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SURGICAL REGENERATIVE TREATMENT IN COMBINATION WITH MAGNETIC LASER SUPPORTIVE THERAPY OF PERI-IMPLANTITIS

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Abstract

Objective: The objective this study is to evaluate the potential of magnetic-lazer therapy as a supportive treatment of peri-implantitis.

Materials and Methods: The 34 patients suffering from Peri-Implantitis were selected for this study. The patients randomly divided into two groups; 18 patients first group received surgical conventional treatment,16 patients second group received surgical conventional treatment and magnetic-lazer application. A total of 46 implants were treated with moderate peri-implantitis. Diagnostic parameters used to evaluate peri-implantitis include clinical indicators, Probing Pocket Depth (PPD), Bleeding On Probing (BOP), Marginal Bone Level (MBL) suppuration, mobility. Clinical and radiographical parameters were recorded before treatment (baseline) and at 3, 6 and 12, 36 months after therapy.

Results: Reduction PPD and BOP was observed in comparison with basic clinical measurements. The mean BOP in 34 patients before treatment of peri-implantitis was 2.5 ± 0.31, after treatment, the first group of patients had mean 0.6 ± 0.1, the second group had mean 0.4 ± 0.12. The mean PPD in patients before treatment of peri-implantitis was 5,2±0,24, after treatment, the first group of patients had mean 3,9±0,28, the second group had mean 3,2±0,17. The mean MBL concomitant bone level gain averaged was 1, 54 mm in first group and 2.35 mm in second group. Stable clinical measurements PPD and BOP were demonstrated during the following 1,3 years.

Conclusion: Surgical regenerative treatment combined with magnetic-laser supportive therapy reliable method for treatment peri-implantitis and may be considered an adjunct to the conventional surgical treatments of peri-implantitis

Keywords: *Peri-Implantitis; Dental Implant; Regenerative Therapy; Magnetic-Laser Therapy*

Introduction

Dental implantation is a successful method for treating partial or completely edentulous patients. However, according to various authors, in patients with implants, peri-implantitis is one of the late complications [1-4]. Peri-implantitis is an inflammatory disease of the tissues surrounding osseointegrated dental implants with varying degrees of peri- implant bone loss, increased pocket formation, purulence and eventually implant loss [5].

A consensus report identified the prevalence (5–10 years period) of peri-implantitis to be 28% to 56% of patients and 12% to 40% of implants [5, 6]. Inflammatory process surrounding dental implants is represented in two common forms: peri-mucositis and peri-implantitis.

The American Academy of Periodontology defines peri-mucositis is a reversible inflammatory response limited to the soft tissues surrounding an active oral implant. Peri-implantitis is an inflammatory response that involves loss of marginal bone around a functioning around osseointegrated implants, leading to the formation of a peri-implant pocket and loss of supporting bone [7].

The etiology of peri-implant diseases is characterized by various factors [8]. Risk factors include poor oral hygiene, no regular maintenance care after implant therapy, the volume of attached gingiva surrounding implant, the volume and quality of alveolar bone tissues, previous history of periodontal disease, para functional habits, smoking [9-16]. Bacterial biofilm, microbial colonization plays an important role in the etiology and development of peri-implantitis. Commonly found microorganisms are Gram-negative anaerobes, Prevotella intermedia, Porphyromonasgingivalis, Aggregatibacter actinomycetemcomitans, Bacterioides forsythus, Treponema denticola, Prevotella nigrescens, Peptostreptococcusmicros, Fusobacterium nucleatum [17, 18].

Excessive biomechanical forces may lead to high stress in the coronal bone-to-implant contact and thus lead to loss of osseointegration around the neck of the implant19

The impact of keratinizedgingiva around dental implants has been controversially discussed [20]. In the development of peri-implantitis, the cement remaining after fixation of the restoration can also play a significant role [21]. Factors associated with the patient include systemic diseases, for example, diabetes mellitus, osteoporosis, prolonged treatment of corticosteroids, chemotherapy [22-23]. Forum and Rosen (2012) proposed classification for peri-implantitis depending on bleeding on probing, pocket depth and bone loss, peri-implantitis is divided into three categories: early, moderate, severe [24]. Strategies for the prevention and treatment of peri-implant diseases should be integrated into modern rehabilitation concepts in the field of oral implantology.

Peri-mucositis can be effectively treated with conservative methods. Prevention and treatment of peri-implantitis is extremely important because they lead to disintegration and loss of implants. For the treatment peri-implantitis, the etiological factor must be removed. Treatment of peri-implantitis is aimed at combating infection, decontamination of the surface's implants, regeneration of lost tissue [25, 26]. Various treatment methods are suggested in the treatment of peri-implantitis, non-surgical machining debridemen, chemotherapeutic disinfection, use of antibacterial agents, resective and regenerative surgical procedures, laser therapy, the employment of combination of lasers and surgical treatment [27-30]. However, there is no standard approach for the treatment of peri-implantitis, since with any of the treatment options complete elimination of inflammation is not achieved.

