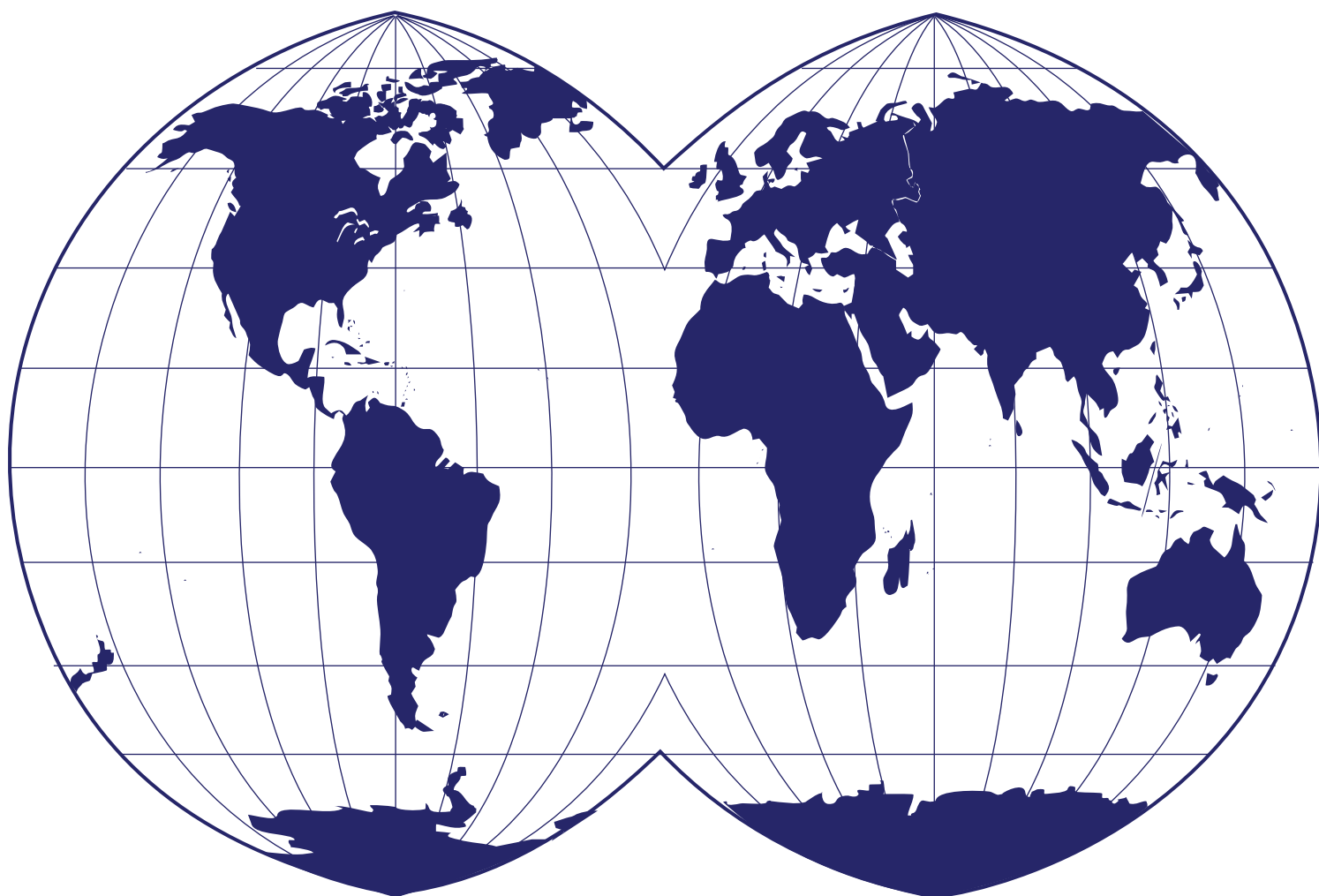




Journal of the International Academy of Periodontology

The official journal of the International Academy of Periodontology

Volume 19 Number 4 Supplement October 2017



Abstracts presented at the Sixteenth International Biennial Congress of the International
Academy of Periodontology. Held in Brasnov, Romania from 27-29 April 2017

Published by The International Academy of Periodontology

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**Volume 19
Number 4
October 2017
Supplement**

ISSN 2518-3745

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Mark R. Patters

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Prologue to the Supplement

The International Academy of Periodontology (IAP) was founded in 1985 with the mission of spreading the research and developments in periodontology across the globe and among other dental and medical fields. In keeping with this mission, the IAP coordinates the presentation of the latest scientific and clinical findings in periodontology during its biennial congresses, bringing international experts together with local and regional leaders, students and trainees in periodontology. Every two years, the IAP organizes an international congress. In 2017, the 16th International Biennial Congress of the International Academy of Periodontology was held in Brasov, Romania from 27 to 29 April, 2017. The congress was organized by Anton Sculean of the University of Bern, Switzerland, Alpdogan Kantarci of the Forsyth Institute, Boston, USA, and Raluca Cosgarea, of the University of Cluj-Napoca, Romania. There, a slate of renowned speakers in basic science, clinical periodontology and implantology presented the latest findings in periodontology and implantology to an audience of over 500 attendees.

All participants in the congress had the opportunity to present their research in the form of a poster presentation. The presentations were divided into basic sciences and clinical sciences. In an effort to disseminate the information presented by these posters to the global periodontal community, a supplement to the Journal of the International Academy of Periodontology was prepared. This supplemental issue of the Journal contains the abstracts of these poster presentations.

Mark R. Patters, DDS, Ph.D.

Editor

The Journal of the International Academy of Periodontology

Expression of Neprilysin in Periodontitis-Affected Gingival Tissues

Arata Nezu¹, Takehiko Kubota², Satoshi Maruyama¹, Masaki Nagata¹, Makoto Horimizu^{1,2}, Kaname Nouno¹, Takahiro Hokari¹, Toshiya Morozumi^{1,2}, Hiromasa Yoshie^{1,2} and Takashi Saku¹

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Objective: Although the pathogenesises of Alzheimer's disease (AD) and periodontal diseases have overlapping features such as aging and inflammation, the association remains unclear. While exploring the pathogenesis of periodontitis, we found that the AD pathway, including AD-related genes, amyloid beta precursor protein (APP), interleukin-1 beta and complement 1QA, was significantly up-regulated in periodontitis-affected gingival tissues. In the present study, mRNA levels and protein localisation of APP and a potent amyloid degradation enzyme, neprilysin (NEP), were analysed.

