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COMPARISON OF PERIODONTAL PATHOGEN BIOFILM FORMATION ON TWO D-PTFE MEMBRANES

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Aim: Periodontal pathogens attach to all oral surfaces covered by pellicle, natural as well as restorative and/or prosthetic materials, followed by colonization and biofilm formation; therefore, the aim was to test biofilm formation by Fusobacterium nucleatum, Porphyromonas gingivalis and Prevotella intermedia on two different dense polytetrafluoroethylene membranes (d-PTFE) used in socket preservation and bone regeneration procedures. **Materials and methods:** Two non-absorbable d-PTFE membranes were tested (Permamem® and Cytoplast®). Membranes were covered by 50% with artificial saliva and exposed to bacterial suspensions: F. nucleatum, P. gingivalis and P. intermedia, each in concentration 107. Biofilm was grown in rich brain heart infusion broth, and fresh medium containing 0.05% sucrose was added at 24 hour-intervals. During 72h of incubation in anaerobic conditions at 35°C a determination of the number of bacteria (CFU/ml) adhering to the tested materials was performed. The cultivated biofilm was observed with scanning electron microscopy technique (SEM). **Results:** All tested bacterial species demonstrated more pronounced adhesion to Cytoplast® membrane compared to Permamem®. Within 72 hours the number of bacteria in biofilm reached the value of 106 on Permamem® and significantly higher values on Cytoplast® membranes for all tested species. These results were also supported by SEM analysis. **Conclusion:** Tested periodontal pathogens adhered less to Permamem® membrane which – in turn – resulted in a lower bacterial count in the biofilm. The data presented suggest that Permamem® membranes could, due to their physical properties, contribute to a reduced adherence and biofilm formation, as well as improved outcomes in socket preservation and bone regeneration procedures.
Keywords: Periodontitis; Polytetrafluoroethylene; Biofilms; Bacteria

THE EFFECT OF MANUKA HONEY ON THE PERCENTAGE OF POCKET CLOSURE (6 MONTHS FOLLOW-UP)

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Aim: Initial non-surgical therapy is the first step and gold standard in the treatment of periodontitis. The aim was to explore alternative treatments, to which bacteria could not develop any resistance, and one of these could be Manuka honey. **Materials and methods:** In this randomized clinical trial, a total of 45 participants with stage III periodontitis underwent full-mouth non-surgical therapy, then after randomization, Manuka honey was applied to 23 participants and placebo products were applied to 22 participants. The effectiveness of Manuka honey was investigated by comparing the percentage of pocket closure after 6 months between the 2 groups, separately for each initial periodontal probing depth (PPD) value (6-9 mm) using the chi-squared test. **Results:** Statistically higher percentage of pocket closure were identified after 6 months in sites treated with Manuka, compared to placebo treated sites. The significantly beneficial effect of Manuka honey was identified for all initial PPD values - for 6 mm initial PPD (84.1% Manuka / 76.6% placebo), 7 mm (74.5% Manuka/52.8% placebo), 8 mm (64.8% Manuka/48.7% placebo), 9 mm (45.7% Manuka/28.3% placebo). **Conclusions:** The use of Manuka honey showed a promising potential for being used as an adjunctive therapy to non-surgical treatment. The improvements in the outcomes of pocket closure percentage were modest but statistically significant, for sites additionally treated with Manuka in terms of percentage of pocket closure after 6 months. This will indicate the lower need of surgical treatment for patients.
Keywords: Periodontitis; Dental scaling; Root planing; Periodontal pocket

ANALYSIS OF OUTCOMES USED IN RANDOMIZED CONTROLLED TRIALS ABOUT EFFICACY AND SAFETY OF DENTAL IMPLANT THERAPY: META-RESEARCH STUDY

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Aim: The aim of this meta-research study was to analyse outcomes used in clinical trials in the field of implantology. **Materials and methods:** We searched the Cochrane Oral Health Group (COHG) register to identify systematic reviews of interventions in the field of implantology. From the randomised controlled trials (RCTs) included in the relevant reviews, we extracted data on the characteristics of the included trials and the outcomes used. We categorised outcomes into domains. From 182 systematic reviews in the COHG register, we included 11 systematic reviews about implant therapy. **Results:** The reviews included 117 unique RCTs with 4725 participants, published from 1995 to 2020, which analysed 74 different outcomes. Implant failure was analysed most often (73 RCTs) using different definitions of implant failure, while 17 RCTs did not define implant failure. Failure was most often (35 RCTs) followed up for one year. Only two RCTs assessed implant failure after five years. Complications were analysed in 48 RCTs, although not clearly defined in 12 RCTs. Failure of prosthodontic supra-structure was analysed in 68 RCTs, with different definitions of failure, and criteria not clearly defined in 44 RCTs. Other outcomes considered adverse events, peri-implant tissues health, and patient opinions and attitudes. These outcomes were often different between trials. A total of 26 outcomes were observed only once per study. **Conclusion:** Clinical trials in the field of implantology use different outcomes, different definitions of outcomes and use different times to monitor them. Standardisation of outcomes is necessary to allow comparability and evidence synthesis about the effectiveness of implant-prosthodontic therapy.
Keywords: Treatment outcome; Dental implants; Randomized controlled trials

