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Professional paper

EVALUATION OF CLINICAL EFFICACY THERAPEUTIC ON THE USE OF CHLORHEXIDINE GLUCONATE TO INFLUENCE THE SHAPE OF THE GEL AND PERIOCHIP DURING GINGIVAL INFLAMMATION IN CHRONIC PERIODONTAL DISEASE

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Abstract

Objectivies: Evaluation of the practical clinical therapeutic effect, on the influence of the form in gel and chip containing chlorhexidine Gluconate during gingivitis, through comparative analysis in patients using conventional method (CM), conventional gel-supported therapy (chlosite) Chlorhexidine gluconate (CM-S and conventional therapy supported with PerioChip Chlorhexidine gluconate (CM-S).
Materials and Methods: To achieve this goal, there were included 30 patients from both groups and genders, aged 20-50 years old, during the radiological and clinical examination were diagnosed with chronic periodontal disease. The subjects were divided into three groups: the first group, there were used only conventional methods, the second group was treated with CM-S gel, and the third group with CM-S PerioChip Chlorhexidine gluconate. In all three groups included in this study, gingival inflammation with the Silness Loo index was determined at four-time points: first, during the initial treatment, then after the 15th day, after the 30th day and in the end after 90 days of the first treatment. The Gel and PerioChip Chlorhexidine gluconate in patients was initially administered during the first examination. Numerical statistics were analyzed by descriptive statistical methods (Mean Standard Standard Deviation, ± 95% CI, Min., Max.), While the interactive effects between the two examined methods after the first treatment, on the 15th, 30th and the 90th day, were analyzed the effects with repeated measures of Anova (F) / Bonferroni Post-hoc test (p).
Results: The results show the reduction of gingival inflammation in all three groups after 15th, 30th and 90th days after the treatment compared to the first examination. Comparison of the gingival inflammation index on the 15th, 30th and 90th day between the three groups, shows significantly better therapeutic efficacy in the CM-S-treated groups, which was supported using Gel and PerioChip Chlorhexidine gluconate.
Conclusion: Subjects treated with CM-S, compared to those treated with CM, had a significantly improved their clinical effect, while having significant efficacy against gingival inflammation whereas the gel application method has more significant application efficacy.

Keywords: chronic periodontal disease, gingival inflammation, conventional therapy, Gel and PerioChip Chlorhexidine gluconate.

1. Introduction

The Biofilm, as an inevitable etiological factor in its content and structure, contains bacterial conglomerate, which with toxins, enzymes, and other accompanying factors cause gingival inflammation, which means the progressive destruction of connective tissue and alveolar bone (1).

The control of dental plaque through the maintenance of oral hygiene, and the removal of plaque formed, are one of the ways that have a role of preventive or curative action against the occurrence of gingivitis at the same time to maintain the achieved therapeutic success.

The irregular and unqualified mechanical structure can damage hard tissues, manifesting gingival recession (3).

During therapeutic treatment, despite the mechanical removal of dental plaque, local or systemic antimicrobial chemotherapeutic treatment is used in clinical practice.

For these purposes, many methods are used, where in this case we will mention the CIST protocol.

The CIST protocol modifies the conventional (basal) periodontal method, as a therapeutic procedure that includes antimicrobial support or modern antiseptic assets in the form of a chip, in which the primacy belongs to chlorhexidine.

Based on the latest scientific knowledge and proven results on the effectiveness of gels and antiseptic assets with topical administered in the form of gel and chip, we have determined the purpose of this research, where we follow the therapeutic effect of gel and PerioChip Chlorhexidine gluconate in gingivitis through comparative analysis of patients using conventional therapy (CM) and conventional therapy assisted by PerioChip Chlorhexidine gluconate (CM-P) comparing the effectiveness of practical application between both the gel form and the chip-shaped assets.

2. Method and material

To achieve this goal, the research was conducted in the dental clinic "Fjolla medica" in collaboration with the Clinic for Oral and Periodontal Diseases at the Faculty of Dentistry, where they were followed in two groups of 30 patients of both sexes aged 20-50 years., where he was diagnosed with X-ray, and periodontopathy in the second clinical phase.