Design: Eighteen periodontitis-affected and 18 clinically healthy control gingival tissue samples taken from informed consented patients with severe chronic periodontitis were analysed. The mRNA levels and the immune localisations were analysed by quantitative reverse transcription real-time polymerase chain reaction (qRT-PCR) and immunohistochemistry (IHC), respectively.

Results: APP and NEP genes were significantly up-regulated in periodontitis-affected gingival tissues ($p < 0.05$). APP-expressing macrophages, NEP-expressing neutrophils and fibroblasts, reflecting inflammatory stages, were detected in inflamed gingival tissues.

Conclusion: The up-regulation of APP and NEP mRNA levels in periodontitis-affected gingival tissues compared with healthy controls was confirmed. Since NEP is not only the primary enzyme that degrades amyloid beta, but has several functions including degradation of vasoactive substances, increased NEP in periodontitis may act to control inflammation in periodontitis, though further research is needed.

Synergistic Effects of the Combined Use of Human Cultured Periosteal Sheets and Platelet-Rich Fibrin on Bone Regeneration

Makoto Horimizu, Takehiko Kubota, Tomoyuki Kawase, Masaki Nagata, Mito Kobayashi, Kazuhiro Okuda, Koh Nakata and Hiromasa Yoshie
Niigata University, Niigata, Japan

Objectives: A human cultured alveolar bone-derived periosteal (hCP) sheet is an osteogenic grafting material used clinically in periodontal regenerative therapy, while platelet-rich fibrin (PRF), a platelet concentrate with fibrin clot, is considered to augment the wound healing process. Therefore, whether the combined use of hCP-PRF complex could facilitate bone regeneration synergistically was evaluated in an animal study.

Material and methods: Human periosteal segments (1 mm x 1 mm) were cultured initially on plastic dishes and formed an hCP sheet. The hCP sheet was implanted with freshly prepared human PRF into subcutaneous tissue and calvarial bone defects prepared in nude mice. At four weeks' post-implantation, new bone formation was evaluated using X-ray micro-computed tomography (μ CT). Cell growth and neovascularization were evaluated by histochemical and immunohistological methods.

Results: In the subcutaneous tissue, mineral deposit formation and collagen deposition were higher in the hCP + PRF group than in the hCP-alone group. New bone formation and the numbers of vessels and proliferating cell nuclear antigen (PCNA)-positive cells in calvarial defects were significantly higher in the hCP + PRF group than in the hCP-alone group and control group.

Conclusion: PRF preparations support periosteal cell growth and simultaneously augment spontaneous osteoblastic differentiation to form well-combined osteogenic materials. The combined use of hCP and PRF could be clinically applicable in bone regeneration therapy.

Hydroxyapatite Crystal Particles Induce Cell Death in the HSC-2 Oral Epithelial Cell Line

Ziauddin SM¹, Atsutoshi Yoshimura¹, Jorge Luis Montenegro Raudales¹, Yukio Ozaki¹, Takashi Kaneko², Kanako Higuchi¹, Chiaki Shiraishi¹, Akiko Kuramoto¹, Yuzo Takamori¹, Yasunori Yamashita¹, Hiroki Kobayashi¹, Takashi Ukai¹ and Yoshitaka Hara¹

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Objective: Dental calculus is a mineralized deposit frequently found in periodontal pockets, comprising mostly calcium phosphate crystals such as hydroxyapatite (HA). We have recently found that HA crystals could induce IL-1 β production via NLRP3 inflammasomes in mouse and human phagocytes. However, the effect of dental calculus on the epithelial cells has not been explored. This study aimed to examine whether HA crystals can induce cell death via NLRP3 inflammasomes in human oral epithelial cells.

Methods: HSC-2 human oral squamous carcinoma cells were stimulated with HA crystals for 24 hours and cell death was detected by measuring lactate dehydrogenase (LDH) release and/or staining with propidium iodide (PI). To examine the role of NLRP3 inflammasomes in cell death, HSC-2 cells were stimulated with HA crystals in the presence or absence of glyburide (NLRP3 inflammasome inhibitor) or z-YVAD-fmk (caspase-1 inhibitor).

Results: Following stimulation with HA crystals, HSC-2 cells released LDH and were stained with PI. Cell death was significantly inhibited by glyburide and z-YVAD-fmk.

Conclusions: HA crystals can induce cell death via NLRP3 inflammasomes in HSC-2 cells. The induction of epithelial cell death by HA crystal particles may be important for the etiology of periodontitis.

Photobiomodulation Activates Human Endothelial Cell Function

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²Ponta Grossa State University, Ponta Grossa, Brazil

³The American International School of Muscat, Oman

Objective: To measure the impact of photobiomodulation (PBM) on endothelial cell function and signaling.

Methods: Cells were irradiated for 1 min for 8 days, or for 10 min on day 1 and day 5, or for 10 min for 8 days. The control group was not exposed to PBM. Cell proliferation was measured by MTT; vessel formation was analyzed by calcein uptake; VE-cadherin was measured by immunocytochemistry, and VEGFR1 and VEGFR2 were analyzed by FACS. VEGF-A, VEGF-R1, VEGF-R2, MMP-1, MMP-2, angiopoietin 1, angiopoietin 2, E-selectin, β 3 and α V expressions were quantified by Q-PCR. Culture supernatants were analyzed for EGF, FGF-2, PDGF-BB, PDGF-AA, TGF- β 1, VEGF, MMP-2, sICAM-1, sVCAM-1 and P-selectin by ELISA or multiplex immunoassay.

Results: PBM significantly promoted endothelial cell proliferation and tube formation in all groups compared to the control group ($p < 0.05$). VE-cadherin was significantly increased in response to prolonged exposure to PBM compared to the control group (~2-3-fold; $p < 0.01$). Expression of sVCAM-1, P-selectin and E-selectin, VEGF release, and expression of VEGFR1 and VEGFR2 were significantly increased in response to PBM ($p < 0.05$).

Conclusion: PBM promotes endothelial cell proliferation, accelerates angiogenesis, and modulates the expression of angiogenesis-related genes, suggesting a direct impact on vascular tissues by PBM.