SEVERE PERIODONTITS AND PREGNANCY GRANULOMA IN A 34-YEAR OLD PATIENT – CASE REPORT

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Case presentation: Pregnancy granulomas represent a proliferative red to purple tumor formation growing from the gingiva. Although the etiology is still unclear, most lesions are associated with the presence of local irritants or trauma, and the pathogenesis is associated with high levels of female sex hormones. A 34-year-old female patient, who was 16 weeks pregnant, presented to the clinic complaining of tumor formation on the gingiva (18x15 mm) in the lingual and interdental areas of the mandibular incisors. Symptoms included difficulty in chewing, phonation, and bleeding during tooth brushing. Periodontal examination revealed a plaque index of 60 %, bleeding on probing 100 %, an average probing depth of 4.08 mm with a maximum probing depth of 8 mm, and an average interdental loss of clinical attachment of 4.2 mm. The diagnosis was pregnancy granuloma and generalized periodontitis stage III, grade B. Initial periodontal therapy was performed and a macrolide antibiotic was prescribed. The patient was given oral hygiene instructions. After 2 weeks, a follow-up visit was performed, which revealed a significant improvement in clinical and subjective symptoms. 7 weeks after the initial therapy, the remainder of the granuloma was surgically removed because it was still causing discomfort to the patient. The clinical diagnosis was confirmed by pathohistological diagnosis. At 12 months postpartum, clinical parameters were reevaluated, radiological control and professional dental cleaning were performed. The pregnancy granuloma was successfully removed, preserving the affected teeth. Due to the confirmed diagnosis of periodontitis, the patient is included in the system of supportive periodontal therapy.

Keywords: Periodontitis; Pregnancy; Granuloma; Gingiva

ORAL HEALTH, ORAL HYGIENE HABITS AND QUALITY OF LIFE OF PREGNANT WOMEN: CROSS-SECTIONAL STUDY

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Aim: To determine periodontal status, oral hygiene habits, quality of life, and KEP index in pregnant women and women of childbearing age who are not pregnant and to examine whether there are differences in these parameters. **Materials and methods:** 22 pregnant women and 23 non-pregnant women of childbearing age were included in the research. Following periodontal anamnesis and examination, the periodontal status and KEP index have been determined. The impact of oral health on the quality of life respondents was assessed using the OHIP-14 questionnaire. **Results:** Pregnant women have significantly higher average clinical attacment level (CAL) (P <0.01) as well as average pocket probing depth (PPD) (P <0.01) compared to control respondents, while in the bleeding on probing (BoP) index of the respondents did not differ. Both respondents groups had good oral hygiene habits, the only difference was found for the use of mouthwash. It was shown that control respondents were more likely to use mouthwash compared to pregnant women (P <0.01). No statistically significant differences were found between the groups for the total KEP index, or for the assessment of quality of life according to the OHIP-14 questionnaire. Stepwise logistic regression analysis showed that only BoP was a significant predictor of periodontitis in pregnant women (OR = 1.168 CI 95% = 1.028 – 1.327, P <0.01). **Conclusion:** Pregnant women had a worse periodontal status compared to control respondents. Differences in the status of hard dental tissues, quality of life related to oral health, and oral hygiene habits between pregnant women and control subjects were not found.

Keywords: Pregnancy; Quality of life; Oral health; Oral hygiene

SOCKET SHIELD THERAPY IN SOLVING A CENTRAL AND LATERAL INCISOR DILEMMA CASE IN A COMPROMISED CASE

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Case presentation: This case describes the placement of 2 adjacent implants (central and lateral incisor) in the frontal part of the maxilla in a much compromised situation - a patient with a high smile line, unfavorable aesthetic relations to the contralateral side, and periapical pathology. The peri-implant papilla always represents a great challenge for clinicians, especially the one located between 2 adjacent implants located on the central and lateral incisors. Its shape, color, height and location can be compared with the contralateral side and this represents a great challenge. In the therapy, the socket shield therapy concept, bone substitute and digital technology were used to establish the harmony of the smile.

Keywords: Denal implant; Bone substitutes; Digital technology

IMPLANTOPROSTHETIC THERAPY OF A LOST UPPER CENTRAL INCISOR

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Case presentation: Tooth loss in the esthetic zone is a psychosocial problem. It is usually the result of trauma or unsuccessful endodontic treatment. The treatment of such conditions is a major challenge for clinicians, considering the complexity of the procedures required and the high esthetic expectations of patients. **Materials and Methods:** A 42-year-old woman sought implant prosthodontic therapy to replace tooth 11, which she had lost after unsuccessful endodontic treatment. After the extraction, socket seal technique was performed to achieve the ridge preservation. An inlay bridge was made to replace the missing tooth, but esthetical outcome was not satisfactory for the patient. Three years later, an implant treatment with immediate loading was performed. During a period of 8 months, three temporary crowns were exchanged to shape the initial profile of the soft tissue around the implant. Once the appropriate soft tissue shape was achieved, a screw-retained zirconia ceramic crown was fabricated. **Results:** Implant prosthetic therapy to replace tooth 11 ensured hard and soft tissue stability with proper mastication, phonation, and esthetic function. **Conclusion**: With the preservation of the alveolar ridge, the correct implant position and the provisional prosthetic restorations, optimal conditions were created for the final prosthetic restoration, which provided an adequate esthetic result.

