

Effective Management of Non-Surgical Periodontal Treatment in a Patient with Severe Gingival Enlargement and Periodontal Bone Loss: A Case Report

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Abstract

The immune-inflammatory response of periodontal tissue can be influenced by various systemic variables such as hormone disorders, hematologic diseases, nutrition, and medications. Inflammatory cytokines released by infected periodontal tissue are implicated in suppressing erythrocyte growth, differentiation, and erythropoiesis inhibition.

We present a case of non-surgical periodontal treatment in a 31-year-old female patient with severe gingival enlargement associated with aggressive bone destruction combined with iron deficiency anemia (IDA). The periodontal treatment plan was achieved in collaboration with the hematologist, starting with oral hygiene instruction, scaling and root planning (SRP) by sextants with systemic antibiotic therapy combined with a chemical agent and low-level-laser-therapy (LLLT), and extraction of hopeless teeth. Effective non-surgical periodontal treatment with SRP and LLLT reduces inflammation and gingival enlargements and controls the recolonization of subgingival sites by periodontal pathogens as a crucial factor to proceed with periodontal surgery. Function, aesthetics, and the patient's social communication are all improved. (**International Journal of Biomedicine. 2022;12(2):311-315.**)

Key Words: scaling and root planning • periodontal pockets • gingival enlargement • low level laser therapy

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Abbreviations

BOP, bleeding on probing; **CBCT**, cone-beam computed tomography; **GI**, gingival index; **IDA**, iron deficiency anemia; **LLLT**, low-level-laser-therapy; **MCV**, mean corpuscular volume; **MCH**, mean corpuscular hemoglobin; **MCHC**, mean corpuscular hemoglobin concentration; **PD**, periodontal disease; **PBD**, probing depth; **PI**, plaque index; **PPD**, periodontal pocket depth; **SRP**, scaling and root planning.

Introduction

The local microbiota and host immune response are the most significant etiologic and risk factors in the initiation and development of periodontitis, where uncontrolled gingival

inflammation can lead to periodontal cellular injury and tooth loss.⁽¹⁾

Periodontal disease (PD) with complex etiology is a dysbiotic inflammatory disease that has adverse implications for the overall health-inducing inflammatory disease at both local and distant levels.⁽²⁾ It affects the host on multiple levels: at the microbial level, based on the presence of dysbiotic microbial communities with the potential for destructive inflammation; at the host level, based on genetic factors that may increase hyper-inflammatory phenotype; and at the level

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of environmental stimuli and systemic health conditions, which alter the host's protective or destructive reaction.^(3,4) Periodontal microorganisms, predominantly Gram-negative bacteria, trigger an immunological response from the host and injure periodontal tissue, where inflammatory cytokines, which are released by infected periodontal tissue, are implicated in suppressing erythrocyte growth and differentiation.⁽⁵⁾ Inflammatory cytokines, including IL-1, IL-6, and TNF, are involved in erythropoiesis inhibition. All of the facts mentioned above suggest that PD raises the danger of iron deficiency anemia (IDA). Iron is essential for the production of heme enzymes and other iron-containing enzymes involved in electron transfer and oxidation reduction, as well as the synthesis of oxygen transport proteins such as hemoglobin and myoglobin.⁽⁶⁾ A reduction in oxygen in the tissues in the anemic condition has been hypothesized to contribute as a modifying feature in the periodontium. These diseases and conditions do not cause periodontitis, but they may contribute to accelerating its course, or exacerbating it.⁽⁷⁾ Individuals at risk for periodontal disease can be identified by identifying risk factors associated with periodontitis, which is directly related to periodontal patient treatment.

Periodontitis treatment attempts to prevent the infection from progressing further in order to lower the possibility of tooth and bone loss, as well as the symptoms and complications of the disease. The key approaches in periodontal treatment are oral hygiene instructions, a smoking cessation program, diets, plaque and calculus removal, scaling and root planning (SRP), local and systemic medication, low-level-laser-therapy (LLLT), and various forms of periodontal surgery.^(8,9)

Case Presentation

A 31-year-old female patient was referred to our clinic, the Department of Periodontology at the University Dentistry Clinical Center in Kosovo. The patient had several complaints of progressive swelling and bleeding gums associated with difficulty in swallowing and speaking, time after time, with pain in gums and luxation of front teeth. The complaints continued for several months, and she did not receive any periodontal treatment except some mouthwashes.