Determination of Recall Visit Frequency for Patients with Periodontal Disease Using a Formal Mathematical Model

Oksana Shekera

O. Bogomolets National Medical University, Kyiv, Ukraine

Background: According to the regulations of the Ministry of Health of Ukraine, the frequency of recall visits for periodontal disease patients is 2-3 times per year (depending on the periodontal disease type).

Objective: The aim of the study was to calculate recall visit frequency on the basis of an original mathematical model for periodontal health care.

Methods: Analysis of modern analytical and statistical mathematical models.

Results: Considering the needs of periodontal patients for recall visits, a mathematical model of periodontal care for the population of the Ukraine is proposed. The following factors are taken into account: 1) Periodontal care is provided at regular intervals along with the possibility for patients to be treated in the intervals between recall visits; 2) Patients with periodontal complaints do not always ask for help in the interval between recall visits; 3) There are a number of false requests from periodontal patients for medical care; 4) Periodontal disease diagnosis largely determines the volume of medical and recall dental care.

Conclusion: The proposed mathematical model allows us to calculate and customize the recall interval for each individual patient. In turn, both the quality of diagnoses and the comprehensive periodontal care provided will improve. Consequently, the prevalence of periodontal disease among Ukrainians will be reduced.

BRONJ in Ovariectomized Female Wistar Rats - Radiological Implications

Adela Cristina Lazar, Sorin George Andreica, Robert Purdoi, Lucia Bel, Radu Lacatus, Pacurar Mariana and Radu Septimiu Campean

"Iuliu Hatieganu" UMPH, Cluj-Napoca, Romania

Objective: Experimental comparative study in an animal model (female Wistar rats) using two types of bisphosphonates (ibandronic acid and denosumab) for treating osteoporosis induced by ovariectomy, performing extractions of the maxillary central incisors and noting occurrence of bisphosphonates-related osteonecrosis of the jaw (BRONJ).

Methods: In 30 female Wistar rats for which ovariectomy was performed, osteoporosis was demonstrated radiologically after 3 months. After this period of time the surviving rats (23) were divided into 3 groups (group 1, ibandronic acid - 8 rats; group 2, denosumab - 8 rats; group 3, control group - 7 rats). After 20 days, we performed tooth extractions in every rat.

Results: The appearance of BRONJ in female Wistar rats that had undergone ovariectomy in advance, some of which received bisphosphonates (groups 1 and 2), was compared among the three groups.

Conclusions: According to the experiment conducted by us, the administration of this class of bisphosphonates has antibacterial effects, decreases osteoclast activity and thus decreases bone resorption, but as a secondary main effect it induces BRONJ after performing routine dental surgeries.

Association of Vitamin D-Receptor Gene Polymorphisms with Periodontal Disease in a Population in Western Romania

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Objective: Recent data indicate that gene polymorphisms, such as vitamin D-receptor (VDR) polymorphisms, are associated with an increased susceptibility to chronic periodontitis (CP). This study aimed to investigate whether the VDR gene polymorphism is associated with CP in a population in Western Romania by determining the prevalence of the BsmI (rs1544410), ApaI (rs7975232), TaqI (rs731236) and FokI (rs2228570) genotypes and comparing the CP group with a periodontally healthy group.

Methods: This case control study included 53 patients with CP and 47 healthy patients. VDR polymorphisms were genotyped using real-time polymerase chain reaction (PCR). The associations between VDR polymorphisms and CP were determined using logistic regression models.

Results: We found a significant association between the single nucleotide polymorphism (SNP) rs2228570 (FokI) SNP as well as for rs1544410 (BsmI) and CP. Subjects with the CC variant were 19 times more likely to have the disease (OR 19.58, 95% CI 2.67 - 198.92) and with the TC genotype were 8 times more likely (OR 7.86, 95% CI 1.29 - 61.56). An association between the SNP rs1544410 polymorphism (BsmI) and the disease was also observed, in which the AG genotype was almost 4 times more common in patients with CP (OR 3.76, 95% CI 1.15 - 13.80).

Conclusion: This case-control study of a Western Romania population confirms that vitamin D receptor (VDR) polymorphisms are associated with susceptibility to CP.

Funding sources: This study was partially supported by an internal grant (P-IV-CI-PDCC 2015/2016, contract 7199/01.07.2015) of the Victor Babes University of Medicine and Pharmacy, Timisoara, Romania.

Clinical Outcomes Following Combination of Periodontal Regenerative Therapies Using a Deproteinised Bovine Bone Mineral, Enamel Matrix Derivative with or without Collagen Membrane

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Aim: To examine the effectiveness of collagen membrane (CM) for periodontal intrabony defects in regenerative therapy with deproteinised bovine bone mineral (DBBM) and enamel matrix derivative (EMD).

Methods: Forty defects of chronic periodontitis patients were enrolled. One intrabony defect per patient with probing pocket depth (PPD) ≥ 6 mm was assigned to the treatment. Clinical parameters including PPD, clinical attachment level (CAL) as well as the filled bone volume measured by cone beam computed tomography were recorded and evaluated at baseline and twelve months. Then stratified statistics were done by periodontal biotype, type of bone defects, and smoking habit.

Results: PPD and CAL significantly improved in both groups ($p < 0.05$). The between-group comparison showed that the CM group resulted in significantly more reduction in mean PPD ($p < 0.05$). According to stratified comparison, patients with thick gingival biotype in the CM group showed greater significant improvement in PPD and CAL ($p < 0.05$).

Conclusion: Within the limitations of the study, both periodontal regenerative therapies using EMD and DBBM with and without CM demonstrated good clinical outcomes. The usage of CM may result in greater decrease in PPD; however, long-term prognosis needs to be further studied.

The Effects of the Nd:YAG Laser in Addition to Conventional Periodontal Therapy in Aggressive Periodontitis

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Objective: Data for treatment protocols of aggressive periodontitis with antimicrobial drugs are still confusing in the literature. Nd:YAG lasers can provide an alternative treatment. The aim of this study was to investigate the clinical, microbiological and biochemical outcomes of antibiotics and Nd:YAG laser treatment in addition to conventional therapy in aggressive periodontitis.

Methods: This clinical study involved 26 patients suffering from generalized aggressive periodontitis assigned to two treatment groups. The first group was treated with scaling and root planing (SRP) combined with antimicrobial drugs; the second group was treated with SRP and Nd:YAG laser.