Nonsurgical therapy includes with or without adjunctive local-release and systemic antibiotics [31-35]. In modern literature and expert assessments, mechanical processing of the implant is recommended, followed by early assessment and surgical intervention, decontamination of the implant's surfaces using a variety of mechanical and chemical methods, then adjunctive systematic antibiotics [35]. Surgical treatments include a number of approaches (resective or regenerative) techniques, such as open flap debridement, augmentation and regenerative treatment. Surgical resection therapy for peri-implantitis is the recommended treatment option, however, due to the increase in postoperative recessions, this procedure is not recommended in aesthetic areas. Regenerative approaches include filling of the intraosseous peri-implant defect with a bone graft material with a resorbable membranes and led to the most promising results [36, 37]. Laser therapy is a modern therapeutic technique that can be effectively used as a complement to traditional mechanical therapy for the treatment of peri-implantitis. Diode lasers have been shown to have potent bactericidal effects based on this diode laser, carbon dioxide (CO2) and Erbium Yttrium, Aluminum, Garnet (Er: YAG) lasers are suitable for irradiating [38-40]. Diode lasers have been shown to photobiomodulatory effects promoting wound healing and tissue regeneration. Diode lasers stimulate fibroblasts and osteoblasts, cause increased production of RNA messengers, which leads to significant collagen production during tissue healing [41-43]. The effect of a magnetic field on the surgical field also has an anti-inflammatory, analgesic, regenerating and accelerating tissue healing effect [44, 45]. Such a similar therapeutic effect of laser radiation and magnetic field implies an increase in efficiency when used together. The insufficient effectiveness of the proposed methods of treatment of peri-implantitis requires the improvement of

surgical techniques, as well use innovative technology for the treatment of peri-implantitis. Based on this, research is needed to illustrate the clinical benefits of peri-implantitis treatment using magnetic-laser therapy.
The objective this study is to evaluate the potential of magnetic-lazer therapy as a supportive treatment of peri-implantitis.

Materials and Methods

Thirty-four systemically healthy patients (16 females, 18 males, at a mean age 47, 2 years) suffering from peri-implantitis having pocket depth over 5mm in implants and having no mobility were selected for the study. Nine patients (12 implants) had a history of periodontal disease.
All patients were informed of the study and received an informed consent form. The patients randomly divided into two groups;

- 18 patients first group received surgical conventional treatment
- 16 patients second group received surgical conventional treatment and magnetic-lazer application

46 implants were treated in total with moderate peri-implantitis. Clinical and radiological methods have been used to examine patients.
Diagnostic parameters used to evaluate peri-implantitis include clinical indicators bleeding On Probing (BOP), Probing Pocket Depth (PPD), Marginal Bone Level (MBL) suppuration, mobility. Bleeding On Probing (BOP) is assessed as present if bleeding was evident within 30 seconds after the study or was not present if bleeding was not observed within 30 seconds after the study.

BOP indices were evaluated by the following criteria

0 - no bleeding,
1 - bleeding occurs no earlier than 30 seconds,
2 - bleeding occurs in less than 30 seconds,
3 - bleeding occurs when eating or brushing your teeth.

The degree of bleeding was assessed by the criteria

0.1 - 1.0 mild inflammation,
1.1 - 2.0 medium inflammation,
2.1 - 3.0 severe inflammation.

The Probing Pocket Depth (PPD) was measured with a full millimeter with a manual periodontal probe from the edge of the mucosa to the bottom of the examined pocket. Indications for Marginal Bone Level (MBL) were evaluated by periapical radiographs (takenat the baseline diagnostic appointment). Before treatment (baseline) and at 3, 6 and 12, 24, 36 months after therapy clinical and radiographical parameters were recorded.
Reduction BOP, PPD and MBL was observed in comparison with basic clinical measurements. The occlusion of all implant supported dental prosthesis was monitored and, if present, the extreme contacts were removed.
Professional hygiene was carried out 7 days before the treatment, the patients were rinsed twice a day for 1 min with chlorhexidine 0.12%.
The day before surgery, orally with a duration of 7-10 days, patients were prescribed systemic antibiotics (amoxicillin 500 mg and metronidazole 200 mg or augmentin 875 mg or ciprofloxacin 250 mg).
For the selection of the most effective antibiotic for each case, microbial testing was performed. Local anesthesia was accomplished by articain 4%. After local anesthesia, the superstructure was removed, incision was made around the neck of the implants and the flap of full thickness was raised to provide access to the defect of the peri-implant and the open surface of the implant. The abutment was removed and cover plugs were inserted in the implant (fig.1. a, b, c)

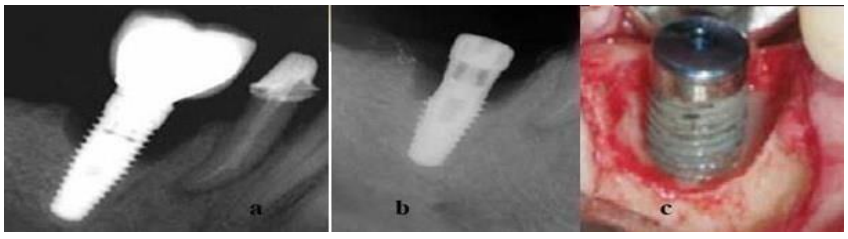

Fig. 1a. X-ray of an implant with peri-implantitis before treatment, 1b. Implant x-ray with periimplantitis, abutment was removed and cover plugs were inserted in the implant, 1c. The flap of full thickness was raised to provide access to the defect of the peri-implant and the open surface of the implant.

With titanium instruments granulation tissue was carefully removed in the bone defect the implant surface is cleaned (fig. 2. a). The implant surface is decontaminated with Air-Flow Perio Soft, successive topical applications of citric acid, 0.12% chlorhexidine, sterile physiological saline.

Patients of the second group underwent magnetic-laser irradiation with a wavelength 0.89 μm, radiation power 1.2-5 mW/cm2, magnetic field is 5-10 mTl, for 30 seconds (fig. 2. b).