Keywords: Dental implant; Prosthodontics; Tooth loss; Alveolar ridge augmentation

PROSTHETIC DRIVEN SOFT TISSUE MANAGEMENT - CONCEPT. A CASE REPORT

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Case presentation: Loss of teeth is often accompanied by the loss of volume of surrounding tissues. The consequences are volume deficiency and significant aesthetic damage to the facial soft tissue at the implant emergence site when compared to natural teeth. Peri-implant soft tissues could be preserved at the time of extraction and implant placement, but the shape of the gingival and alveolar mucosa should be reconstructed so that the implant supported restoration could show a natural tooth-like emergence profile (EP). Many different reconstructive surgical procedures have been developed, however it is challenging to manage surgical and prosthetic procedures to achieve optimal EP with acceptable quantity and quality of peri-implant soft tissue. Three different patients with volume deficiency at the planned implant site were treated with implants. The implants were inserted according to immediate or delayed implant placement protocol, using different surgical techniques either one-stage or two-stage approach. All implant sites were augmented with bone substitute material or soft tissue graft or combining both; furthermore, all implants received anatomical shaped prosthetic components for soft tissue healing. **Conclusion:** Application of anatomical shaped prosthetic component for soft tissue healing according to the prosthetic driven soft tissue management concept enables immediately to attain an EP of optimal shape and volume, thus eliminating need for step-by-step peri-implant soft tissue conditioning through induction of progressive mechanical injuries. In this manner it is allowed to insert the definitive prosthesis without pressure or under very light contact pressure.

Keywords: Tooth loss; Dental implant; Bone substitutes; Dental implant loading

SOCKET SHIELD TECHNIQUE AND IMMEDIATE IMPLANT PLACEMENT IN THE ESTHETIC ZONE: A CASE REPORT

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Case presentation: Tooth loss in the esthetic zone presents a therapeutic challenge because of unfavourable loss of hard and soft tissues in the jaw. "Socket shield" technique presents a therapeutic approach of partial tooth extraction by leaving the vestibular root fragment to prevent alveolar bone resorption and therefore maintaining soft tissue volume. **Materials and methods:** A 50 years old male patient of good general health presented himself in the clinic with a loose metal post and crown on tooth 11. Clinical examination determined a severe carious lesion and the CBCT scan analysis revealed significant loss of tooth structure that excluded the possibility of fixed prosthodontic treatment, as well as thin vestibular alveolar bone. **Results:** The root of tooth 11 was separated in mesiodistal direction and palatal fragment was atraumatically extracted. The remaining buccal segment was shaped and the implant was placed immediately. The space between the implant and the remaining root fragment was filled with bone substitute biomaterial. In order to preserve soft tissues emergence profile, an acrylic temporary crown was made following the biologically oriented preparation technique (BOPT). After 6 months, the preparation of the definitive screw-retained zirconia crown started. In order to transfer the soft tissue emergence profile accurately, an individualized transfer was made. Definitive

restoration imitated the shape of the temporary, which obtained an optimal emergence profile. **Conclusion:** By using a "socket shield" technique in tooth 11 loss treatment, a soft tissue stability was achieved aroud the implant restoration, which led to the optimal esthetic outcome.

Keywords: Dental implant; Tooth loss; Bone substitute; Esthetics

THE EFFECT OF CHLORHEXIDINE ON THE SUCCESS OF INITIAL PERIODONTAL THERAPY

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Aim: To examine the effect of smoking and chlorhexidine 0.12% on the success of initial periodontal therapy. **Materials and methods:** 60 subjects with periodontitis were included in the study and all of them were scheduled for initial periodontal therapy. The subjects were divided into 4 groups - 15 non-smokers, 15 smokers, 15 non-smokers who used chlorhexidine for 2 weeks after therapy and 15 smokers who used chlorhexidine after therapy. The initial therapy was performed according to the "Guided biofilm therapy" principles (EMS Dental, Switzerland). Periodontal indices were measured before and 8 weeks following therapy. **Results:** FMPS was significantly reduced after therapy in all groups. FMBS was significantly reduced after therapy in the group of non-smokers and non-smokers who used chlorhexidine, while in the groups of smokers and smokers who used chlorhexidine the change were not significant. Probing depth values were significantly reduced after therapy in all groups. More improvement was detected in the groups of non-smokers and those who used chlorhexidine. An increase in gingival recession was observed in all groups except the smokers. Recession values were higher after using chlorhexidine. There were no significant differences in tooth mobility before and 8 weeks after therapy. **Conclusion:** The best results were, as expected, demonstrated in the groups of non-smokers. Chlorhexidine as an addition to initial periodontal therapy had positive effects on the treatment success in both non-smokers and smokers.