Data and anamnesis were taken from all patients and clinical examinations were performed by x-ray analysis.

Examiners who were part of this study were divided into two groups:

- Examiners from the first group were treated with the conventional method (KM) - standard method (removal of local irritants, dental plaque, calculus, and processing of periodontal pockets). In this group, the periodontal pocket toilet consisted of rinsing with 3% hydrogen and maintaining oral hygiene.
- Examiners from the second and third groups were treated with the combined method, conventional method, and application of gel and PerioChip Chlorhexidine gluconate (CM-P), after clinical therapy of periodontal treatment.

Patients treated by MK-P were instructed after applying the gel and chip for oral hygiene maintenance.

The research was done in several stages: during the first examination of the patient, after the 15th, 30th, and 90th day of treatment with the conventional method, and the method assisted with Periochip Chlorhexidine gluconate.

All respondents underwent clinical examinations through assessment of dental plaque and gingival inflammation index.

The Gingival inflammation index was determined by the Loe-Silnes method.

The findings were compared between the two groups in different groups examined, i.e., upon admission, on days 15, 30, and 90 of treatment. All results achieved were statistically processed.

In the series with numerical signs are evaluated: Descriptive statistics (Mean ± Std.Dev., ± 95% CI, Min., Max.), While the interactive effects of the two methods examined after treatment due to the first examination after the 15, 30 and 90 day were examined according to repeated measures Anova (F) / Post-hoc-Bonferroni test (p).

3. Results

Table 1 presents gingival inflammation (during the first examination, after 15, 30, and 90 days), in patients with MS and MS-P. The results given by this research are presented in Table 1)

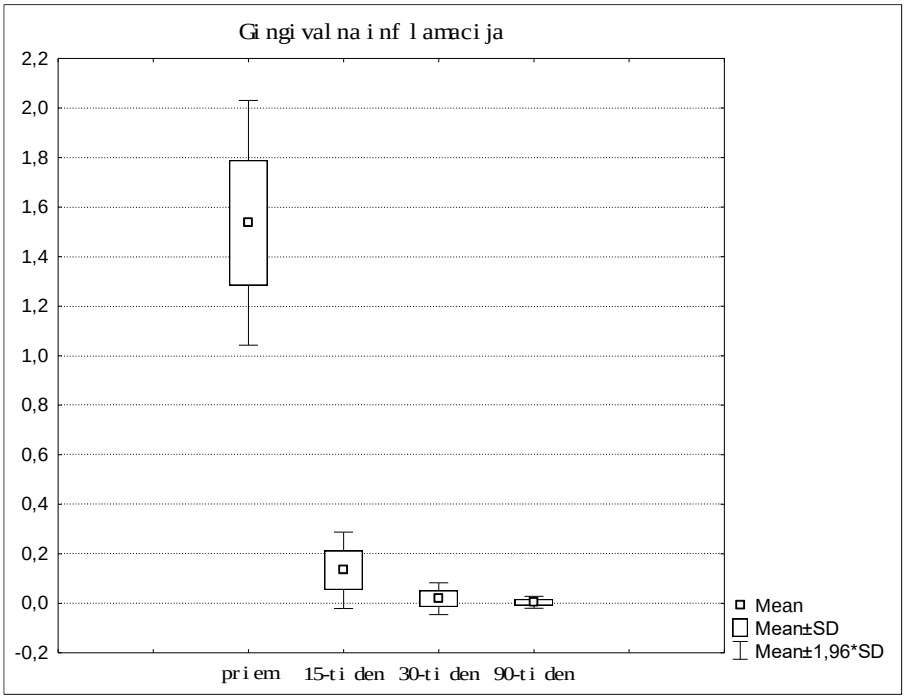
For $F = 88.23$ and $p < 0.001$ ($p = 0.000$) there were significant changes in the given distribution (table 1 and graph 1)

Patients treated with MS-P after the 15th day of control for $p < 0.001$ ($p = 0.000$) had significantly lower

gingival inflammation (0.28), compared to the first data (1.54). We found identical results after the 30th control day, for p <0.001 (p = 0.000) with gingival inflammation (0.12) compared to the first data (1.54). Significant gingival inflammation p <0.001 (p = 0.000) was observed (0.04) after the 90th day of treatment.

