



## CLINICAL OUTCOME COMBINED SURGICAL THERAPY OF PERI-IMPLANTITIS

## Dental Science

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## ABSTRACT

**Purpose:** The objective this study was to evaluate the outcome of combined surgical therapy of peri-implantitis.

**Methods:** The 32 patients involved in this study with inflammatory-destructive processes in the field of peri-implant tissues of osseointegrated implants. The patients were examined clinically and radiographically. The diagnostic parameters used for assessing peri-implantitis include clinical indices, probing pocket depth (PPD), bleeding on probing (BOP), periimplant radiography. PPD and BOP data at the re-examination were retrospectively compared to baseline data.

**Results:** A statistical significant reduction in both PPD and BOP were seen at all timepoints as compared with the baseline clinical measurements. Stable clinical measurements PPD and BOP were demonstrated after 1 year the initial treatment, remaining stable during the following three years. Conservative treatment methods are effective in the treatment of peri-implant mucositis and early peri-implantitis. When peri-implantitis category moderate and severe effective surgical treatment combined conservative therapy.

**Conclusion:** Surgical regenerative treatment combined with mechanical and chemical detoxification of the implants' surface, magneto-laser therapy and regenerative therapy using an autologous bone, xenograft, hyaluronic acid and a resorbable membrane a reliable method for stopping and treatment peri-implantitis.

## KEYWORDS

peri-implantitis treatment, regenerative therapy, magneto-laser therapy

## Introduction

The use of dental implants has become a common method for treating partial and complete adentia. The recorded long-term results are quite successful, but the implantation process is also not immune from complications<sup>1-3</sup>. Complications after dental implantation can be divided into several groups: complications during implantation, in the early postoperative period, during implant engraftment and late complications of osseointegrated implants during functional loading<sup>4</sup>. Of the late complications, the most common are peri-implantitis pathology and is represented in two forms: peri-mucositis and peri-implantitis<sup>5,6</sup>. Periimplantitis is an inflammatory and destructive bone disease surrounding the implant, radiologically characterized by a decrease in bone tissue around the implant neck, is clinically manifested by a complex of inflammatory symptoms: bleeding, swelling of the gum, pain sensations, serous purulent discharge and ultimately loss of the implant<sup>7</sup>. According to the results of world studies, 10-15% of patients who had implants had a risk of peri-implantitis<sup>8</sup>.

The etiopathogenesis of peri-implantitis is complex and includes 3 main factors: microbiological factors, biomechanical factors and factors associated with the patient<sup>9,10,11,12</sup>.

Factors associated with the patient include systemic diseases, for example, diabetes mellitus, osteoporosis, prolonged treatment of corticosteroids, chemotherapy, history of periodontitis, dental plaque, poor oral hygiene, smoking<sup>13</sup>.

Peri-implantitis has been put under three categories depending on the pocket depth and bone loss: early peri-implantitis - bone loss <25% of the implant length, moderate- bone loss <25-50% of the implant length, severe - bone loss >50% of the implant length<sup>14</sup>.

Treatment of peri-implantitis may include non-surgical and surgical methods, either alone or together<sup>15</sup>. The surgical treatment can be divided into resection techniques and regenerative techniques. Resection techniques are used when there are vestibular dehiscences in a non-aesthetically compromised region<sup>16</sup>. Regenerative procedures such as bone graft techniques with or without the use of barrier membranes resulted in various degrees of success<sup>17</sup>.

Laser therapy is another method of treatment for decontamination of implant surfaces and peri-implant tissues<sup>18</sup>.

The search for optimal methods for the treatment of peri-implantitis is ongoing. However, as of today, no consensus exists regarding effective

peri-implantitis treatment.

Hyaluronic acid is a natural polysaccharide, which is part of the glycosaminoglycan group. Hyaluronic acid increases local immunity in the oral cavity, by strengthening the antibacterial function of cells, stimulates the migration of fibroblasts and cell proliferation, enhances tissue regeneration, which has a positive effect on the healing process<sup>19</sup>.

