allergens, especially to bee products.

We paid attention to a general view of the patient, lymph node status and red border of the lipsduring an examination of patients dental status.We also determined the alveolar mucous membrane state,depth of periodontal pockets, the presence of dental plaque and the degree of gums bleeding.Wepaid attention to the state of oral mucosa dentitions andused periodontal tests.

Fedorov-Volodkyna and Green-Vermillion indexes were determined oral hygiene status.Samples of Schiller-Pisarevwasconducted qualitative assessment of gingivitis.PMA indexby Parma modificationand thegingival sulcus bleedingby Mullemanindex were conducted quantitative assessment of gingivitis. The condition of the alveolar processes was determined by orthopantomography.

Antimicrobial activity of NBF Gingival Gel was studied by methods of agardiffusion and serial dilutions in semi-liquid agar and meat-peptone broth to determine the minimum bactericidal concentration according to the №167 order from 05.04.2007[2].Standard strains of *S. aureus* ATCC 25923, *E. faecalis* ATCC 29212, *E. coli* ATCC 25922 and *C. albicans* ATCC 10231 were used for the microbiological examination.

Antimicrobial activity of the NBF Gingival Gel togingival pockets microflora of patients with chronic catarrhal gingivitis was studiedin comparison with Metrogil dent and Gengigel.

Collection ofthe material samples from periodontal pockets of patients with chronic catarrhal gingivitiswas performed with sterile paper pin No 20which was placed into eppendorf with saline solution and transported to the laboratory.Not

later than 2 hours,eppendorf was shaken during 10 seconds andinoculated on the surface of Petri plates with sugar agar.Paper discs soaked in medications were puton the surface of the mediumafter drying.The plates were incubated in thermostat during 24 hours at a temperature of 37ºC.

Growthinhibition zones of microorganisms around their respective diskswere measured with the help of a compass. Growthinhibition zones with a diameter less 10 mm were regardedthe strains as resistant, more than 10 mm – as insensitive, 25 mm – high sensitivity [24].

Treatment of gingivitis included professional oral hygiene and the application of the NBF gingival gel. Before applying the medications gums were dried clear. Gel was appliedwith a cotton swab on gingiva surfaces. Thegel is thoroughly washed off after 10 minutes after application. This procedure was repeated 3-4 times a day for 5 days.

Clinical efficacy of the medications NBF Gingival Gel was evaluated according to subjective and objective examination in dynamics of 16 patients with chronic catarrhal gingivitistreatment.

The first comparison group included 16 patients with chronic catarrhal gingivitis who underwent traditional therapy with the use of applications of Metrogil dent during 5 days [4].The second comparison group included 16 patients who underwent application of the Gengigel during of 5 days too.

Statistical processing of results carried out on the computer by using Microsoft Office Excel 2010. The significance of the obtained results were analyzed using t-criterion by Student.

During the examination of patients with chronic catarrhal gingivitis the presence of complaints of bleeding gums during teeth brushing and taking solid food within 1-2 years. During collection of the patientslife history they are denied the presence of somatic diseases.Inspection of the oral cavity was determined congestive hyperemia and oedema of gingival papilla and gingival margin, tight fit to the tooth surface, the presence of supragingival dental plaque, soft plaque and Calculus. In probing was determined gingival pockets and positive symptom of

bleeding.Crowding of the teeth in the frontal part of the mandible was revealed in 15 patients (31 %).

Fedorov-Volodkinaindexwas installed a satisfactory state of oral health - according to the research results it was 1.95±0.28 points. The hygienic index by Green-Vermillion was 1.37±0.23 points.

Schiller-Pisarev sample was positive in all patients. Objective assessment of the gingivitis degree was conducted in terms of the PMA index by Parma which was equal 32,0±2,03 %. Mullemanbleeding indexof the gingival sulcus of patients with chronic catarrhal gingivitis was 1,94±0,54 points.