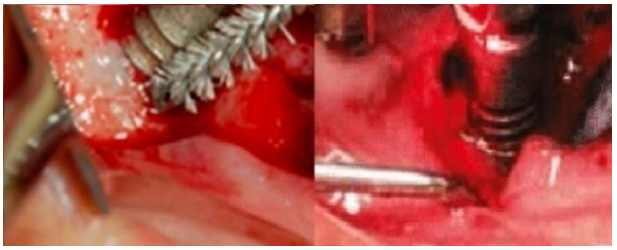

Fig. 2a. With titanium instruments the implant surface is cleaned, 2b. Implant surface for 30 seconds of irradiation with magneto-laser radiation

Bone loss was evaluated intrasurgically, Bio-Oss was mixed with Gengigel hyaluronic acid preparation outside the mouth, and the peri-implant defect was filled (fig. 3. a, b) A bioresorbable collagen membrane Bio-Gide was placed over the filled defect (fig.3c) After bone grafting flaps were repositioned and sutured, wound healing was performed in a submerged (fig. 3. d).

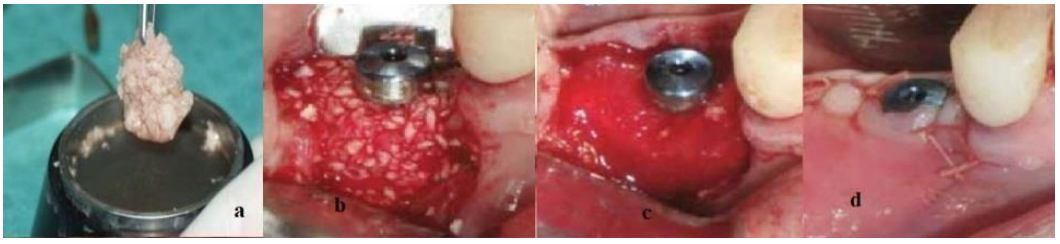

Fig. 3a. Bio-Oss was mixed with Gengigel hyaluronic acid preparation outside the mouth, 3b. The periimplant defect was filled, 3c. A bioresorbable collagen membrane Bio-Gide was placed over the filled defect, 3d. After bone grafting flaps were repositioned and sutured, wound healing was performed in a submerged

Patients were instructed to rinse twice a day for 1 minute for 2-3 weeks with chlorhexidine 0.12%.

After surgery the patients of the second group received magnetic laser irradiation 7 days with a wavelength of 810 nm and a density of 100 mW during 3 min. Magnetic-laser therapy was performed using the Milta-F-8-01 device (Space Equipment GAM, RF). The Milta-F-8-01 device includes low-intensity pulse lasers, a magnetic fi eld generator, low-intensity laser radiation, and a combined physiotherapeutic effect of the magnetic fi eld. The following parameters were selected for the treatment: pulsed wave frequency 80 Hz, wavelength 0.89 μm, radiation power 1.2-5 mW/cm2, magnetic field is 5-10 mTl, for 3 minutes.

Healing periods occurred without complications, and with minimal postoperative discomfort. The sutures were removed 7-10 days after the surgery.

To monitor healing, patients were observed for the first 4 weeks, and then at a three-month interval. Cover plugs of the implants were replaced with prosthetic abutments after 3 months of submerged healing and prosthetic components were installed after 1 week of soft tissue healing. Professional hygiene was conducted every six months.

Effectiveness treatment was evaluated by the following criteria: (1) the absence of progressive loss of bone mass, (2) the absence of suppuration, (3) bleeding when probing for ≤ 50% of sites and (4) Probing pocket depth < 5mm.

Statistical analyses

Statistical analyses performed using SPSS software ver. 22.0 (IBM, Armonk, NY, USA), and MedCalc program for Windows. To test the significance of variations in the BOP, PPD, MBL, the t-test was used. The minimum level of statistical significance was set at a value of less than 0.05.

The diagnostic parameters of the two groups were comparable at baseline and after treatment. Radiologically increased or stable levels of the marginal bone compared with the baseline periapical x-rays is considered to be a treatment success. The mean initial both BOP and PPD of the groups was not significantly different ($p>0.05$). Clinical evaluation of the results of treatment after 3, 6, 12 months showed reduction in both BOP and PPD were as compared with the baseline clinical measurements, more pronounced in the surgical treatment and magnetic-lazer application method of treatment.

The mean BOP in thirty-four patients before treatment of peri-implantitis was 2.5 ± 0.31, after 6 months treatment. After 6 month treatment no statistically significant finding was observed in the mean BOP of both groups (p>0.05), the first group of patients had mean 0.6 ± 0.1, the second group had mean 0.4 ± 0.12. The mean PPD in thirty-four patients before treatment of peri-implantitis was 5.2 ± 0.24. After 6-month treatment the volume of pocket depth in the first group (mean 3.9±0.28) was significantly higher than the second group mean (3.2 ± 0.1) (Figure 1).