Keywords: Periodontitis; Chlorhexidine; Periodontal index; Smokers

ANALYSIS OF SERUM VITAMIN D LEVELS IN PATIENTS WITH PERIODONTITIS - A CROSS-SECTIONAL STUDY

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Aim: Available literature indicates that there is a relationship between serum levels of vitamin D and periodontitis. The aim of this study was to investigate whether there is a difference in the level of serum vitamin D concentration between subjects with periodontitis and subjects without periodontitis, and whether there are differences in the level of serum vitamin D concentration in patients with periodontitis depending on age, gender, smoking and stage of the disease. **Materials and methods:** 20 subjects with periodontitis and 20 subjects without pathological changes in the periodontium were included in the study. Detailed anamnestic data were collected from all subjects, including information on age, gender and daily smoking habits, periodontal status as well as blood samples to determine the vitamin D serum level in the blood. **Results:** Subjects with moderately severe periodontitis had lower serum vitamin D levels compared to controls (P=0.005), while the difference between subjects with moderately severe periodontitis and those with advanced form of the disease could not be demonstrated. Risk factors (age and smoking) as well as modifying factors (gender) had no significant impact on the reduction in serum vitamin D concentration in periodontitis patients **Conclusion:** Serum levels of vitamin D are lower in subjects with periodontitis, than in subjects without periodontaitis, regardless of the degree of disease.

Keywords: Periodontitis; Vitamin D; Periodontal index; Cross-sectional studies

CLINICAL EVALUATION OF XENOGENEIC COLLAGEN MATRIX ADDITION IN KERATINIZED MUCOSA INCREASE FOLLOWING VESTIBULOPLASTY

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Aim: Inadequate retention and stabilization of the lower complete denture is a common problem caused by resorption of hard and soft tissues following tooth extraction. Vestibuloplasty is a surgical procedure performed for the purpose of deepening the vestibule for better retention and stabilization, especially for the lower complete denture. Dental implants also improve retention and stabilization of prosthetic appliances in general, and in order to evaluate treatment success special emphasis is put on peri-implant keratinized tissue. It is commonly measured with periodontal probe, however due to possible misinterpretation this procedure is often inaccurate. The aim of this pilot study was to compare the dimensional changes of attached mucosa after Obwegeser's vestibuloplasty and vestibuloplasty with xenogeneic collagen matrix in three patients with lower complete denture, using split-mouth design. **Materials and methods:** An intraoral scanner was used in order to precisely monitor changes in the dimensions of the attached mucosa. Before every measurement, oral mucosa was stained with 2.5 % iodine solution in order to distinguish between the non-keratinized and keratinized mucosa. The same procedure was performed postoperatively after 4, 8 and 12 weeks. A computer program measured the increase in keratinized tissue and compared left and right side. **Results:** Results are presented on the photographic images (clinical presentation) and in table (dimensions of the keratinized mucosa). **Conclusion:** Intraoral scanning of the iodine-stained mucosa and the computer data processing represent valuable tools for accurate analysis of the soft tissue dimensions, and the addition of xenogeneic collagen matrix may significantly improve the outcome of the surgical vestibuloplasty procedure.

Keywords: Vestibuloplasty; Oral mucosa; Dentures; Dental implant

APPLICATION OF XENOGENIC TRANSPLANT IN THE TREATMENT OF BONE DEFECT: CASE REPORT

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Case presentation: Bone substitute materials are used in the treatment of bone defects. Xenografts are transplants whose properties, hydrophilicity, and porosity enable successful integration into the human body. The inserted graft serves as a support and structural guide for the ingrowth of blood vessels and the differentiation of precursor cells for the development of healthy bone. The patient was treated for cystic changes and internal resorption in region 11. Two preoperative and one postoperative CBCT scan were recorded. Tooth 11 was extracted and the cyst was surgically enucleated. The prepared graft was mixed with hyaluronic acid, covered with a collagen membrane. An implant was placed in the next phase. In the axial section, the surface of the cyst was 41.11 mm2 during the first measurement, 19.24 mm2 during the second measurement, and 15.80 mm2 during the third measurement. Dimensional changes of the alveolar ridge were observed buccoorally in the sagittal section at depths of 1, 3, and 5 mm. An increase in bone tissue volume by 0.50 mm was observed at a depth of 1 mm, at a depth of 3 mm the increase was 1.55 mm, and at a depth of 5 mm an increase of 4.68 mm. Comparing the results before tooth extraction and cyst enucleation and after, it can be seen that the bone volume decreased. By implanting the bone replacement material, the bone volume was preserved. In this case report, the use of a combination of materials is shown to be an excellent choice in treating a bone defect caused by a cystic formation.