The impact on the oral cavity microflora is one of the important links in the local treatment of catarrhal gingivitis. Antiseptic drugs of synthetic and natural origin, in particular of bee products were widely used at different stages of treatment. Propolis extract which is included to the NBF Gingival Gel has antibacterial, antifungal, anti-inflammatory and analgesic action. It also differs by the significantly lower number of complications than synthetic drugs.

Antimicrobial activity of NBF Gingival Gel was studied in comparison with similar effects of Metrogil Dent and Gengigel. Museum strains of gram-positive bacteria – *S. aureus*ATCC 25923, gram-negative – *E. faecalis* ATCC 29212, *E. coli* ATCC 25922 and fungi *C. albicans* ATCC 885-653As were selected as atest objects, because they belong to the major groups of microorganisms that may be present in the composition of the normal microflora of healthy person and among periodontal patients.

The results of the comparative analysis of dental gels antimicrobial activity are shown in table 1.

We found that the most sensitive museum strains of microorganisms were to Metrogil dent according to the study of antimicrobial activity of dental gel medications. The drug Gingivalgel had moderate antifungal activity. Most sensitive to NBF Gingival Gel strain was Enterococcus – *E. faecalis* ATCC 29212. The growth inhibition zone was 24 mm, which corresponds to the moderate sensitivity of the museum microorganism.

Table 1

Characteristics of the museum strains of microorganisms sensitivity to the dental gels action

Medications	The zone of growth inhibition, mm			
	***S. aureus*ATCC 25923,**	***E. faecalis*ATCC 29212**	***E. coli*ATCC 25922**	***C. albicans*ATCC10231**
NBFGingivalGel	9,3±1,9	24,2±2,9	10,5±2,9	6,2±0,9
Metrogil dent	25,5±2,9	20,5±2,1	15,3±2,7	8,1±1,2
Gengigel	6,1±0,1	9,2±0,3	7,4±0,2	20,5±2,7

Since the composition of the oral cavity microflora patients with chronic catarrhal gingivitis is quite variable and depends on many local and general factors of organism.We undertook a study of the sensitivity of periodontal pockets microflora to NBF Gingival Gel in comparison with Metrogel dent and Gengigelmedicatoins(tab. 2).

Table 2

The sensitivity of periodontal pockets microflora to dental gelsaction

Medications	The area of stunting (average, mm)
NBFGingivalGel	5,0±0,1
Metrogil dent	20,6±2,3
Gengigel	14,2±2,8

As the table shows, the highest sensitivity of gum pockets bacteria to applied gel was Metrogil dent. A similar effect of Gengigel was low and the majority of strains (60 %) were insensitive to the drug. Studied NBF Gingival Gel is not detected antibacterial properties against the periodontal pockets mixed microflora

and on the contrary bacterial growthwas increased.Enhancement of the microorganismsgrowth was especially good and showed more intense gas formation in test tubes with semi-liquid media.

Thus, NBF Gingival Gel shows the properties of prebiotic, which promotes the growth of streptococci which are main in oral cavity normal microflora, but has an antimicrobial effect against opportunistic microorganisms.

Evaluation of the effectiveness of chronic catarrhal gingivitis treatment with the use of NBF Gingival Gel was carried out according to the dynamics of subjective and objective changes and indicators for major indexes and samples which characterize the state of periodontal tissues.

Reduction or disappearance of gums bleeding and unpleasant smell from the mouth was considered as the positive effect of the treatment. Also the objective picture of the disappearance or reduction of hyperemia and edema of the gums and symptom of bleeding were taken into account.

Positive effect after the treatment was revealed in all groups of patients during the dental examination.

The gums became pale pink in color, densely covered the neck of teeth, dental plaque was not observed, the sample ofSchiller-Pisarev was negative in all patients of the main group during the examination of the oral cavity after treatment.Slight hyperemia of the gums and the sample of Schiller-Pisarev remained weakly positive after 5 days of treatmentin four patients of the second group**.**

Improvement of oral cavity hygienic state at the influence of the therapy was observedin all patients with chronic catarrhal gingivitis**.** Fedorov-Volodkinaindex was decreased in 2.3 times and amounted to 0,87±0.21 points ($p<0.01$) in patients of the main group immediately after the treatment. Also we can see reduction of the Green-Vermilion index in 2.2 times (0,63±0.17 points, $p<0.05$).Oral cavityhygienic state also was improved in patients of comparison groups. The difference between groups was not significant.