In the field of dentistry, preliminary clinical trials have been conducted by Pagnacco and Vangelisti in 1997<sup>20</sup>. Ballini et al. found that autologous bone combined with an esterified low-molecular hyaluronic acid preparation seems to have good capabilities in accelerating new bone formation in the infra-bone defects<sup>21</sup>. Due to its specific properties, hyaluronic acid has great potential for application in implantology practice and could be a very valuable addition to those used to treat peri-implantitis.

The aim of this study was to evaluate the outcome of combined surgical regenerative therapy of peri-implantitis using autologous bone, a xenograft in combined with a hyaluronic acid gel and collagen membrane.

**Materials and Methods:** The 32 patients involved in this study (14 females, 18 males, at a mean age 48,3 years) with inflammatory-destructive processes in the field of peri-implant tissues of osseointegrated implants. A total of 46 implants were treated. (16 implants diagnosed with peri-implant mucositis, 14 implants-early peri-implantitis, 12 implants-moderate peri-implantitis and 4 implants severe peri-implantitis). The patients were examined clinically and radiographically. The diagnostic parameters used for assessing peri-implantitis include clinical indices, probing pocket depth (PPD), bleeding on probing (BOP), suppuration, mobility, periimplant radiography.

The degree of bleeding was judged by the evaluation criteria:

- 0,1 - 1,0 - mild inflammation;
- 1,1 - 2,0 - the average inflammation;
- 2,1 - 3,0 - severe inflammation.

Probing pocket depth (PPD) was measured full millimetre with a manual periodontal probe. Marginal bone loss readings from periapical radiographs (taken at the baseline diagnostic appointment). Clinical and radiographical parameters were recorded before treatment (baseline) and at 3, 6 and 12 months after treatment.

16 implants with peri-implant mucositis, 8 implants with early peri-implantitis and 5 implants with moderate peri-implantitis was treated only conservative treatments methods, 6 implants with early peri-implantitis, 7 implants with moderate peri-implantitis and 4 implants with severe peri-implantitis was treated surgically.

**Treatment Protocols**

**Conservation treatment** including systemic antibiotics (amoxicillin 500mg and metronidazole) all the above antibiotics were administered per with duration of 7-10 days. Mechanical implant cleaning with titanium or plastic-curettes, Air-Flow Perio Soft, irrigation with the circus-pocket with 0.12% chlorhexidine, magneto-laser therapy with a wavelength of 810nm power density of 100mW during 2min (Laser therapy apparatus MILTA-F-8-01,RF).

**Surgical treatment** can be subdivided into two phases:

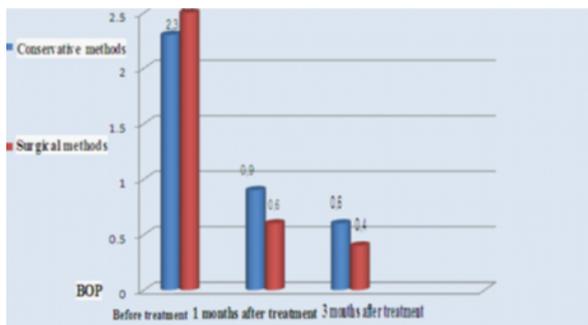
1. the anti-infective phase(to reduce clinical signs of inflammation before surgery);
2. the regenerative phase.

Following local anesthesia, granulation tissue was carefully removed in the bone defect with titanium instruments. The implant surface is decontaminated with Air-Flow Perio Soft, 0.12% chlorhexidine, sterile physiological saline and adjunctive magneto-laser therapy with a wavelength of 810 nm power density of 100mW during 30 seconds. A autologous bone and Bio-Oss had mixed with Gengigel and the periimplant bone defect was filled. A bioresorbable collagen membrane Bio-Gide was placed over the filled defect. After bone grafting full thickness buccal and lingual flaps were repositioned and sutured. The wound healing was performed in a submerged mode. After surgery the patients received 7 days magneto-laser therapy during 2min. Patients observed the first 4 weeks to monitor healing, and then with a three-month interval.