Keywords: Bone substitutes; Dental implant; Hyaluronic acid; Cysts

IS PERIODONTITIS RISK FACTOR OF MILD COGNITIVE IMPAIRMENT-A PRELIMINARY STUDY

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Aim: The aim of our study was to explore if periodontitis can be considered as one of risk factors for development of mild cognitive impairment (MCI). **Materials and methods:** This study included 53 individuals diagnosed with periodontitis. Data on patient characteristics, oral hygiene habits (OHH), and quality of life were collected using the OHIP 14 questionnaire (Oral Health Impact Profile). Clinical examination to assess periodontal and hard dental tissues was performed as well as neuropshycological examination. For the cognitive assesment of MCI risk instruments and domains appropriate for the age level were selected: memory functions in verbal and auditory form (Verbal Memory; Digit Span and Digit Span Reverse); psychomotor speed, attention and mental flexibility (TMT (A, B, B-A); Attention Matrices; ZSB). **Results:** Most of participants were female (n=29/53), the median age was 46 (IQR=40-52), and almost all had a high school degree. The median number of teeth of the participants was 26 (IQR=22-30), half of them were

non-smokers and ex-smokers (26/53) and had a family history of periodontitis (n=29/53). Severe forms of periodontitis were the most common among participants (n=39/53). OHH were not satisfactory, while quality of life was rated as good. Of the examined cognitive functions, Digit Span Reverse test showed a borderline result (median=4, 95% CI 4-5, M ≥ 4.33). Significant results are found in the ZSB test, which with its average result (median=35, 95% CI 32-37) deviates from the average (M=47). **Conclusion:** Our results showed that individuals with periodontitis were at higher risk for developing MCI. These results should be justified by a larger sample size.
Keywords: Periodontitis; Cognitive dysfunction; Quality of life; Oral health

A MULTIDISCIPLINARY APPROACH TO THE REHABILITATION OF TRAUMA OF THE OROFACIAL REGION

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Case presentation: Traumas of the facial region represent severe physical injuries. The most common causes of such injuries are falls, traffic, violence, and sports. This case involves a 25-year-old man who was struck in the mouth and nose with his head and fists. Radiologically (CBCT, MSCT), a root fracture of tooth 11, an alveolar fracture of tooth 21, and a fracture of the nasal bone were detected. Clinical examination revealed increased tooth mobility, swollen interdental papillae, laceration of the gingiva and upper lip frenulum. Immediately after the trauma, the patient returned teeth that had been palatally retracted by the impact of the head. On the third day after the injury, wire composite immobilization (13-23) was performed with harmonization of the occlusion. The patient received oral hygiene instructions (teeth brushing, mouth rinsing with chlorhexidine solution). After 14 days, the patient came with symptoms of pain and throbbing. The persistent inflammation of the interdental papilla was found between 21, 22 and on 21, distopalatal probing depth was 15 mm. Subgingival instrumentation and irrigation was performed, the mucopurulent contents were removed, and a systemic antibiotic was administered. This was followed by endodontic treatment and coronal restoration of teeth 11 and 21, in next 10 months. After 7 weeks, the immobilization was removed. At 12 months follow-up, percussive sensitivity of 11, 21 and loss of the interdental papilla between 21, 22 was noted. The patient must be constantly monitored to detect the possible consequences of late complications such as the appearance of cysts or external root resorption.
Keywords: Facial injuries; Tooth fractures; Immobilization; Gingiva

STAGE IV OF PERIODONTITIS: 10 YEARS FOLLOW-UP CASE REPORT

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Case presentation: Periodontitis is a chronic inflammatory disease characterized by loss of clinical attachment and surrounding bone, presence of pockets and bleeding gums. Patient was referred to the Dental Clinic Zagreb due to a painfull and swelling gingiva and mobility of the lower incisors. Poor oral hygiene was observed. Pocket probing depths were > 4 mm and up to 12 mm in the lower frontal teeth which were severely mobile. The vitality test showed that the teeth were not vital. On the basis of the periodontal and radiographic findings stage IV of generalized periodontitis was diagnosed. After endodontic treatment and immobilization of lower incisors a non-surgical treatment was performed as a full-mouth therapy and was supplemented with antibiotics (amoxicilin 500 mg and metronidazol 400 mg, 3 times a day for 7 days). Three months after completion of the non-surgical therapy a re-evaluation was performed and resective surgery with extraction of 32 was undertaken. Regenerative surgical treatment was undertaken after 6 months in the area of 34 using bone substitute material (Bio-Oss, Geistlich) and membrane (Bio Gide, Geistlich). Following treatments, recall appointments were scheduled every 3 months and thereafter every 6 months. The control radiograph after 10 years showed that further bone destruction had stopped, and probing depths were reduced to 3 mm. After appropriate endodontic, periodontal and surgical tretments there has been a notable recovery of the periodontium. This case report shows that over a period of 10 years, a periodontal health can be well maintained without further periodontal support deterioration.
Keywords: Periodontitis; Bone substitutes; Case reports