Table 1. Descriptive statistics of gingival inflammation values in the first review, after day 15.30 and 90 of combined therapy performed, supplemented with PerioChip chlorhexidine gluconate.

Gingival inflammation	Valid N	Mean	Confidence -95,00%	Confidence +95,00%	Minimum	Maximum	Std. Dev.
reception	30	1,54	1,44	1,63	1,18	2,16	0,25
15 days	30	0,13	0,10	0,16	0,00	0,28	0,08
30 days	30	0,02	0,006	0,03	0,00	0,12	0,03
90 days	30	0,004	-0,0006	0,009	0,00	0,04	0,01



Graph 1. Overview of gingival inflammation values at different time intervals in patients treated with a combined method supplemented with PerioChip chlorhexidine gluconate

The differences between gingival inflammation values in the first-line relationship after 15, 30, and 90 days of the combined therapy (Perio-Chip chlorohexidine gluconate) are shown in Table 1.

For ANOVA Chi Sqr. = 85.20 and p <0.001 (p = 0.000) there is a significant difference between the values of gingival inflammation in the analyzed ratio.

After 15 days of therapy, the mean value of gingival inflammation is lower in relation to admission and varies in the range of 0.13 ± 0.08.

After 30 days of therapy, the mean value of gingival inflammation is lower in relation to admission and varies in the range of 0.02 ± 0.03.

After 90 days of therapy, the mean value of gingival inflammation is lower than the rate of admission and varies in the range of 0.004. 0.01.

Table.1 Shows the differences between gingival inflammation values in the first-line relationship after 15, 30, and 90 days after therapy. 1. Therapeutic efficacy of using different therapeutic modalities in both groups in different periods.

Gingival inflammation	Average Rank	Sum of Ranks	Mean	Std.Dev.
First examination	4,00	120,00	1,54	0,25
15 days	2,90	87,000	0,13	0,08
30 days	1,70	51,00	0,02	0,03
90 days	1,40	42,00	0,004	0,01

The mean value of gingivitis (Mean = 0.004) after 90 days of therapy with the combined method (chlorohexidine gluconate Perio-Chip) for Z = 4.78 and p <0.001 (p = 0.000) is significantly lower than the mean value of gingival inflammation Mean = 1.54) in the first revision

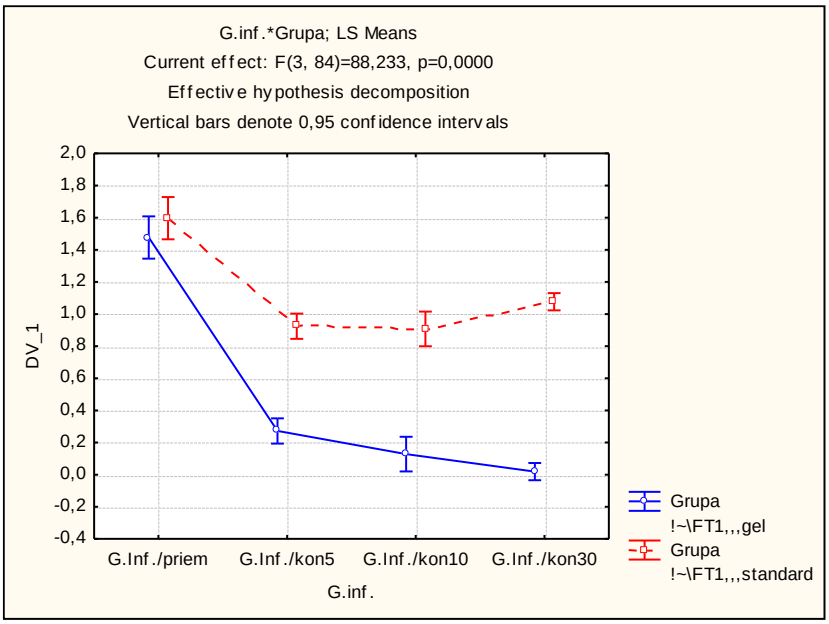
Table. 1.1 Differences between dental plaque values at the first examination and after 90 days of combination therapy, supplemented with PerioChip chlorohexidine gluconate