Results: Clinical and biochemical measurements showed no significant difference between the groups except that TIMP-1 concentrations were significantly higher in the laser group. Both *Porphyromonas gingivalis* (Pg) and *Treponema denticola* decreased in the non-laser group, but only Pg decreased in the laser group. A significantly increased number of *Tannerella forsythia* was observed in the non-laser group. *Aggregatibacter actinomycetemcomitans* showed no significant change in either group.

Conclusions: Within the limitations of this study the increase in TIMP-1 concentrations in the laser group is promising. Further studies need to be done for usage of lasers as an alternative to antimicrobial drugs in the treatment of aggressive periodontitis.

Evaluation of Gingival Inflammation in Pregnancy and Postpartum via 25-Hydroxyvitamin D₃, Prostaglandin E₂ and TNF- α Levels in Saliva

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Background: Physiological changes and immunological modifications occur during pregnancy. The clinical and biological features of periodontal infections are affected by pregnancy. The present study aimed to evaluate saliva levels of 25-hydroxyvitamin D₃ (25(OH)D₃), prostaglandin E₂ (PGE₂) and tumor necrosis factor- α (TNF- α) in pregnancy, postpartum and non-pregnant controls.

Methods: Whole saliva samples together with full-mouth clinical periodontal recordings were obtained from 59 pregnant, 47 postpartum and 70 systemically healthy non-pregnant women. Groups were also evaluated according to periodontal health status. 25(OH)D₃, PGE₂ and TNF- α levels in the saliva samples were determined by enzyme-linked immunoassays. Data were statistically tested by non-parametrical tests.

Results: Saliva TNF- α and PGE₂ levels were significantly lower and 25(OH)D₃ levels were significantly higher in the pregnant group than the postpartum group ($p < 0.0001$). Saliva TNF- α and 25(OH)D₃ levels were

significantly higher and PGE2 levels were significantly lower in the control group than the postpartum group ($p < 0.0001$). In the pregnant healthy, gingivitis and periodontitis groups' saliva TNF- α levels were significantly lower than the postpartum and control counterparts ($p < 0.05$). In control healthy, gingivitis and periodontitis groups' saliva 25(OH)D₃ levels were significantly higher than the postpartum counterparts ($p < 0.05$). In the control (healthy) and gingivitis groups' saliva 25(OH)D₃ levels were significantly higher than in the pregnant healthy and gingivitis groups ($p < 0.0001$).

Conclusions: It seems that pregnancy has an effect on parameters in saliva in relation to the periodontal status of the women. Further studies are required for better understanding of the impact of periodontal diseases on pregnancy or otherwise.

Intermittent Administration of Parathyroid Hormone in Rat Cranial Bone Defects

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Background: The aim of this study was to evaluate the local intermittent administration of PTH for bone regeneration in rat cranial bone defects.

Materials and Methods: Eight-week-old male Wistar rats were used, divided into four groups. Two groups (PTH-3 and PTH-1 groups) underwent creation of two cranial bone defects using a trephine bur (\varnothing 4.3 mm). These groups received PTH at 14.1 μ g/kg in absorbable collagen sponge placed in bone defects. The collagen group received saline at 14.1 μ g/kg in absorbable collagen sponge in bone defects. The control group underwent sham-surgery. After surgery, the PTH-3 group received subcutaneous injection of PTH (14.1 μ g/kg) twice at the experimental sites. The PTH-1 group was administered saline twice. The control group was injected subcutaneous with saline. All animals were sacrificed 21 days after surgery. Bone mineral content to total volume (BMC/TV, mg/cm³) at the experimental sites was evaluated using micro-computed tomography. Tissue samples were analyzed histochemically and immunohistochemically. Tissue sections were stained with anti-ALP antibody, anti-DMP1 antibody and anti-Osterix antibody.

Results: BMC/TV was significantly higher in the PTH-3 group and PTH-1 group than in collagen group. Ratio of new bone area to defect area (N/D%) was significantly higher in PTH-3 than in controls. ALP-positive area was more widely distributed in new bone in PTH-3 than in PTH-1, collagen and controls. DMP1-positive area was seen wider in PTH-3 than in PTH-1, collagen and controls. Osterix-positive reactions were more widespread in PTH-3 than in PTH-1, collagen and controls.

Papilla Reconstruction Following Periodontal and Orthodontic Treatment

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Objective: To present a multidisciplinary approach regarding the reconstruction of interdental papilla.

Methods: A 45-year-old female was diagnosed with class IV recessions, extrusion, proclination and diastema of the lower central incisors. The patient was treated with a free gingival graft in order to augment gingival dimensions and obtain keratinized tissue. After 3 months, the patient underwent orthodontic therapy to reduce the distance between the contact point and the crestal bone and diastema closure using intrusion forces, stripping and a negative torque.

Results and conclusion: This case report demonstrates the importance of multidisciplinary treatment in achieving esthetics of the papillary level, soft tissue stability and function.

Clinical, Immunological and Microbiological Evaluation after Periodontal Therapy in Patients with and without Rheumatoid Arthritis

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Aim: To determine the clinical periodontal and rheumatological, and the microbiological and immunological effects of non-surgical periodontal treatment in patients with rheumatoid arthritis (RA) and severe chronic periodontitis (PA).

Methods: Eighteen patients with RA and PA (RA-PA-group) and 18 systemically healthy periodontal patients (PA-group) were treated with scaling and root planing (SRP) within 24 h. At baseline, at 3 and 6 months after SRP, clinical periodontal and rheumatological parameters, gingival crevicular fluid and microbial sampling were assessed. The primary outcome variable was the number of sites with probing depth (PD) ≥ 4 mm at 6 months.

Results: Both groups presented an improvement of all investigated periodontal, immunological and microbial parameters. At 6 months, statistically significant improvements in the number of sites with PD ≥ 4 mm and ≥ 6 mm were found in both groups. RA subjects obtained significant improvements in all periodontal parameters and reductions in the rheumatological parameters IL-1 β , DAS28, CRP and ESR, and of *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis* and *Treponema denticola*.

Conclusions: Within their limits, the present data suggest that: a) in patients with severe chronic periodontitis with or without RA, non-surgical periodontal treatment improved the periodontal conditions; and b) in patients with RA the treatment had a positive effect on bacterial, immunological and rheumatological parameters.

Diode Laser-Assisted Treatment of Gingival Overgrowth in a Patient with Fixed Orthodontic Appliance: Case Report

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Objective: To quantify the time of remission regarding gingival overgrowth by comparing the results between clinical procedures of laser-assisted curettage and laser gingivectomy.