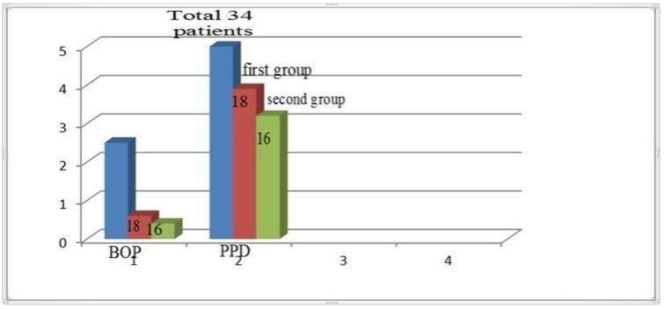

Figure 1: The mean BOP and PPD patients before and after 6 months treatment of peri-implantitis

The mean MBL concomitant bone level gain averaged was mean 1.74 mm in first group and mean 2.35 mm in second group 6 months after treatment (fig. 5. b).

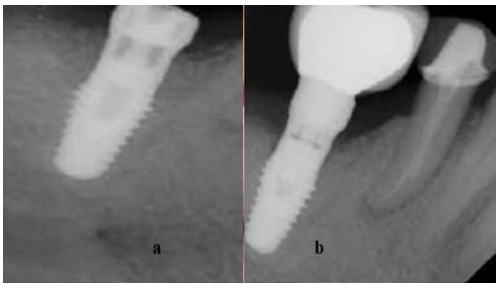

Fig. 5a. X-ray of an implant with peri-implantitis, 5b. After treatment and 6 months after treatment

When considering the treatment benefit of both groups, in patients received surgical conventional treatment and magnetic-lazer application, achieved better outcomes in terms of PPD reduction and MBL. At 1 year after initial treatment, stable clinical measurements of PPD and BOP were demonstrated and remained stable during the following three year. For the long-term stability of the treatment results, it is necessary for the patient to maintain good oral hygiene.

Discussion

Dental implants successful treatments for partial or full edentulous patients. One of the most commonly diagnosed complications of dental implants is peri-implantis [8].

The etiology of peri-implantitis is multifactorial and treatment requires an integrated approach. Periimplant diseases have always been associated with the biofilm, since it is generally accepted that periimplantitis has a bacteriological etiology, decontamination of the implant surface is very important and the difference methods of the implant surface decontamination were used (such as powder air flow, saline flushing, citric acid, laser, hydrogen peroxide).

Moderate and severe peri-implantitis will require surgical consideration. There are various surgical treatments methods (resective or regenerative). Surgical resection is used for peri-implantitis located in nonaesthetic sites [46]. Surgical regenerative therapy was carried out, using: (1) autogenous bone grafts alone (2), autogenous bone grafts covered by membranes, (3) xenogen bone grafts covered by membranes, (4) xenogen bone grafts, platelet-rich plasma covered by membranes [47].

Adjunctive peri-implant therapies, such as antibiotics, antiseptics, have been proposed to improve the nonsurgical treatment options of peri-implantitis, however nonsurgical therapy is ineffective at treating periimplantitis.

Different treatments methods have been suggested, but little reliable evidence exists, suggest-ing which could be the most effective one for the long-term treatment's methods. Currently there is no universal approach therapy peri-implantitis [48]. The need to determine a standard treatment regimen for periimplantitis was emphasized in the consensus report of the 8th European Periodontology Workshop [49].

Laser therapy is widely used in Dentistry. Laser therapy effective in periodontal treatment and there is ongoing debate regarding the efficacy of lasers in periodontal disease [50-53].

The American Dental Association's (ADA) and American Academy of Periodontology's (AAP) recommendations regarding their use in treating periodontal disease [54]. Since the role of periodontal pathogens in the etiology of peri-implantitis is indisputable, this indicates that anti-infection therapy for periimplantitis should be consistent with the treatment strategy for periodontitis [55].

With the advent of laser technology, there is a growing tendency to use in implant dentistry. Now lasers have myriad applications in implant dentistry, which includes non surgical therapy and is recommended in addition to the available conventional methods for the treatment of peri-implantitis [56]. The non-surgical treatment of periimplantitis using Er: YAG laser showed in reduction peri-implant probing pocket depth and bleeding on probing. However, single course of treatment with the Er: YAG laser may not be adequate for achieving a stable therapy of peri-implantitis and that additional subsequent osseous regenerative procedures, might be required [57]. In vitro studies have shown that laser irradiation increases the release of bFGF from gingival fibroblasts [58]. With clinical use, this leads to an improved and accelerated wound healing [59]. Diode laser is used in peri-implant treatment to access the photochemical and photosensitive effects of laser.

The main role of the laser in the treatment of peri-implants is its bactericidal effect. Magnetic-laser therapy combines the therapeutic factors widely used in modern medicine: magnetic field, low laser radiation and infrared light radiation. The therapeutic effect of magnetic-laser therapy is manifested by immunomodulatory, antiinflammatory, regenerative and enjoys from high bactericidal and detoxication effects [60-63].

This study describes clinical results of a magnetic-lazer therapy as a supportive treatment of periimplantitis. Clinical and radiological evaluations of the results of treatment after 6 months showed reduction in both PPD and BOP was as compared with the baseline clinical measurements in both groups, a significant reductionswas shown in the second group of patients. At 1 year after initial treatment, stable clinical measurements of PPD and BOP were demonstrated and remained stable during the following three year. Magneticlaser therapy has shown promising therapeutic effect in treatment of peri-implantitis. To achieve an optimal clinical result, at least 7 sessions of magnetic-laser therapy are necessary.

The clinical significance objectives of a magnetic-laser therapy approach are:

1. The reduce microorganisms on the implant surface,
2. The decrease BOP,
3. The reduce PPD,
4. To enhance self-performedoral hygiene and peri-implant health.