Gingival inflammation
First examination and 90 days

Table 2. Descriptive statistics of gingival inflammation values in the first review, after day 15.30 and 90 of combined therapy performed, supplemented with chlorhexidine gluconate gel.

G.inf.*Group; LS Means; Current effect: F(3, 84)=88,23, p=0,000 Effective hypothesis decomposition

	Group	Gingival inflammation	DV_1 Mean	DV_1 Std.Err.	DV_1 -95.00%	DV_1 +95.00%	N
1	gel	I.G./ acceptance	1,48	0,06	1,35	1,61	15
2	gel	I.G./ acceptance 15	0,27	0,04	0,19	0,35	15
3	gel	I.G./ acceptance 30	0,13	0,05	0,02	0,24	15
4	gel	I.G./ acceptance 90	0,02	0,03	-0,03	0,07	15
5	standard	I.G./ acceptance	1,60	0,06	1,47	1,73	15
6	standard	I.G./ acceptance 15	0,92	0,04	0,85	1,00	15
7	standard	I.G./ acceptance 30	0,91	0,05	0,80	1,02	15
8	standard	I.G./ acceptance 90	1,08	0,03	1,02	1,13	15



The results show the reduction of gingival inflammation after using the standard method supplemented with Chlorhexidine gluconate gel.

Table 3. Post-hoc Test / Bonferroni test / Group - Gingival inflammation

	Group	I. G.	{1} 1,48	{2} 0,27	{3} 0,13	{4} 0,02	{5} 1,60	{6} 0,92	{7} 0,91	{8} 1,08
1	gel	I g./acceptance		0,000	0,000	0,000		0,000	0,000	0,000
2	gel	I g./ acceptance 15	0,000		0,03	0,000	0,000	0,000	0,000	0,000
3	gel	I g./ acceptance 30	0,000	0,03			0,000	0,000	0,000	0,000
4	gel	I g./ acceptance 90	0,000	0,000			0,000	0,000	0,000	0,000
5	standard	I g./ acceptance		0,000	0,000	0,000		0,000	0,000	0,000
6	standard	I g./ acceptance 15	0,000	0,000	0,000	0,000	0,000			0,01
7	standard	I g./ acceptance 30	0,000	0,000	0,000	0,000	0,000			0,003
8	standard	I g./ acceptance 90	0,000	0,000	0,000	0,000	0,000	0,01	0,003	

Patients treated with gel (standard method/gel) after the check up after the 15th day, for p <0.001 (p = 0.000) has a significantly lower inflammation (0.27), compared to the checkup group (1.48).
Patients treated with gel (standard method / gel) after the check up after the 30th day, for p <0.001 (p = 0.000) has significantly lower inflammation (0.13), compared to the checkup group (1.48).
Patients treated with gel (standard method / gel) after the checkup, after 90th day, for p <0.001 (p = 0.000) has significantly lower inflammation (0.02), compared to the admission group (1.48).
The results from the table show reduction of gingival inflammation after using the standard method supplemented with Chlorhexidine gluconate gel, compared to the group as treatment used only the standard method no significant percentage changes are observed.