TOOTH OR DENTAL IMPLANT - CHANGING THE HOPELESS PROGNOSIS: A CASE REPORT

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Case presentation: A tooth presenting more than 50 % of bone loss has a questionable to hopeless prognosis. In addition, if the tooth is multirooted and exhibits furcation involvement, the tooth prognosis downgrades even more toward the hopeless category and extraction treatment. A female patient aged 44 years with severe bone loss at the furcation of tooth 46 (grade III furcation involvement) and insufficient endodontic treatment of the same tooth was referred to our clinic. Tooth 46 had hopeless prognosis and was considered for extraction. The diagnoses of localized periodontitis, grade III, class C and periodontitis apicalis chronica 46 were made. A thorough non-surgical periodontal treatment and endodontic retreatment of tooth 46 were provided, followed by the regenerative periodontal surgery using BioOss and BioGide to manage the advanced bone defect in the furcation of tooth 46. A successful treatment outcome (grade I furcation involvement and complete periapical healing) with a good prognosis was achieved. Maintenance through the supportive treatment phase showed marked bone gain. Teeth with severely compromised periodontium of hopeless prognosis can still be maintained with satisfactory restoration of the function and support despite the baseline unpredicted treatment outcome. Proper selection of an advanced periodontal treatment plan and an adequate endodontic treatment can exclude the option of tooth extraction and prosthetic replacement.
Key words: Periodontitis; Bone substitutes; Root canal obturation; Prognosis

BIOLOGICALLY GUIDED EXTRACTION - BIO EX

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Case presentation: Biologically guided extraction is a tooth extraction concept developed to preserve buccal complex architecture of alveolar ridge. The main goal of the concept is atraumatic tooth extraction, preservation of buccal wall and socket augmentation by using only autologous tissues in one single procedure. Biologically guided extraction protocol is as follows: 1. Root exposition on gingival level, 2. Root fragment separation, 3. Atraumatic extraction of the palatal fragment, 4. Autologous composite graft production, 5. Autologous composite graft socket augmentation, 6. Aplication of PRF protective layer. Biologically guided extraction is minimally invasive tooth extraction concept with excellent clinical results of alveolar ridge preservation.
Keywords: Tooth extraction; Platelet-rich fibrin; Alveolar ridge augmentation

NON-SURGICAL PERIODONTAL THERAPY OF NECROTIZING PERIODONTITIS IN A PATIENT WITH OROFACIAL GRANULOMATOSIS

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Case presentation: Orofacial granulomatosis (OFG) is a clinicopathological entity of unknown etiology that includes various granulomatous conditions and often recurs in episodes. The aim of the therapy was to control the inflammation of the tooth's supporting structures to eliminate one of the risk factors for OFG. To achieve treatment success, a multidisciplinary approach was needed. A 28-year-old female patient, a nonsmoker, without the presence of systemic diseases, was referred to the Department of Periodontology by a specialist in oral medicine, where she was previously treated for OFG, which was confirmed by pathohistological findings. In the initial step of periodontal therapy, the diagnosis of necrotizing periodontitis was determined with detailed medical history and measurement of periodontal indices. The patient received instructions on proper oral hygiene and was continuously motivated during the following visits. Caries and all protruding restorations were treated by a specialist in restorative dentistry. In the second step, non-surgical supra and subgingival removal of hard and soft deposits were performed and adjuvant antibiotic therapy was prescribed. After six weeks of reevaluation we found an improvement in all periodontal indices and significantly better implementation of oral hygiene, and the patient was able to enter supportive therapy and maintenance. **Conclusion:** The long-term outcome will depend on individual risk factors, which should be brought under control during non-surgical periodontal therapy, and in particular, it is necessary to take into account the general health, the patient's cooperation, understanding and persistence in the implementation of correct oral hygiene and regular recall appointments.
Keywords: Periodontitis; Orofacial granulomatosis; Periodontal pocket; Periodontal debridement

QUALITATIVE AND QUANTITATIVE HISTOLOGIC COMPARISON OF SYNTHETIC BIOMATERIAL AND XENOGRAFT IN ALVEOLAR RIDGE AUGMENTATION

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Aim: In the case of atrophy of the alveolar ridge, hard and soft tooth tissues are damaged. Many biomaterials are used for bone regeneration, such as allografts, xenografts,

autogenous bone and synthetic biomaterials. The aim of this research is to gain insights into the regenerative potential of injectable biphasic calcium phosphate (I-BCP). The hypothesis of the study is that I-BCP achieves approximately the same effect in the percentage of new bone formation (NB) compared to xenograft and has an equal histocompatibility. **Materials and methods:** The study included 38 subjects divided into two groups. After tooth extraction, the socket in the test group was filled with I-BCP, and in the control group, the socket was filled with xenograft. After six months of healing, a biopsy was performed. In the pathohistological analysis, the response of the tissue to the biomaterial was evaluated, while the percentage of NB, residual biomaterial and soft tissue was determined histomorphometrically. **Results:** Qualitative results of both biomaterials showed osteocytes in NB, while osteoblasts were found at the interface between NB and residual biomaterial. The proportion of NB was 39.91 ± 8.49 % for I-BCP, residual biomaterial 28.61 ± 11.38 % and soft tissue proportion 31.49 ± 11.09 %. The proportion of NB in xenograft was 41.73 ± 13.99 %, residual biomaterial 31.72 ± 15.52 %, while the soft tissue proportion was 26.54 ± 7.25 %. **Conclusion:** We can conclude that there is no statistically significant difference between the examined and the control group regarding NB (p = 0.629).