Patient history: A female patient undergoing orthodontic treatment reported to the clinic complaining of pain and volume modifications regarding the gingiva of the lower teeth; the gingival modifications had their debut approximately 12 months ago.

Methods: Treatment protocol was as follows: The first step consisted of ultrasonic debridement. During the second week, the lower arch received subgingival ultrasonic debridement and laser curettage (940 nm, 0.8 w CP0 mode, 300 microns). During the fourth week, the lower left quadrant received laser gingivectomy (940 nm, 1.4 w CP0 mode, 300 microns), and the right lower quadrant received laser curettage.

Results: After evaluation, there was a significant improvement of the gingival tissue of both left and right lower arches. There was, however, a slight difference in the healing time between left and right lower arches; the arch that received laser gingivectomy having healed at a much faster rate.

Conclusion: The adjunct use of diode laser gingivectomy can produce a greater improvement in gingival health quickly, suggesting that it has potential benefits for orthodontic patients.

Nanolaser Technology for Treatment of Dentin Hypersensitivity

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Objectives: Development of new effective treatments for dentin hypersensitivity by using nanolaser technologies. Nanostructured fluorine apatite, synthesized in molten nitrate at relatively low temperatures, was used in the research.

Materials and methods: Sixty extracted human teeth with dentin hypersensitivity were stored in physiological saline solution. The samples were assigned to three groups. Group 1 served as a control. Group 2 teeth were covered with nanodispersed fluorine apatite and irradiated with an Er:YAG laser. Group 3 teeth were covered with nanodispersed fluorine apatite and irradiated with a CO₂ laser. Scanning electronic microscopy was performed to evaluate morphological changes.

Results: Fluorine apatite nanoparticles penetrated into dentinal microtubules and created obturation. Laser irradiation of the hypersensitive area was done in order to induce photothermal activation and melting of nanoparticles, associated with the effect of coalescence of nanoparticles resulting in reliable sealing of dentin microtubules. Laser irradiation was carried out at the wavelength that lies at the maximum of the spectral absorption of calcium fluorine apatite.

Conclusions: Synthesized fluorine apatite was observed in the crystal grating, proving penetration of fluorine apatite nanoparticles into open dentinal tubules in the hypersensitive area and confirming the use of modes of laser radiation for reliable obturation without thermal load on the tooth pulp.

Periodontal Management of Biological Width Invasion: A Case Report

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Background: The aspect of the gingival tissues around the teeth is an important part of smile esthetics. Nowadays, patients have a greater desire for esthetical results, which may influence the treatment choice.

Objective: This study presents a clinical case representing an esthetical challenge. The main objective was to obtain periodontal health and a leveled free gingival margin. This along with the final prosthetics ensures an esthetic final result.

Methods: A female patient presented at our clinic because of gingival bleeding and poor smile appearance. A three-step surgical crown lengthening procedure was used to reestablish the biological width. The provisionalisation was done by individual CAD-CAM PMMA crowns. Tissue conditioning and maturation was guided by the systematic adaptation of the provisional crowns until full papilla growth was obtained.

Results: After the surgical and prosthetic steps, we obtained a stable periodontal status, associated with a perfect symbiosis between hard and soft tissues.

Conclusions: In order to obtain predictable results, it is necessary to follow strict treatment protocols. Having in mind the biological width concept introduced by Cohen, the esthetic perspective is modified. Conditioning of soft tissues is considered to be the key to success for optimal treatment of this esthetic challenge.

Salivary Levels of Aspartate Aminotransferase in Patients with Initial Periodontal Lesions

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Objective: To assess the levels of of salivary aspartate aminotransferase (AST) in patients with initial periodontal lesions at baseline and 4 weeks after scaling and root planing.

Methods: A cross-sectional study included 68 patients, aged 19-34 years (mean \pm SD = 26.80 \pm 4.22), with generalized incipient chronic periodontitis (1-3 mm). The AST salivary levels were assessed biochemically at baseline and 4 weeks post-operative. Ethical approval from the Ethics Committee of the University of Medicine and Pharmacy “Nicolae Testemitanu” and informed consent were achieved prior to study. Correlations between periodontal parameter values and AST levels were analyzed by Pearson’s coefficient. Periodontal parameters such as periodontal depth (PD), clinical attachment level (CAL), bleeding on probing (BOP) were assessed at baseline and 4 weeks post-operative.

Results: The AST salivary levels indicated a sustained, statistically significant decrease after treatment ($F = 13.983$, $p < 0.01$). There was a positive correlation with periodontal parameters PD, CAL, and BOP at baseline ($p < 0.01$ for all three) and after 4 weeks ($p < 0.01$, $p < 0.01$, $p < 0.05$, respectively).

Results: These results indicate that salivary AST levels are correlated with inflammation and destruction of periodontal tissues, suggesting useful markers in periodontal therapy. AST also can be considered an indicator of prognosis of periodontitis.

Effect of Serum 25(OH)D Levels in Patients with Chronic Periodontitis and Well-Controlled Type-2 Diabetes Mellitus

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Objective: This study assessed the possible relationship between serum levels of vitamin D metabolite 25(OH)D and periodontal status among patients with chronic periodontitis (CP) and well controlled type 2 diabetes mellitus (T2DM).

Methods: Forty-one non-smoker patients with CP and well controlled (HbA1c <7%) T2DM were randomly included. The serum level of 25(OH)D was determined and subjects divided into two study groups according to 25(OH)D levels: Vitamin D-sufficient group (≥ 50 nmol/L) and vitamin D-deficient group (< 50 nmol/L). Probing depth (PD), clinical attachment level (CAL), plaque index (PI) and papilla bleeding index (PBI) were assessed. Associations between serum levels of 25(OH)D and periodontal health status were analyzed using Spearman’s rank correlation test.

Results: CAL score in the vitamin D-deficient group was significantly higher compared to the vitamin D-sufficient group ($p = 0.038$). No significant difference was found in the PD, PI and PBI scores among the study groups ($p > 0.05$). A statistically significant association was found between serum 25(OH)D levels and CAL scores ($r = -0.368$, $p = 0.018$).

Conclusion: Clinical attachment loss was higher in vitamin D-deficient patients. Lower serum 25(OH)D levels might be associated with periodontal destruction in patients with CP and well controlled T2DM.