Magnetic-laser therapy is not only useful because of its bactericidal effect, but can also accelerate the regeneration processes in the peri-implant area. After 6 months x-ray examination demonstrated newly formed hard tissue was observed filling the defects around the implants and is considered to be a treatment success. For the long-term success of peri-implant treatment, constant dynamic monitoring and regular professional hygiene were performed.

The protective effect and slow absorption of hyaluronic acid provide reliable and predictable regeneration of augmentate [64,65]. This barrier function of hyaluronic acid is very important in the process of wound healing.

Our results suggest that the preparation of hyaluronic acid Gengigel is used in combination with Bio-Oss represents a good adjunctive treatment to conventional therapy of peri-implantitis.

The use of magneto-laser therapy for stabilization and decontamination of the affected surface of the implant has demonstrated promising results treating peri-implantitis. This combination of surgical and therapeutic treatment aims at improvement of the quality of regenerated bone structures. The results of this study indicated that a surgical procedure based on pocket elimination, bone grafting with grafts materials and hyaluronic acid Gengigel, magnetic-laser therapy accelerates the regeneration processes in the peri-implant area and was an effective therapy for treatment of peri-implantitis. It was found in the study that the combined magnetic-laser supportive therapy for implant surface debridement in peri-implantitis therapy were better at decreasing the PPD and MBL. Magnetic-laser therapy led to positive effects on clinical and radiologic parameters over the long-term subsequent period of time.

The surgical protocol for the treatment of peri-implantitis described in this article has shown positive results, therefore it is recommended as a simple and effective method of therapy.

Conclusion

The prognosis of the affected implant will depend on the early detection and treatment of peri-implant periimplantitis. Supportive care should be given every 6 months. Surgical regenerative treatment combined with magnetic-laser therapy reliable method for treatment peri-implantitis. Magnetic-laser supportive therapy may be considered an adjunct to the conventional surgical treatments of peri-implantitis. The long-term success of periimplant treatment requires constant dynamic observation, regular professional hygiene.

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DOI:10.58240/1829006X-2022.18.1-84

REFERENCES

1. Sequeira V., Todkar M.M., Abhyankar V., Fernandes G. (2018). Prevention of Peri-Implantitis: A Narrative Review. J Dent Oral Care Med 4: 106.
2. Schwarz F., Derks J., Monje A., Wang H.L. (2018). Peri-implantitis. J Clin Periodontol 45: 246-66.
3. Rajesh K.S., Spoorthi K.H., Shashikanth Hegde, Arun Kumar M.S. (2015). Peri-implantitis 360. Int J Dent Med Res 1: 213-9.
4. Nguyen-Hieu T., Borghetti A., Aboudharam G. (2012). Peri-implantitis: from diagnosis to therapeutics. J Investig Clin Dent 3: 79-94.
5. American Academy of Periodontology Task Force on Peri-implantitis (2013). Peri-implant mucositis and periimplantiti: a current understanding of their diagnoses and clinical implications. J Periodontol 84:436-43.
6. Linde J., Meyle J. (2008.) Peri-implant diseases: consensus report of the sixth European workshop of Periodontology. J Clin Periodontol 35: 286-291.
7. G. Caton J., Armitage G., Berglundh T., Chapple ILC, Jepsen S., et al. (2018). A new classification scheme for periodontal and peri-implant diseases and conditions Introduction and key changes from the 1999 classification. J Clin Periodontol 45: 1-8.
8. Zitzmann N.U., Berglundh T. (2008). Definition and prevalence of periimplant diseases. J Clin Periodont.35:286-91.
9. Alsaadi G., Quirynen M., Komarek A., Van Steenberghe D. (2008). Impact of local and systemic factors on the incidence of late oral implant loss. Clin Oral Implants Res 19: 670-6.
10. Subramani K., Jung R.E., Molenberg A., Hammerle C.H. (2009). Biofilm on dental implants: a review of the literature. Int J Oral Maxillofacial Implants 24: 616-26.
11. Korsch M., Obst U., Walther W. (2014). Cement-associated peri-implantitis: A retrospective clinical observational study of fixed implant-supported restorations using a methacrylate cement. Clin Oral Implants Res 25: 797-802.
12. Smeets R., Henningsen A., Jung O., Heiland M., Hammächer C., et al. (2014). Definition, etiology, prevention and treatment of peri-implantitis-a review. Head Face Med 3: 34.
13. Mombelli A., Muller N., Cionca N. (2012). The epidemiology of peri-implantitis. Clin Oral Implant Res 23: 67-76.
14. Karoussis I.K., Salvi G.E., Heitz Mayfield L.J., Bragger U., Hammerle C.H., et al. (2003). Long term implant prognosis in patients with and without a history of chronic periodontitis: a 10-year prospective cohort study of the ITI Dental Implant System. Clin Oral Implants Res 14: 329-39.
15. Roccuzzo M., Bonino F., Aglietta M., Dalmasso P. (2012). Ten-year results of a three arms prospective cohort study on implants in periodontally compromised patients. Part 2: clinical results. Clin Oral Implants Res 23: 389-95.
16. Ueno D., Nagano T., Watanabe T., Shirakawa S., Yashima A., et al. (2016). Effect of the keratinized mucosa width on the health status of periimplant and contralateral periodontal tissues: a cross sectional study. Implant Dent 25: 796-801.
17. Heydenrijk K., Meijer H.J., Van Der Reijden W.A., Raghoebar G.M., Vissink A., et al. (2002). Microbiota around root-formed endosseous implants: A review of the literature. Int J Oral Maxillofac Implants 17: 829-38.
18. Ata-Ali J., Candel-Marti M.E., Flichy-Fernandez A.J., Penarrocha-Oltra D., Balaguer Martinez J.F., et al. (2011). Periimplantitis: associated microbiota and treatment. Med Oral Patol Oral Cir Bucal 16: 937-43.
19. Naert I., Duyck J., Vandamme K. (2012). Occlusal overload and bone/implant loss. Clin Oral Impl. Res 23: 95-107.
20. Brito C., Tenenbaum H.C., Wong B.K., Schmitt C., Nogueira-Filho G. (2014). Is keratinized mucosa indispensable to maintain peri-implant health? A systematic review of the literature. J Biomed Mater Res B. Appl Biomater 102: 643-50.
21. Pette G.A., Ganeles J., Norkin F.J. (2013). Radiographic appearance of commonly used cements in implant dentistry. Int J. Periodontics Restorative Dent 33: 61-8.
22. Javed F., Romanos G.E. (2009). Impact of diabetes mellitus and glycemic control on the osseointegration of dental implants: a systematic literature review. J Periodontol 80: 1719-30.
23. Chen H., Liu N., Xu X., Qu X., Lu E. (2013). Smoking, radiotherapy, diabetes and osteoporosis as risk factors for dental implant failure: a meta-analysis. PLoS One 8: e71955.
24. Froum S.J., Rosen P.S. (2012). A proposed classification for peri-implantitis. Int J. Perio. Restor Dent 32: 533-40.
25. Esposito M., Grusovin M.G., Worthington H.V. (2012). Treatment of peri-implantitis: what interventions are effective? A Cochrane systematic review. Europ J. Oral Implantology 5: 21-41.
26. Schwarz F., Hegewald A., John G., Sahm N., Becker J. (2013). Four year follow up of combined surgical therapy of advanced peri-implantitis evaluating two methods of surface decontamination. J Clin Periodontol 40: 962-7.
27. Kotsovilis S., Karoussis I.K., Trianti M., Fourmousis I. (2008). Therapy of peri implantitis: a systematic review. J Clin Periodontology 35: 621-9.