4. Discussion

The gingival inflammation, because of periodontitis, of increased accumulation of dental plaque and other inflammatory factors increase the level of osteoresorption factor leading to the advancement of chronic

periodontal disease.
Results for gingivitis after application of both methods; the Conventional method (standard) and the combined method (modified) have shown that there is no significant difference in the results between the two groups for gingivitis in the admission of patients and there is a significant difference between the two groups for the inflammatory index of gingivitis after control of patients after the 15, 30, and 90 day;
Differences between gingival inflammation values in the first-line relationship, after 15, 30 and 90 (conventional) therapy days with the use of chlorhexidine glucone selectivity for ANOVA Chi Sqr. = 83.38 and $p < 0.001$ ($p = 0.000$), there is a significant difference between the values of gingival inflammation in the analyzed ratio.
After 15 days of therapy, the mean value of gingival inflammation is lower compared to the first examination and varies in the range of 0.61. 0.22.
After 30 days of therapy, the mean value of gingival inflammation is lower compared to the first examination and varies in the range of 0.65 ± 0.21.
After 90 days of therapy, the mean value of gingival inflammation is lower than the rate of admission and varies in the range of 0.72 ± 0.19.
The mean value of gingival inflammation (mean = 0.72) after 90 days of treatment with chlorhexidine gluconate conventionally applied for $Z = 4.78$ and $p < 0.001$ ($p = 0.000$) is significantly lower than the mean value of gingival inflammation (Mean = 1.55) upon receipt
Differences between gingival inflammation values in the first-line relationship after 15, 30, and 90 days of the combined therapy (Perio-Chip chlorohexidine gluconate) are shown in Table 1.
For ANOVA Chi Sqr. = 85.20 and $p < 0.001$ ($p = 0.000$) there is a significant difference between the values of gingival inflammation in the analyzed ratio.
After 15 days of therapy, the mean value of gingival inflammation is lower in relation to admission and varies in the range of 0.13 ± 0.08.
After 30 days of therapy, the mean value of gingival inflammation is lower in relation to admission and varies in the range of 0.02 ± 0.03.
After 90 days of therapy, the mean value of gingival inflammation is lower than the rate of admission and varies in the range of 0.004. 0.01.
Patients treated with the standard method during follow-up after day 15 (0.92), day 30 (0.91), and day 90 (1.08), have a significantly lower index of gingival inflammation compared to the day of acceptance (1.60); whereas patients treated with the method combined with gel during a control on day 15 (0.27), day 30 (0.13) and day 90 (0.02), a much more important index to gingival inflammation was recorded compared to the standard method.
The mean value of gingival inflammation (Mean = 0.004) after 90th days of therapy with the combined method (chlorohexidine gluconate Perio-Chip) for $Z = 4.78$ and $p < 0.001$ ($p = 0.000$) is significantly lower than the mean value of gingival inflammation Mean = 1.54) in the first revision. The results obtained coincided with the study of Lt Col AK Jha (22), which examined the therapeutic efficacy of PerioChip locally as an antimicrobial agent in the conventional non-surgical treatment of chronic periodontitis, it becomes clear that the use of chlorhexidine chip can be used regularly in most cases, with particular emphasis on compromised medical patients who are not fit for surgery.
Patients treated with the standard method during follow-up after the 15 (0.92), the 30 day (0.91) and the 90 day (1.08), have a significantly lower index of gingival inflammation compared to day of acceptance (1.60); whereas patients treated with the method combined with gel during control on the 15 day (0.27), the 30 day (0.13) and the 90 day (0.02), a much more important index to gingival inflammation was recorded compared to the standard method.

5. Conclusion

Based on the results, we can conclude that patients treated with MS-P, as opposed to those treated with MS alone had much better clinical results at all stages of this research. Due to the easy application, light degradable power, non-toxic, we can recommend it as an adjunct to conventional treatment during periodontal disease and, the most favorable practical way for manual and instrumental maneuvering during clinical application recommend the use of the gel.

Reference

[1]. Haffajee AD, Socransky SS, Patel MR, Song. Microbial complexes in supragingival plaque. Oral Microbiol Immunol 2008;23(3):196-205.

[2]. Newman MG. Socransky SS. Predominant Cultivable Microbiota in Periodontitis. J periodontal Res 1977; 12:120-127.

[3]. Ljushkovic B. Paradontologija i oralna Medicina Voeno izdavacki zavod,Beograd 2009:149-152.