The Effect of Smoking on GCF CypA Levels in Patients with Chronic Periodontitis

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Objectives: Cyclophilin A (CypA) is released extracellularly in response to inflammatory stimuli and acts as a leukocyte chemotactic factor. Smoking is a risk factor for periodontitis that impairs neutrophil functions. The aim of this study was to evaluate gingival crevicular fluid (GCF) levels of CypA in smoker and non-smoker chronic periodontitis (CP) patients and healthy controls.

Methods: Twenty-eight CP patients (14 smokers, 14 non-smokers) and 30 healthy controls (15 smokers, 15 non-smokers) were included in the study (mean age: 42.03 ± 8.85). Periodontal parameters including probing depth, clinical attachment level, plaque index and papilla bleeding index were recorded. GCF CypA levels (ng/site) were analyzed by ELISA.

Results: GCF CypA levels were significantly lower in smoker CP patients than smoker healthy controls ($p = 0.015$). No significant difference was observed in GCF CypA levels between smoker and non-smoker CP patients ($p > 0.05$). Smoker healthy controls had significantly higher GCF CypA levels than non-smoker healthy controls ($p < 0.001$).

Conclusion: GCF CypA levels tend to be affected by smoking in periodontal health. However, GCF CypA levels do not seem to be influenced by smoking in the presence of chronic periodontitis.

Aggressive and Chronic Periodontitis: Comparison of Subgingival Bacterial Profile

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Objective: The aim of this study was to compare the subgingival microbial profile of patients with aggressive generalized periodontitis or chronic severe generalized periodontitis.

Methods: A total of 20 patients, with ages between 21 and 50 years, were enrolled in this study: 10 with aggressive generalized periodontitis and 10 with chronic severe periodontitis. Crevicular fluid samples were collected from each patient and subjected to a real-time PCR (polymerase chain reaction) test in order to determine the presence and levels of nine periodontal pathogens.

Results: There were no significant differences in the total number of bacteria in the samples from each studied group. The patients with chronic periodontitis had significant higher numbers of *Tannerella forsythia* and *Prevotella intermedia* compared with the patients with aggressive periodontitis, who had higher levels of *Fusobacterium nucleatum* and *Capnocytophaga gingivalis*. We also found a significant presence of *Fusobacterium nucleatum nucleatum* in the collected samples from the group with aggressive generalized periodontitis.

Conclusion: The difference in the subgingival microbial profile for patients with aggressive and chronic severe generalized periodontitis could reside in the higher numbers of some of the periodontal pathogens. The clinical evaluation for these types of cases should always be correlated with a real-time PCR test for individualized periodontal therapy.

Implant Placement in Aesthetic Zone Using an Autogenous Bone Graft from a Retromolar Site

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Objectives: Soft and hard tissue defects pose a therapeutic challenge in modern implant dentistry. This treatment was to replace tooth 12 fractured with significant bone loss with a dental implant and reconstruction of the alveolar ridge in the aesthetic zone using an autogenous bone graft harvested from a retromolar site in the mandible.

Results: A common issue in tooth replacement is re-establishment of the normal architecture of the hard and soft tissue. This is especially challenging in the aesthetic zone where the replacement of a missing tooth must not only function properly but esthetically match the contours of bone and gums integrated with the smile of the patient.

Material and methods: An autogenous bone graft was harvested from the retromolar area of the patient's mandible and grafted into the defect. After graft maturation, an implant with a dimensions 4 x 13 mm was placed after 5 months. The implant stayed submerged for 6 months before exposure and abutment connection, after which a ceramic crown was cemented.

Conclusion: Excellent aesthetics resulted due to the integration of hard and soft tissues around the implant, including the preservation of the papilla in harmony with the patient's smile.

Determination of the Prevalence of *Helicobacter pylori* in Subgingival Plaque in Different Periodontal Disease Groups

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Objective: *Helicobacter pylori* is a Gram-negative, microaerophilic bacterium and an etiological factor in chronic active gastritis and peptic ulcer. It is thought that the oral cavity may be a reservoir for transmission of the organism to the stomach. In this study, we aimed to determine the prevalence of *H. pylori* in subgingival plaque samples from patients with chronic periodontitis, aggressive periodontitis, or gingivitis.

Methods: A total of 155 patients, 61 with gingivitis, 60 with chronic periodontitis, and 34 with generalized aggressive periodontitis, who did not have any dyspeptic complaint and had not used antibiotics in the last 3 months, were enrolled in the study. The presence of *H. pylori*, *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis* was detected by RT-PCR.

Results: At the end of microbiological analysis *H. pylori* was not detected in any of the groups. However, a high incidence of *A. actinomycetemcomitans* (97.1%) and *P. gingivalis* (100%) was observed in the generalized aggressive periodontitis group, as expected. In the other two groups, these bacteria were detected at a low rate.

Conclusions: *H. pylori* was not detected in any of the samples and suggests that subgingival plaque may not be a primary reservoir for these bacteria.

A Rare Complication in the Medullary Space of the Mandible during Implant Placement

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Introduction: Despite that dental implantology has a high success rate, some accidents and complications have been encountered with its increased use. The accidental displacement into the medullary space in the mandible is one of the unusual complications.

Case Report: A 56-year-old female patient was referred to the Department of Periodontology, Dentistry Faculty, University of Ataturk. The surgical plan was to insert 2 screw-type internal connection implants to restore the missing teeth (#46 and #47). After final drilling, the implant was inserted into the first molar area by torque driver. A hand wrench was used for final vertical positioning. When the closure cap was placed, the resistance suddenly decreased and the implant became displaced into the preparation socket. A bone window corresponding to the alignment of the implant was removed from the vestibular bone using piezosurgery. The displaced implant was removed and a new implant was applied. The removed autogenous bone window was replaced and flaps were sutured. Paresthesia was reported the day after surgery. At the first-year appointment, paresthesia was decreased in patient but not fully recovered. Patient follow-up is continued.

Discussion: Accidents and complications can be minimized with careful pre-surgical evaluations. Inadequate primary stability is frequently cause of implant migration. When cortical bone is not sufficient enough to provide primary stability, the implant fixture may migrate to the maxillary sinus or the medullary space during implant placement.

Conclusion: A treatment plan must be made carefully before surgery. When surgical complications occur, the lowest risk procedure must be applied by the clinicians for postoperative patient comfort.