Hakobyan G.V., et al. (2022). Surgical Regenerative Treatment in Combination with Magnetic Laser Supportive Therapy Peri-Implantitis. Bulletin of Stomatology and Maxillofacial Surger, Vol. 18 N1, 84-93.
DOI:10.58240/1829006X-2022.18.1-84

28. Roncati M., Lucchese A., Carinci F. (2013). Non-surgical treatment of peri-implantitis with the adjunctive use of an 810-nm diode laser. J Indian Soc Periodontology 17: 812-5.
29. Mettraux G.R., Sculean A., Bürgin W.B., Salvi G.E. (2016). Two years clinical outcomes following nonsurgical mechanical therapy of peri-implantitis with adjunctive diode laser application. Clin Oral Implants Res27:845-9.
30. Okayasu K., Wang H.L. (2012). Decision tree for the management of peri-implant diseases. Impl. Dent20:256-61.
31. Persson G.R., Salvi G.E., Heit Mayfield L.J., Lang N.P. (2006). Antimicrobial therapy using a local drug delivery system (Arestin) in the treatment of peri-implantitisI: microbiological outcomes. Clin Oral Implants Res 17: 386-93.
32. Tang Z., Cao C., Sha Y., Lin Y., Wang X. (2002). Effects of non-surgical treatment modalities on periimplantitis. Chin J Stomatology 37: 173-5.
33. Salvi G.E., Persson G.R., Heitz-Mayfield L.J.A., Frei M., Lang N.P. (2007). Adjunctive local antibiotic therapy in the treatment of peri-implantitis II: Clinical and radiographic outcomes. Clin Oral Implants Res 18:281-85
34. Buchter A., Meyer U., Kruse-Losler B., Joos U., Kleinheinz J. (2004). Sustained release of doxycycline for the treatment of peri-implantitis: Randomised controlled trial. Br J Oral Maxillofacial Surg 42:439-44.
35. Renvert S., Roos Jansaker A.M., Claffey N. (2008). Non surgical treatment of peri-implant mucositis and peri-implantitis: a literature review. J Clin Periodontol 35: 305-15.
36. Romeo E., Lops D., Chiapasco M., Ghisolfi M., Vogel G. (2007). Therapy of peri-implantitis with resective surgery. A 3-year clinical trial on rough screw-shaped oral implants. Part II: Radiographic outcome. Clin Oral Implants Res 18: 179-87.
37. Berglundh T., Wennström J.L., Lindhe J. (2018). Long-term outcome of surgical treatment of periimplantitis: A 2-11-year retrospective study. Clin Oral Implan Res 29: 404-10.
38. Trivedi A.R., Patel V.G., Gupta S.S., Jathal B.S. (2019). Treatment of Peri-implantitis with Implantoplasty and Diode Laser. Int J Clin Med Imaging 5: 49-53.
39. Guo Hao Lin, Fernando Suárez López del Amo (2018). Hom Lay Wang Laser therapy for treatment of periimplant mucositis and peri-implantitis: An American Academy of Periodontology best evidence review. J Periodontol 89: 766-82.
40. Behdin S., Monje A., Lin G.H., Edwards B., Othman A., et al. (2015) Effectiveness of laser application for periodontal surgical therapy: systematic review and meta-analysis. J Periodontol 86: 1352-63.
41. Lucas Freitas de Freitas, Michael R. Hamblin (2016). Proposed Mechanisms of Photobiomodulation or LowLevel Light Therapy. IEEE J Sel Top Quantum Electron 22: 7000417.
42. de Abreu Chaves M.E., de Araujo A.R., Cruz Piancastelli A.C., Marcos Pinotti M. (2014). Effects of low-power light therapy on wound healing: LASER x LED*. An Bras Dermatol 89: 616-23.
43. Vartika Kathuria, Jatinder Kaur Dhillon, Gauri Kalra (2015). Low Level Laser Therapy: A Panacea for oral maladies. Laser Ther 24: 215-23.
44. K. Marycz, K. Kornicka, M. Röcken (2018). Static magnetic field (SMF) as a regulator of stem cell fate-new perspectives in regenerative medicine arising from an underestimated tool. Stem Cell Reviews 14: 785-92.
45. Darendeliler M.A., Darendeliler A., Sinclair P.M. (1997). Effects of static magnetic and pulsed electromagnetic fields on bone healing. Int J Adult Orthodontics and Orthognathic Surg 12: 43-53.
46. ooChen S., Darby I. (2003). Dental implants: maintenance, care and treatment of peri-implant infection. Aust Dent J 48: 212-20.
47. Samizade S., Kazemian M., Ghorbanzadeh S., Amini P. (2015). Peri-implant diseases: Treatment and management. Int J Contemp Dent Med Rev 2015: 6.
48. Schou S., Berglundh T., Lang N.P. (2004). Surgical treatment of peri-implantitis. Int J Oral Maxillofac Implants 19: 140-9.
49. Berglundh T., Stavropoulos A., Working Group 1 of the VIII European Workshop on Periodontology (2012). Preclinical in vivo research in implant dentistry. Consensus of the eighth European workshop on periodontology. J Clin Periodontol 39: 1-5.
50. Everett J.D., Rossmann J.A.-, Kerns DG, Al-Hashimi I. Laser Assisted Non-Surgical Periodontal Therapy: A Double Blind, Randomized Clinical Trial. Open Dent J. 2017; 14;11:79-90.
51. C. Ren, C. McGrath, L. Jin, C. Zhang, Y. Yang (2017). The effectiveness of low-level laser therapy as an adjunct to non-surgical periodontal treatment: a meta-analysis. J Periodontal Res 52: 8-20.
52. Gregg R.H., Mc Carthy D. (2002). Laser periodontal therapy for bone regeneration. Dent Today21:54-59.
53. Dederich D.N., Bushick R.D.; ADA Council on Scientific Affairs and Division of Science; Journal of the American Dental Association. Lasers in dentistry: separating science from hype. J Am Dent Assoc. 2004 Feb;135(2):204-12