Keywords: Alveolar ridge augmentation; Biocompatible materials; Calcium phosphate; Bone regeneration

CALCULATION AND VISUAL PRESENTATION OF PERIODONTAL INFLAMED SURFACE AREA IN PATIENTS WITH STAGE III PERIODONTITIS

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Case presentation: Periodontal inflamed surface area (PISA) is a numerical variable expressing the inflamed periodontal tissue. It is calculated using clinical attachment level, recession and bleeding on probing measurements. PISA was originally developed to quantify the inflammatory burden of periodontitis. This poster presentation aims to present (i) clinical characteristics, (ii) the PISA score calculation of two periodontitis stage III patients with diverse clinical disease presentation at the time of the examination and (iii) a visual presentation of the PISA score, i.e. the inflamed surface. The two presented patients were referred to the Department of Periodontology, School of Dental Medicine, University of Zagreb, for treatment of periodontitis. A comprehensive periodontal examination (full mouth charting, clinical photographs) was performed, and panoramic x-rays were taken. PISA values were calculated with a free online tool available for research purposes. The calculated PISA scores were 1248,6 and 2950,7 mm2, respectively. The PISA scores calculated for the two patients correspond to the previously reported inflamed surface in severe periodontitis. As PISA scores represent the periodontal wound, the calculation of the score and the visual presentation of this value may serve as a patient education and motivation method in everyday clinical practice and not only as a valuable research tool.

Keywords: Periodontitis; Inflammation; Periodontal index

STRONG ORAL MALODOUR IN A PATIENT WITH PERIODONTITIS: ANALYSIS OF POSSIBLE CAUSATIVE FACTORS

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Case presentation: Halitosis is an unpleasant smell emanating from the oral cavity. In 80-90% of cases, halitosis originates from the oral cavity. As such, halitosis is mainly in the treatment domain of doctors of dental medicine. However, the lack of awareness and knowledge among dental and medical healthcare professionals often leads to misdiagnosis and unnecessary invasive medical procedures, e.g. gastroscopies. This case report analyses possible sources of halitosis in a male patient, 46 y/o, coming to the Department of Periodontology School of Dental Medicine Zagreb upon personal insistence due to persistent halitosis after extensive medical testing and lack of diagnosis. Halitosis was evaluated subjectively as strong (organoleptic score 4/5, Rosenberg & McCulloch scale). The patient was a systemically healthy non-smoker with no symptomatic illnesses of extraoral organs and organ systems that may be causative to halitosis. Upon periodontal examination, he presented with pocket depths up to 8mm, FMBS=88 % and FMPS=93 %. The microbiological analysis of subgingival plaque samples showed significantly increased concentrations of red and orange complex species (Pg, Td, Tf, Pi, Pm). Tongue coating was scored as WTCI = 12. Possible mechanisms causative to halitosis in the specific population of patients with periodontitis are various. The patient described in this case report presented several factors associated with halitosis in patients affected by periodontitis: poor oral hygiene, generalised gingival inflammation, deep periodontal pockets, high concentration of anaerobic gram-negative, VSC-producing bacteria and abundant tongue coating. Effective halitosis treatment presumes correct diagnosis and addressing each of these factors by mechanical and chemical means.

Keywords: Periodontitis; Halitosis; Inflammation; Bacteria

ABSENCE OF SUPPORTIVE PERIODONTAL TREATMENT DURING THE COVID-19 PANDEMIC – RECURRENCE OF PERIODONTAL INFLAMMATION

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Case presentation: Supportive periodontal care (SPC) is defined as step IV by the 2020 and 2022 EFP Guidelines for the treatment of periodontitis stages I-IV. SPC aims to maintain periodontal stability after active periodontal treatment is finished and the endpoints of periodontal therapy are achieved. SPC presumes preventive and therapeutic procedures performed at individualised, patient-based intervals. This case report describes a patient, 43 y/o female, with diagnoses of generalised periodontitis stage IV, grade C and periodontal health on reduced periodontium who was enrolled in long-term SPC provided at 3 – 4-monthly intervals. During the COVID-19 pandemic, the patient did not report for regular SPC due to personal fears of the contagion. After 20 months of absence, the patient was admitted for SPC. The comprehensive periodontal exam showed excellent oral hygiene (FMPS=7%), the presence of five 4 and 5 mm pockets and relapse of periodontal inflammation (FMBS=42%). The affected areas were mostly in the lower jaw. As periodontitis is a chronic disease, patients need to be continuously monitored. SPC reduces the probability of disease progression and tooth loss, as timely re-treatment can be provided in cases of disease recurrence. Various factors can contribute to disease relapse. In terms of the described patient, despite good oral hygiene, factors such as psychological stress and unhealthy living habits experienced during the COVID-19 pandemic might have negatively impacted the innate host response and led to disease relapse.