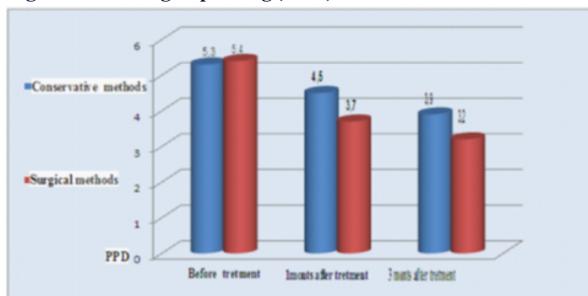
After 3 months of submerged healing the cover plugs of the implants were replaced with prosthetic abutments. After 1 weeks of soft-tissue healing, prosthetic components were inserted. In 4 cases (severe peri-implantitis) with bone resorption at >50% implant length the implants were removed.

**Results**

Treatment was considered successful if the following criteria were met: (1) absence of progressive bone loss, (2) absence of suppuration, (3) bleeding on probing at ≤ 50% of sites and (4) probing pocket depth <5 mm. Radiographically, increased or stable marginal bone levels compared with the baseline periapical x-rays were synonymous with treatment success. Clinical evaluation of the results of treatment after 1, 3 months showed reduction in both PPD and BOP were as compared with the baseline clinical measurements, more pronounced changes in the surgical method of treatment( Figure 1,2).



**Figure 1: Bleeding on probing (BOP) before and after treatment**



**Figure 2: Probing pocket depth (PPD) before and after treatment**

After 6 months x-ray examination demonstrated newly formed hard tissue was observed filling the defects around the implants. Stable clinical measurements PPD and BOP were demonstrated after after 6 months, 1 year the initial treatment, remaining stable during the following three years. Longer periods of observations continued to show positive dynamics clinical dental status.

**Discussion**

A number of protocols have been suggested in the treatment of peri-implantitis. There have been proposals various methods of treating peri-implantitis, however, until now, no methodology has been used as a gold standard<sup>21</sup>.

A consensus report from the 8th European Workshop on Periodontology emphasized the need for identifying a standard mode of therapy for the treatment of peri-implantitis<sup>22</sup>. The insufficient effectiveness of the proposed methods of treatment of perimplantitis requires the improvement of surgical techniques, as well use innovative biomaterials for the treatment of peri-implantitis.

This study describes clinical results of a treatment of peri-implantitis. The evaluation of outcomes in the present study was confined to treatment success criteria that included the combination of findings from clinical and radiological assessments. Significant reductions in both PPD and BOP were shown in the group with less pronounced bone loss pre-surgery.

Based upon in our clinical experience conservative treatment methods are effective in the treatment of peri-implant mucositis and early peri-implantitis. When peri-implantitis category moderate and severe effective surgical treatment combined conservative therapy. Implants with less bone loss before surgery presented better treatment result than more severe cases.

Laser treatment may serve as an alternative or adjunctive treatment to conventional therapy peri-implantitis. The use of magneto-laser therapy in our study for decontamination of the affected surface of the implant has demonstrated promising results treating peri-implantitis. Magneto-laser therapy is not only beneficial because of its bactericidal effect but it can accelerates regeneration processes in periimplant area.

Our results suggest that hyaluronic acid Gengigel represents a reliable adjunctive treatment to conventional therapy. This barrier function of hyaluronic acid is very important in the healing process of the wound, it as a highly promising material for improving outcomes treatment of peri-implantitis. This combination of surgical and therapeutic treatment aims at improvement of the quality of regenerated bone structures. The long term success of peri-implant treatment requires a program of maintenance, including instructions in hygiene.

**CONCLUSIONS:** The results of this study indicated that surgical regenerative treatment combined with mechanical and chemical detoxification of the implants' surface, magneto-laser therapy and bone graft techniques using a autologous bone, Bio-Oss, hyaluronic acid Gengigel with barrier membranes a reliable method for stopping and treatment peri-implantitis.

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