Soft Tissue Regeneration Around Resorbed Sockets after Tooth Extraction

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Objective: The aim of this treatment was to provide soft tissue regeneration in an area of alveolar resorption.

Case report: A 42-year-old male patient was referred to Mustafa Kemal University (MKU) Dentistry Faculty, Periodontology Department from the Prosthodontics Department in July, 2016. Following traumatic tooth extraction alveolar ridge resorption was prominent in the buccal region of the mandibular left first incisor. We decided to perform soft tissue regeneration in the area, because the patient did not accept autogenous bone surgery and couldn't afford allograft applications. A subepithelial connective tissue graft combination and platelet-rich fibrin (PRF) application were performed to provide volumetric support. Six weeks after the surgical procedure, the patient was directed to the prosthodontics department.

Results: It was observed that the surgical area had an acceptable aesthetic appearance at the follow-up appointment 6 months later.

Conclusion: Subepithelial connective tissue graft combined with PRF application are successful in soft tissue regeneration.

Connective Tissue Grafting to Augment Attached Gingiva Around Anterior Implant: Six Months Follow-Up

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Objective: The use of dental implants to improve functional and esthetic demands of patients has increased significantly over the last decades. The increased use of dental implants brings with it biologic complications such as gingival recession and insufficient attached gingiva.

Materials and methods: A 45-year-old woman was referred with gingival recession at the buccal aspect of anterior implant. An insufficiency of attached gingiva and frenulum tension were observed in the clinical assessment. After oral hygiene motivation, a connective tissue graft collected from a retromolar region was applied with a coronally advanced flap to augment attached gingiva on the buccal aspect of the implant. The patient did not brush her teeth for two weeks and chlorhexidine mouthwash was used during this healing period. The patient was seen every week for one month, then every two months for six months after surgery.

Result: Except for post-operative pain, no other discomfort or complications were seen after treatment. Healing was uneventful.

Conclusion: Peri-implant soft tissues sometimes must be preserved and/or augmented by periodontal surgical procedures for optimal aesthetic and functional outcomes. This case demonstrates that a coronally advanced flap can be used for complete coverage of advanced gingival recessions around implants, and consequently this facilitates proper oral hygiene for maintaining implant success.

Dental Lasers - A Game Changer in Periodontal Plastic Surgery

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Objective: We wanted to see the differences that different laser wavelengths can bring to improve and change the outcome in periodontal plastic surgery, especially with regard to gingival retraction augmented with a connective tissue graft.

Methods: We used different dental lasers - diode lasers and Er,Cr:YSGG, with wavelengths of 940 nm, 970 nm and 2780 nm in different phases of the treatment of Miller's class II gingival recession.

Results: Diode lasers had a major impact on the homeostasis and healing of the donor site of the connective tissue graft without using any kind of membrane. An important factor was the decontamination of bacteria, which can be done pre-treatment, during, and post-treatment, especially when confronted with a patient with hygiene problems and gum inflammation. Intrabony defects were managed by utilizing the radial firing periodontal laser tip. The root surface was prepared with Er,Cr:YSGG laser without using any etching gel. Finally, the diode laser was used in biostimulation of the soft tissue graft.

Conclusions: Dental lasers can bring a significant advantage in healing and increasing the chances of success in periodontal plastic surgery. They are safer and more accurate than other classical instruments.

Titanium Platelet-Rich Fibrin (T-PRF) in Treatment of a Severe Perio-Endo Lesion: A Case Report

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Objective: When periodontal and endodontic lesions are combined, severe bone loss can be seen. This case report describes the use of titanium platelet-rich fibrin (T-PRF) alone as a graft material in regeneration of a severe combined lesion of primary periodontal origin.

Materials and methods: A systemically healthy male patient was referred to the Periodontology Department. There was a deep intra-bony defect around the distal root of the lower first molar. The bone resorption reached out to the apical region with a periodontal pocket over 10 mm in depth. After endodontic treatment and phase 1 periodontal treatment, T-PRF was applied to the defect area in small pieces during the surgical phase. An additional T-PRF membrane was spread out over the defect area and the flap was sutured. After 10 days, sutures were removed.

Results: Clinical periodontal parameters were improved significantly at the 1-year follow-up period. Additionally, the defect area was seen to be completely filled with trabecular bone upon radiographic examination.

Conclusion: This case report suggests that T-PRF alone may be sufficient for and will support regeneration.

Is Being an Elite Soccer Player Associated with Improved Oral Health Status in Adolescents?

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Objective: Oral and overall body health are closely related to each other and may both affect athletic performance. We aimed to present the differences in oral health status of elite soccer players (ESP) and non-soccer player controls (CNT) among adolescents.

Materials and methods: A total of 100 healthy boys between the ages of 12-14 (50 in each group) were included. The community periodontal index (CPI) and decayed, missing, filling teeth (DMFT) index were recorded. A survey was conducted about dietary and oral hygiene habits and frequency of dental visits. Mann Whitney U and chi-squared tests were used for comparisons between the groups at the significance level of $p < 0.05$.

Results: The DMFT and CPI scores were found to be significantly lower in ESP compared to the CNT group. The ESP group also exhibited significantly higher meal frequency compared to the CNT. Additionally, it was found that dental visits of controls were more frequent compared to ESP group.

Conclusion: The survey results exhibited almost similar outcomes with the exception of meal frequency and dental visits between the groups. The ESP showed better CPI and DMFT scores than controls. Doing regular sport activities may have a positive effect on oral health status of ESP, perhaps reflective of a more disciplined lifestyle.

Intentional Replantation: A Promising Approach for Hopeless Tooth. A Case Report

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Aim: Intentional replantation is a surgical procedure that has often been regarded as the last treatment option. It is defined as intentional removal of a tooth and reinsertion into the extraction socket after proper endodontic treatment. For cases with advanced periodontal destruction, intentional replantation may be a treatment alternative that deserves consideration to maintain the natural dentition and avoid extraction of the tooth.

Case description: A 33-year-old, systemically healthy, non-smoker woman was referred to our clinic with complaints of discomfort, sensitivity and mobility of the left mandibular central incisor. Clinically, the tooth had severe periodontitis with grade II mobility, inflammation, 9 mm probing depth and gingival recession. A pulp sensitivity test was performed and the tooth was found to be nonresponsive. Radiographic examination showed bone loss around periradicular area of the tooth. The case was diagnosed as a primary endodontic and secondary periodontal lesion. One week after endodontic therapy, intentional replantation was performed and the tooth was splinted provisionally for 2 months, then splinted permanently. The patient was clinically and radiographically evaluated at baseline and 1, 3, 6, and 10 months

Results: The 10-month follow-up results demonstrated that the tooth survived with healthy gingiva, a significant decrease in pocket depth, and evidence of new bone formation. The replanted tooth was asymptomatic. During the follow-up periods, no root resorption was observed radiographically.

