

Summary

Periodontitis is a chronic inflammatory disease leading to the bone and soft tissue loss and, consequently, to tooth loss. After caries, it is the leading cause of tooth loss in adults. Scaling and root planing (SRP) is the basic therapeutic procedure in the treatment of periodontitis. It is a causal therapy that aims to remove the bacterial biofilm from the crown and root of the tooth along with accumulated tartar. Root planing is done to remove toxins from the surface of the root cementum and smooth its surface. The effectiveness of the SRP depends on many factors, including the initial pockets' depth, the type and shape of the debrided tooth, the furcation involvement, and the experience of the person performing the procedure. Due to the limitations of SRP and the multifactorial etiology of periodontal disease, new methods are being sought to support mechanotherapy. One of them is the local use of antiseptics such as low-concentration sodium hypochlorite gel. It is in the form of a new two-component preparation containing 0.95% NaOCl and amino acids (glutamic acid, leucine and lysine).

Therefore, the aim of the study was to clinically evaluate periodontal parameters and the concentration of metalloproteinase 8 (MMP-8) in the gingival crevicular fluid after professional removal of deposits with smoothing of the root surface with intrapocket application of a new preparation with low-concentrated sodium hypochlorite (Perisolv®) and without the use of the gel. The study included 40 patients with periodontitis (stages II and III, grades B and C) randomized to study and control groups - 20 people each. Before SRP, the patients in the study group had a gel with low-concentration sodium hypochlorite introduced into pockets with PD > 5 mm. The patients in the control group underwent SRP alone. The basis for the comparison was the change in clinical parameters of the periodontium after the therapy (examinations after 3 and 6 months) and the change in the amount of MMP-8 in the fluid of the pocket with PD > 5 mm selected at the first visit (examination after one week, two weeks and 3 months). The clinical examination included the following parameters: full-mouth plaque score (FMPS), full-mouth bleeding score (FMBOP), probing depth (PD), clinical attachment level (CAL), gingival recession (GR), and the number of closed pockets. The laboratory test involved determining the concentration of MMP-8 in the gingival crevicular fluid of the deep periodontal pocket using the ELISA method. The data were subjected to statistical analysis.

During the study, none of the patients reported any side effects. All the patients attended regular follow-up visits and completed the study. The patients had moderately good oral hygiene. In both groups, before treatment, the FMPS index exceeded 25% and decreased after the therapy. In the study group there was a decrease to 19.73% and in the control group to 24.4%. After the treatment, the amount of bleeding on probing points decreased in both groups as well. During the six-month follow-up, FMBOP decreased on average from 28.53% to 14.32% in the study group, and from 18.57% to 14.35% in the control group. In both groups, the depth of the periodontal pockets decreased after the treatment. There was also a significant difference in the clinical attachment level. CAL gain was found in both groups. Changes in the height of gingival recession in both groups were unnoticeable. When comparing the means of the examined periodontal parameters (PD, GR, CAL) only for pockets with an initial PD \geq 5 mm, a statistically significant difference was observed in the probing depth and in the clinical attachment level in both groups 6 months follow up. The height of gingival recession increased in both groups. However, only for the control group the increase was significant. In the study group, pockets with PD \geq 5 mm accounted for almost 25% of the places examined before therapy and after the therapy with Perisolv® only 12% of the places examined. In the control

group after SRP, the percentage of deep periodontal pockets decreased from 17.46% to 9.05%. No differences were noted between groups. Additionally, one periodontal pocket was selected in each patient for collection of gingival crevicular fluid (GCF) to determine changes in the amount of metalloproteinase 8 (MMP-8). Probing depth and the clinical attachment level of the pocket selected for laboratory analysis in both groups decreased significantly over time. In the study group, there was a significant reduction in the amount of MMP-8 from 8.32 ng/mL to 5.14 ng/mL after 3 months. No statistically significant difference was observed in the control group. MMP-8 concentrations differed between groups before the study. Changes in the amount of SFFR (sulcus fluid flow rate), i.e. the rate of gingival fluid outflow, were unnoticeable in both groups. The only associations between MMP-8 and other parameters were a moderate correlation of MMP-8 with SFFR before therapy in the study group. These parameters also correlated one week after the therapy. In the control group, moderate correlations were observed between MMP-8 and PD as well as MMP-8 and SFFR.

Based on the results obtained, the following conclusions were drawn:

1. Non-surgical periodontal treatment is an effective therapy.
2. Non-surgical periodontal treatment reduces inflammation, which is expressed in a decrease in the FMBOP index, it reduces periodontal pockets (PD) and results in an increase in the clinical attachment position (CAL).
3. Non-surgical periodontal treatment reduces the number of deep periodontal pockets.
4. The use of low concentration sodium hypochlorite gel before SRP does not result in additional clinical benefits.
5. The use of low concentration sodium hypochlorite gel may affect the amount of metalloproteinase 8 in the gingival crevicular fluid.
6. The use of low concentration sodium hypochlorite gel is safe for a patient.