The patient's anamnestic data stated that she has fatigue and weak immunity, and tends to get cold very often. The extraoral clinical examination showed no significant change, while the intraoral examination showed changes in the gingiva: reddish-purple color, enlarged, covering the crown on all existing teeth, soft, shiny, with a tendency to bleed at the slightest touch. In gingival compression in some teeth, there was purulent secretion, and some of the front teeth were dislocated. There was a considerable amount of supra and subgingival deposits, and dental plaque on the teeth and gums. Due to the existing deep periodontal pockets, some of the teeth have migrated, forming two rows of teeth in the lower jaw, or changed position and migrated in different directions (Figures 1 and 2). The patient's dental cone-beam computed tomography (CBCT) revealed significant bone resorption, as well as teeth in the advanced stages of periodontitis that should be removed and periodontal infrabony pockets in the

majority of the remaining teeth (Figure 3). The diagnosis was aggressive, severe periodontitis associated with severe gingival enlargement based on the symptoms, clinical examinations, and periodontal parameters: periodontal pocket depth (PPD), clinical attachment level, gingival index (GI), sites with bleeding on probing (BOP), and plaque index (PI) described above.



Fig. 1. The first visit to our clinic: Gingival inflammation with reddish-purple color, enlarged covering the crown on existing teeth, soft, shiny, with a tendency to bleed at the slightest touch.



Fig. 2. The first visit to our clinic: Several gingival enlargements in palatal side associated with tooth migration.



Fig. 3. Bone loss: vertical resorption

Laboratory examination revealed decreased levels of red blood cell (RBC) count, hemoglobin (HGB), and hematocrit (HCT), low levels of ferritin and iron in serum, MCH, MCHC and MCV, and slight elevation of leukocytes (Table 1). Other blood parameters were within the normal range.

Table 1.**Blood parameters prior to periodontal treatment**

Parameter	Measured values	Normal range
Leukocytes ($10^3/\mu\text{L}$)	11.5	4-11 $\times 10^3/\mu\text{L}$
Neutrophils (%)	55.3	40-60%
Lymphocytes (%)	31.0	25-40%
Monocytes (%)	8.0	2-8%
Bazophiles (%)	0.4	0-1%
Eosinophils (%)	2.3	1-4%
Red blood cell ($10^6/\mu\text{L}$)	3.4	4.1-5.4 $\times 10^6/\mu\text{L}$
Hemoglobin (g/L)	9.1	12-17.5 g/L
Haematocrit (%)	32	35-50%
Erythrocyte sedimentation rate (mm/h)	15	3-15 mm/h
MCH (pg)	25	27-32 pg
MCHC (g/dL)	28.2	32-36 g/dL
MCV (fL)	85.7	80-95 fL
Serum iron ($\mu\text{mol/L}$)	25	60-150 $\mu\text{mol/L}$
Ferritin ($\mu\text{g/L}$)	6.7	15-200 $\mu\text{g/L}$

IDA was diagnosed after referring the patient to a hematologist, and additional laboratory testing and iron-based treatment were followed. Basic periodontal treatment is started after the anemia has improved. Periodontal treatment for the patient included oral hygiene instruction based on the Bass technique and flossing, full mouth root scaling and planning with an ultrasonic scaler and Gracey curettes by sextants, and systemic antibiotic therapy (Amoxiclav 625 mg tablets + metronidazole 250 mg tablets twice daily for 7 days). The patient was recommended to rinse her mouth twice daily for 14 days using 15 ml of 0.2% chlorhexidine gluconate mouthwash and the teeth in the late stage of periodontitis were extracted. After a month, periodontal pockets were irrigated with 0.2% chlorhexidine gluconate (Figure 4).



Fig. 4. Four weeks after a visit to our clinic: After the full mouth SRP combined with systemic antibiotic therapy and mouth wash.

After two months, the periodontal pockets were treated with LLLT. The patient was treated with a diode laser (Laser HF, Hager-Werken, Germany), with each tooth inside the periodontal pocket exposed for one minute using a light of wavelength 980 nm and a power of 10 mW. The laser fiber was placed in the periodontal pocket during the exposure (Figure 5).