Conclusion: The result of the case shows that intentional replantation can be an alternative approach to extraction in cases where advanced bone loss is present, and may be a promising treatment modality for management of a tooth with a hopeless prognosis. Further long-term follow-up results will be provided.

Importance of Creating a Physiological Vestibule Sulcus with Free Gingival Graft: A Case Report

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Objective: The treatment of mucogingival problems is one of the main objectives of periodontal surgeries. Insufficient keratinized gingiva and oral hygiene increases the risk of development of gingival recessions. The free gingival graft (FGG) is considered the gold standard of treatment, as it increases the amount of attached gingiva, and is frequently used to treat this problem.

Methods: A 32-year-old female patient was referred to Abant Izzet Baysal University, Department of Periodontology, with complaints of gingival pain and bleeding problems. The patient had reddish mucosa on her epithelia and wide swelling of her gingiva mostly in the anterior region of the mandible, which cannot be removed. Lack of oral hygiene was observed. With regard to clinical assessment and radiological report, the patient was diagnosed with a periodontal abscess. She had phase I periodontal therapy and was motivated to improve oral care. Also, a free gingival graft procedure was performed on the same site. Prosthetic restorations were placed after all surgical procedures.

Results: The initial healing was uneventful. In addition, increased keratinized tissue and favorable vestibular sulcular depth was achieved. There were not any esthetic complaints with regard to the patient's wishes.

Conclusion: This process improved the condition of the gingival tissue and appeared to show benefits for oral hygiene and prosthetic rehabilitation.

Use of Platelet-Rich Fibrin with Periodontal Surgery in the Treatment of Periodontal Defect: A Case Report

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Introduction: Bone grafts and membranes have been widely used in the treatment of periodontal problems. With the introduction of platelet-rich fibrin (PRF) in dentistry practice, periodontal surgery utilizing PRF has been used to treat various periodontal defects. This case report presents the use of PRF in the treatment of periodontal defects.

Case Report: A 37-year-old female patient was referred to the Bezmialem Vakıf University Department of Periodontology with complaints of tooth mobility. Periodontal treatment planning was performed after initial periodontal examination of our patient. Periodontal measurements were repeated 6 weeks after non-surgical periodontal therapy. The probing pocket depth of the maxillary left first incisor was 7 mm and periodontal surgery was indicated. Before the flap operation, 20 cc of blood were taken from the antecubital fossa. The full thickness flap was elevated after the operation site was anesthetized with infiltrative anesthesia. After the root surface has been debrided, it was conditioned with EDTA gel. The bone defect of the maxillary left first incisor was filled with allograft, and PRF obtained by centrifuging the blood at 2700 rpm for 12 min was applied as a membrane on the graft. Then the flap was closed without stress as a primer. On the 14th day sutures were removed. First- and three- month controls were performed and clinical and radiographically successful results were obtained. The patient's follow-up continues.

Conclusion: A periodontal defect was successfully treated with periodontal surgery combined with PRF and patient satisfaction was achieved.

Non-Vital Tooth Containing an Endo-Perio Lesion in a Younger Patient: A Case Report

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Introduction: An endodontic-periodontal combined lesion is a clinical dilemma because making a differential diagnosis and deciding a prognosis are difficult. An untreated primary endodontic lesion may become secondarily involved with periodontal breakdown, which clinically presents with unusual signs and symptoms. This may delay the diagnosis and hence the correct treatment.

Case report: An 18-year-old female patient seen in the periodontology department had a deep intrabony defect associated with an endodontic-periodontal lesion in a left maxillary second premolar. Probing pocket depths were mesiobuccal 2 mm, mesiolingual 2 mm, distobuccal 9 mm, and distolingual 8 mm. The distal vertical defect had a 3 mm three-walled component and a 6 mm two-walled component. Initially, root canal therapy was performed. After the symptoms had disappeared the patient received supragingival scaling and root planing. After 3 months, a flap operation was done as a regenerative surgical procedure for the treatment of the intrabony defect using an allograft. Patient follow-up performed at regular intervals. Examinations revealed absence of pain, gain in clinical attachment level, reduction in probing depth observed clinically, and satisfactory bone regeneration were seen radiographically at the 6-month follow-up.

Conclusion: In endodontic-periodontal lesions, accurate diagnosis and simultaneous treatment with a multi-disciplinary approach is important.

Effect of Cyclosporine-A on Human Gingival Fibroblasts Periostin and Transforming Growth Factor-Beta Expression

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Objective: Cyclosporin A (CsA) is a powerful immunosuppressive agent and causes several side-effects, including gingival overgrowth. Periostin and TGF- β (TGF- β) were shown to contribute to nifedipine-induced gingival overgrowth. The aim of this study was to investigate the effect of CsA on the proliferation and expression of periostin and transforming growth factor-beta in human gingival fibroblasts (HGFs).

Materials and methods: HGF cell lines (American Type Culture Collection, Rockville, MD, USA) were incubated with increasing concentrations of CsA and the proliferation of cells was measured by colorimetric WST-8 assay. Fluorometric evaluation of binding efficacy and fluorescence imaging of CsA on HGFs were carried out by using fluorescein isothiocyanate (FITC) labeling. ELISA was used to analyze the effects of increasing concentrations of CsA on TGF- β and periostin expression levels of HGFs at 24, 48 and 72 hours.

Results: Treatment of HGFs with CsA significantly stimulated cell proliferation in a dose-dependent manner. Incorporation of CsA by HGFs elevated with increases in dose and time. At 24 hours, the TGF- β expression level of HGFs was significantly increased upon stimulation with 1 ng/mL CsA, while periostin expression level was significantly increased with 100 ng/mL CsA.

Conclusion: CsA was shown to be incorporated by cytoplasm of HGFs. The data from this study demonstrated that CsA influences the proliferation of the cells as well as expression of TGF- β and periostin by HGFs. It seems that periostin and TGF- β might play an important role in the pathogenesis of gingival overgrowth.

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