The degree of the gums inflammation significantly decreased at the influence of the treatment with the application of dental gels in all patients with chronic catarrhal gingivitis. PMA index by Parmawas decreased in 6.4 times ($p<0.001$) and the bleeding index in 2 times ($p<0.01$) in patients of main group after treatment. Significant decrease of gingivitis degree ($p<0.001$) was observed in patients of the first group. Also the positive dynamics of treatment was found in patients of the second group (tab. 3).

Table 3

The clinical effectiveness of gel medications with anti-inflammatory and antimicrobial action

Indexes	NBFgel n=16		Metrogildenta n=16		Gengigel n=16	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Fedorov-Volodkina	1,95± 0,28	1,01± 0,05 p<0,001	2,04± 0,37	1,03± 0,19 p<0,05	2,08± 0,13	1,23± 0,05 p<0,001
Grin-Vermilion	1,37± 0,23	0,63± 0,17 p<0,05	2,33± 0,13	0,85± 0,21 p<0,001	1,35± 0,16	0,45± 0,094 p<0,001
PMA	32,0± 2,03 %	5± 1,12 % p<0,001	38,5± 3,64 %	12,6± 2,7 % p<0,001	32,8± 5,03%	8,4± 1,8% p<0,001
BI	1,94± 0,26	0,86± 0,08 p<0,001	1,4±0,16	0,4±0,03 p<0,001	1,24 0,15	0,4± 0,08 p<0,001

Notes: n-number of observations.

As thestudies have shown NBF Gingival Gel reduces subjective feelings and cause anti-inflammatory, soothing and protective actionto the oral cavity mucous membrane. Therefore, it can be applied in complex treatment of periodontal patients.

Conclusions

1.The medications NBF Gingival Gel shows the properties of prebiotic which promotes the growth of streptococci which are main in normal oral cavity microflora. NBF Gingival Gel has an antimicrobial effect against opportunistic microorganisms.

2. Analysis of microflora sensitivity to the dental gels action had showed the low antimicrobial activity ofNBF Gingival Gel compared to traditional drugs.

3. Using of NBF Gingival Gel applications increases the effectiveness of chronic catarrhal gingivitis treatment due to anti-inflammatory, soothing and protective action to the mucous membrane of the mouth.

4. It was found that it is rational to use NBF Gingival Gel in combination with other antimicrobials medications in the form of rinses, mouth trays or irrigation.

5. NBF Gingival Gel can be used as a local anti-inflammatory agent for the treatment of chronic catarrhal gingivitis and edematous forms of hypertrophic gingivitis as well as in the complex generalized periodontitis treatment.

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Summary

CLINICAL EFFICACY OF NBF GINGIVAL GEL INPATIENTSWITH CHRONIC CATARRHAL GINGIVITISTREATMENT

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The results of NBF Gingival Gel effectiveness study in patients with chronic catarrhal gingivitis compared with Metrogildenta and Gengigel are presented in the article.

Analysis of microorganisms sensitivity to the dental gels action had showed the low antimicrobial activity of NBF Gingival Gel compared to traditional medications. NBF Gingival Gel detects the prebiotic properties, promotes the growth of normal oral cavity flora and has antimicrobial activity to opportunistic microorganisms. Application of NBF Gingival Gel increases the effectiveness of chronic catarrhal gingivitis treatment due to anti-inflammatory, soothing and protective effect to the mucous membrane of the mouth. The results of microbiological examination were revealed the expediency of simultaneous use of antimicrobial agents, including antiseptic rinses, irrigation and mouth trays.

Key words: chronic catarrhal gingivitis, NBF Gingival Gel, gingival pocketsflora.