Fig. 5. Two months after visit to our clinic: LLLT of periodontal pockets.

After non-surgical periodontal treatment, we had an improvement in the periodontal parameters PPD, GI, BOP, and PI. Complete remission of gingival inflammation resolved 11-12 weeks after initial admission to our department. Gingiva was a pink color, with normal form and size, did not bleed after probing, and the patient had no bad breath. In terms of functionality, she could eat more comfortably and communicate more easily, and her social life improved (Figures 6 and 7).



Fig. 6. Three months after the first visit to our clinic: Gingiva on right buccal maxillary side is healthy with no signs of inflammation



Fig. 7. Three months after the first visit to our clinic: Gingiva on palatal side is healthy with no signs of inflammation

Following a definitive SRP, sites with continuous active probing depths and symptoms of inflammation, and levels of attachment loss associated with intra-bony defects, are considered for periodontal regenerative surgery.

Discussion

The treatment of periodontal disease in its different forms has progressed over the last century, with studies demonstrating that the elimination of biofilms, both through SRP periodontal therapy and rigorous home oral hygiene, combined with systemic or local administration of chemotherapeutic drugs, showed impressive clinical, microbiological, and inflammatory outcomes.⁽¹⁰⁾ According to studies, SRP reduces the pocket depth and eliminates clinical symptoms of inflammation, such as edema and bleeding on probing (BOP), by aiming at the primary objective: reduce the bacterial load and keep infection under control.⁽¹¹⁾

According to current research, inflammation caused by periodontal pathogens impacts both the oral cavity and the patient's overall health, and the presence of calculus and biofilm is definitely linked to periodontal inflammation,⁽¹²⁾ and it is also evident in our case study, where local irritational factors dental plaque, calculus, debris and staining associated with poor oral hygiene were evident in all existent teeth.

It is essential to identify systemic diseases or conditions that are directly related to periodontitis progression but also have an impact on the periodontal treatment approach. As the periodontal tissues produce an immunological inflammatory response to pathogens and their byproducts, systemic exposure to these substances triggers a significant vascular response. Certain inflammatory cytokines released during periodontal inflammation can inhibit erythropoietin production, resulting in anemia,⁽¹³⁾ findings of a periodontal examination and blood sample in over 800 subjects revealed that periodontitis is characterized not only by leukocytosis but also by a predisposition to "anemia of inflammation."⁽¹⁴⁾ The recent data show that periodontitis reduces Hb concentration and alters iron metabolism balance, confirming the severity of the link between severe periodontitis and the tendency of "anemia of inflammation" to develop.⁽¹⁵⁾

SRP with LLLT has been suggested for its photochemical significance in anti-inflammation, biostimulation, and analgesia and has a biomodulatory effect on periodontal tissue. The results of a low-level laser are attributable to its non-heating effects, which stimulate fibroblast reproduction; LLLT can accelerate the repair process, reduce post-operative pain, influence inflammation, improve wound healing after gingivectomy, and other procedures.⁽¹⁶⁻¹⁸⁾

SRP helps periodontal tissues heal by significantly reducing PBD, GI, BOP, and PI due to recollagenation of supracrestal fibers, reducing the inflammatory infiltrate, and changing the supra- and subgingival bacterial flora, with a decrease in Gram-negative and an increase in Gram-positive bacteria.⁽¹⁹⁻²²⁾ LLLT can only be used in combination with non-periodontal treatment and cannot replace regular SRP procedures. Crispino et al.⁽²³⁾ reported that combining mechanical treatment (SRP) with diode laser therapy gives more significant effects than laser treatment alone, in this regard.

In conclusion, mechanical, nonsurgical periodontal therapy, also referred to as scaling and root planing or subgingival debridement, is significantly efficacious in not only treating periodontitis but is also integrated as a part of overall health management.

Competing Interests

All authors declare that they have no competing interests.

Ethics Approval and Consent to Participate

This case report was reviewed and approved by the Joint Ethics Committee of the University Dentistry Clinical Center of Kosovo. Written informed consent was obtained from our patient.

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