[4]. Gurinsky BS. Concepts in periodontology, Winter, Texas, 2009:2-3.

[5]. Sbordone L, Bortolaia C. Oral Microbial Biofilms and Plaque-Related Diseases. Clin Oral Research 2003;7:.181-188.

[6]. Zhou T, Xie H, Yue Z. Relationships of five periodontal pathogens causing subgingival plaque in patients with chronic periodontitis under different periodontal conditions]. Hua Xi Kou Qiang Yi Xue Za Zhi. 2013;31(5):518-21.

[7]. Wang J, Chen W, Jiang Y, Liang J. Imaging of extraradicular biofilm using combined scanning electron microscopy and stereomicroscopy.Microsc Res Tech. 2013;76(9):979-83.

[8]. Mancl KA, Kirsner RS, Ajdic D. Wound biofilms: lessons learned from oral biofilms. Wound Repair Regen. 2013;21(3):352-62.

[9]. Killoy GW. Assessing the effectiveness of locally delivered chlorhexidine in the treatment of periodontitis. JADA, 1999;130:567 - 570.

[10]. Angst PD, Piccinin FB, Oppermann RV, Marcantonio RA, Gomes SC. Response of molars and non-molars to a strict supragingival control in periodontal patients.Braz Oral Res. 2013; 27(1):55-60.

[11]. Galgut P. Periodontal diseases. School of Dental Hygiene, University College Dental Hospital, London, U.K. 2009;26-28.

[12]. Eit HAA,Usama M, Gouda MM. Al-Abdaly ,The evaluation of Topical Application of CHLO-SITE (Chlorhexidine gel) in Management of Chronic Periodontitis, ED Journal, 2010;56(2.3):120-129.

[13]. Yue Y, Liu Q, Xu C, Loo WT, Wang M, Wen G, Cheung MN, Bai LJ, Dou YD, Chow LW, Hao L, Tian Y, Li JL, Yip AY, Ng EL.Comparative evaluation of cytokines in gingival crevicular fluid and saliva of patients with aggressive periodontitis. Int J Biol Markers. 2013;28(1):108-12.

[14]. Bollen CM, Quirynen M. Microbiological response to mechanical treatment in combination with adjunctive therapy. A review of the literature, J. Periodontol.1996; 67: 1143±1158.

[15]. Benedettis M and Grassi R, Clinical and microbiologic effects of subgingival controlled- release delivery of chlorhexidine chip in the treatment of periodontitis: a multicenter study. J Periodontol. 2008;79(2):271-82.

[16]. Bromberg LE, Buxton DK, Friden PM. Novel periodontal drug delivery system for treatment of periodontitis. J Control Release. 2001;71(3):251-9.

[17]. Greenstein G. Polson A. The role of local drug delivery in the management of periodontal diseases: a comprehensive review. Department of Periodontology, University of Medicine and Dentistry, Newark, NJ, USA. J Periodontol. 1998;69(5):507-20.

[18]. Abrishami M, Iramloo B, Ansari G, Eslami G, Akbarzadeh AB, Anaraki M. The effect of locally delivered xanthan based CHLOSITE gel with scaling and root planning in the treatment of chronic periodontitis: microbial findings J Dent Research 2008;5(2): 47-52.

[19]. Soskolne WA. Citation Information Modified-Release Drug Delivery Technology Edited by Michael J . Rathbone, Jonathan Hadgraft, and Michael S. Roberts Informa Healthcare 2002: 99–400.

[20]. Chetan C, Effect of chlosite (xanthan gel with chlorhexidine) on clinical & microbiological parameters in smokers - A case series Year. 2010; 4(2):165-98.

[21]. Senel SI, Kas GG, Yousefi-Rad A, Sargon MF, Hıncal AA. Chitosan films and hydrogels of chlorhexidine gluconate for oral mucosal Delivery.

[22]. Lt Col; AK Jha Comparative clinical response of periochip as local drugdelivery system to calling and root planning in the treatment of chronic generalized periodontitis – A clinical and radiolographic study- Medical Journal Armed Forces India (2008)