54. Costa F.O., Ferreira S.D., Cortelli J.R., Esteves Lima R.P., Cortelli S.C., et al. (2019). Microbiological profile associated with peri-implant diseases in individuals with and without preventive maintenance therapy: a 5-year follow-up. Clin Oral Invest 23: 3161-71.
55. Lin G.H., Suarez Lopez Del Amo F., Wang H.L. (2018). Laser therapy for treatment of peri-implant mucositis and peri-implantitis: An American Academy of Periodontology best evidence review. J Periodontol 89: 766-82.
56. Schwarz F., Bieling K., Bonsmann M., Latz T., Becker J. (2006). Nonsurgical treatment of moderate and advanced periimplantitis lesions: a controlled clinical study. Clin Oral Investig 10: 279-88.
57. Almeida-Lopes L., Rigau J., Zangaro R.A., Guidugli-Neto J., Jaeger M.M. (2001). Comparison of the low-level laser therapy effects on cultured human gingival fibroblasts proliferation using different irradiance and same fluence. Lasers Surg Med 29: 179-84.
58. Schwarz F., Aoki A., Sculean A., Becker J. (2009). The impact of laser application on periodontal and periimplant wound healing. Periodontol 2000 51: 79-108.
59. Fouda A., Refai H., Mohammed N. (2013). Low level laser therapy versus pulsed electromagnetic filed for inactivation of myofascial trigger points. Am J Res Commun 1: 68-78.
60. Kathuria V., Dhillon J.K., Kalra G. (2015). Low Level Laser Therapy: A Panacea for oral maladies. Laser Ther 24: 215-23.
61. Sculean A., Schwarz F., Becker J. (2005). Anti-infective therapy with an Er: YAG laser: Influence on periimplant healing. Expert Rev Med Devices 2: 267-76.
62. Ashnagar S., Nowzari H., Nokhbatolfoghahaei H., Zadeh B.Y., Chiniforush N. (2014). Laser Treatment of PeriImplantitis: A Literature Review. J Lasers Med Sci 5: 153-62.
63. Parveen Dahiya, Reet Kamal (2013). Hyaluronic Acid: A Boon in Periodontal Therapy. N Am J Med Sci 5: 309-15.
64. Pagnacco A., Vangelisti R., Erra C., Poma A. (1997). Double-blind clinical trial versus placebo of a new sodiumhyaluronate-based gingival gel. Attual Ter In 15: 1-7.
65. Ballini A., Cantore S., Capodiferro S., Grassi F.R. (2009). Esterified hyaluronic acid and autologous bone in the surgical correction of the infra-bone defects. Int J Med Sci 6: 65-71.

ՊԵՐԻԻՄՊԼԱՆՏԻՏԻ ՎԻՐԱԲՈՒԺԱԿԱՆ ՎԵՐԱԿԱՆԳՆՈՂԱԿԱՆ ԲՈՒԺՈՒՄ ՄԱԳՆԻՍԱ-ԼԱԶԵՐԱՅԻՆ ՕԺԱՆԴԱԿ ԹԵՐԱՊԻԱՅԻ ՀԵՏ ՀԱՄԱՏԵՂ

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Ամփոփում

Նպատակը: Այս հետազոտության նպատակն է գնահատել մագնիսական-լազերային թերապիայի ներուժը որպեսպերիիմպլանտիտի օժանդակ բուժում:

Նյութեր և մեթոդներ: Այս հետազոտության համար ընտրվել են միջին ատիճանի պերիիմպլանտիտով 34 հիվանդներ: Հիվանդները պատահականության սկզբունքով բաժանվել են երկու խմբի. 18 հիվանդների առաջին խումբը ստացել է վիրաբուժական բուժում, 16 հիվանդների երկրորդ խումբը ստացել է վիրաբուժական բուժում համագնիսական-լազերային թերապիա:

Ընդհանուր առմամբ բուժվել են 46 իմպլանտներ պերիիմպլանտիտով: Պերիիմպլանտիտը գնահատելու համար օգտագործվող ախտորոշիչ պարամետրերը ներառել են կլինիկական ցուցիչներ՝ հարիմպլանտային

գրպանի զոնդավորման խորություն (PPD), արյունահոսություն զոնդավորման ժամանակ (BOP), հարիմպլանտային ոսկորերի սահմանային մակարդակ (MBL), իմպլանտի շարժունակություն, կլինիկական և ռենտգենաբանականպարամետրերը գրանցվել են բուժումից առաջ (բազային) և թերապիայից 3, 6 և 12, 36 ամիս հետո:

Արդյունքները: PPD-ի և BOP-ի կրճատում նկատվել է հիմնական կլինիկական չափումների համեմատ: Միջին BOP-ը 34 հիվանդների մոտ մինչև պերիիմպլանտիտի բուժումը եղել է 2,5 ± 0,31, բուժումից հետո առաջին խմբի հիվանդների մոտ եղել է միջինը 0,6 ± 0,1, երկրորդ խմբի մոտ՝ 0,4 ± 0,12:Միջին PPD-ն հիվանդների մոտ մինչև պերիիմպլանտիտի բուժումը եղել է 5,2 ± 0,24, բուժումից հետո առաջին խմբի հիվանդների մոտ եղել է միջինը 3,9 ± 0,28, երկրորդ խմբի մոտ՝ 3,2 ± 0,17:
Հարիմպլանտային ոսկրային մակարդակի միջին բարձրացումը եղել է 1,54 մմ առաջին խմբում և 2,35 մմ երկրորդ խմբում: Կայուն կլինիկական չափումներ PPD և BOP ցուցադրվել են հաջորդ 1,3 տարիների ընթացքում: **Եզրակացություն:** Վիրաբուժական վերականգնողական բուժումը զուգորդված մագնիսական-լազերային աջակցողթերապիայի հետ պերիիմպլանտիտի բուժման հուսալի մեթոդ է և կարող է համարվել որպես պերիիմպլանտիտի ավանդական վիրաբուժական բուժման հավելում:

ХИРУРГИЧЕСКОЕ РЕКОНСТРУКТИВНОЕ ЛЕЧЕНИЕ ПЕРИИМПЛАНТИТА В СОЧЕТАНИИ С МАГНИТОЛАЗЕРНОЙ АДЪЮВАНТНОЙ ТЕРАПИЕЙ

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Резюме

Цель: Целью данного исследования является оценка потенциала магнитно-лазерной терапии в качестве поддерживающего лечения периимплантита.

Материалы и методы: Для этого исследования были отобраны 34 пациента, страдающих периимплантитом. Пациенты случайным образом разделены на две группы; 18 пациентам первой группы проведено традиционное хирургическое лечение, 16 больным второй группы хирургическое общепринятое лечение и магнитолазерная терапия. Всего было пролечено 46 имплантатов с периимплантитом средней тяжести. Диагностические параметры, используемые для оценки периимплантита, включают клинические показатели, глубину кармана при зондировании (PPD), кровотечение при зондировании (BOP), резорбция на уровне маргинальной кости (MBL), подвижность импланта. Клинические и рентгенологические параметры регистрировали до лечения (исходный уровень) и через 3, 6 и 12, 36 месяцев после терапии.

Результаты: Наблюдалось снижение PPD и BOP по сравнению с основными клиническими показателями. Среднее значение BOP у 34 пациентов до лечения периимплантита составило 2,5 ± 0,31, после лечения в первой группе больных в среднем было 0,6 ± 0,1, во второй группе в среднем 0,4 ± 0,12.

Среднее значение (PPD) у больных до лечения периимплантита составило 5,2±0,24, после лечения в первой группе больных в среднем 3,9±0,28, во второй группе в среднем 3,2±0,17.

Среднее значение сопутствующего прироста костной ткани в среднем составило 1,54 мм в первой группе и 2,35 мм во второй группе. Стабильные клинические показатели PPD и BOP были продемонстрированы в течение следующих 1,3 лет.

Заключение: Хирургическое регенеративное лечение в сочетании с магнитолазерной поддерживающей терапией является надежным методом лечения периимплантита и может рассматриваться как дополнение к традиционным хирургическим методам лечения периимплантита.

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