Keywords: COVID-19; Inflammation; Periodontitis; Case reports

VERTICAL AUGMENTATION OF THE ALVEOLAR RIDGE BY THE TECHNIQUE OF GUIDED BONE REGENERATION USING A RESORBABLE MAGNESIUM MEMBRANE: A CASE REPORT

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Case presentation: Lack of bone volume either vertically or horizontally may prevent prosthetically guided implant placement. Guided bone regeneration is the best documented surgical technique in the literature for alveolar bone regeneration. Membranes developed for this technique can be divided into two groups: resorptive and non-resorptive. The magnesium-based membrane (NOVAMag®) is a new resorptive membrane that has improved properties compared to most other resorptives: excellent mechanical properties and a reduced possibility of the membrane collapsing within the bone defect. After completing orthodontic therapy, the patient comes to the office to compensate for the loss of a frontal tooth in the maxilla. Analysis of CBCT revealed a lack of bone in horizontal and vertical dimensions. The bone defect was regenerated using magnesium-based resorptive membrane (NOVAMag®) and a composite bone graft consisting of a majority of autologous bone and a smaller percentage of xenogeneic bone. The membrane was fixed with magnesium-based resorptive screws (NOVAMag® fixation screw). In order to achieve an optimal soft tissue profile, xenogenic collagen matrix (mucoderm®) was placed over the membrane. The flap was sewn in two layers. Clinically, after five months of healing at the augmentation site, a satisfactory volume of bone and soft tissue was achieved, and control CBCT confirmed the regeneration of the labial and palatal cortex of the alveolar ridge. **Conclusion:** This case report describes the use of new magnesium-based resorptive membrane for vertical augmentation of alveolar ridge. After five months of healing, bone regeneration at the augmentation site was confirmed clinically and radiologically.

Keywords: Alveolar ridge augmentation; Biocompatible materials; Bone regeneration

BUCCAL WALL AUGMENTATION WITH RESORBABLE MAGNESIUM MEMBRANE WITH IMMEDIATE IMPLANT PLACEMENT: CASE REPORT

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Case presentation: Immediate implant placement with an immediate provisional on the implant is the most acceptable therapeutic solution for the patient. Early implant

placement 4-8 weeks after tooth extraction with bone regeneration or immediate implant placement with bone regeneration are two options used when the prerequisite for immediate implant placement is missing, namely an intact buccal wall with a minimum thickness of 1 mm. The aim of this work is to demonstrate immediate implant placement with augmentation of the buccal wall with a new resorbable magnesium membrane. The patient came to the surgery because of residual tooth root of the maxillary second premolar. The therapy plan was the immediate implantation. CBCT revealed residual tooth root of the maxillary second premolar with very thin buccal wall. After lifting the mucoperiosteal flap and showing residual tooth root, the tooth root was extracted and an implant was immediately placed in that place. A magnesium-based resorptive membrane (NOVAMag®) was placed to preserve original width of the buccal wall. The xenograft (cerabone®) was placed between the outer surface of the buccal wall and the membrane and between the implant and the inner surface of the buccal wall. The diaphragm was fixed with magnesium-based resorbable screws (NOVAMag® fixation screw). A xenogenic collagen matrix (mucoderm®) was placed above the membrane for the purpose of soft tissue augmentation. **Conclusion:** The technique of augmentation and immediate implant placement demonstrated in this case improves architecture of the alveolar ridge after extraction and aesthetic outcome of the future prosthetic restoration.

Keywords: Alveolar ridge augmentation; Biocompatible materials; Bone regeneration, Dental implant

PERIODONTAL APPROACH IN THE SURGICAL TREATMENT OF ODONTOMA - OSSEOUS DEFECT REGENERATION USING AUTOGENOUS BONE AND PRF (FOUR YEARS FOLLOW-UP)

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Case presentation: Odontoma is a benign, often asymptomatic odontogenic tumour, most commonly originating from mesenchymal and epithelial cells. Surgical enucleation is a definite treatment method. This case report describes a patient, male, 33 y/o, referred to the Department of Periodontology, Clinical Department of Dental Medicine, UHC Zagreb, after an accidental OPG discovery of an unknown, odontoma-like structure in the anterior region of the first quadrant. Clinical examination showed a toothlike structure protruding buccally from the soft tissue. A CBCT scan confirmed a retained 13 and a buccally located odontoma in the region of teeth 12 and 14. The treatment of choice was periodontal minimally invasive surgical access and enucleation of the odontoma. The bone defect was filled with autogenous bone and covered with a PRF membrane. Postoperative healing was undisturbed, and sutures were removed after 14 days. The control x-ray showed a remaining odontoma particle. The patient was regularly followed up for four years and underwent prosthodontic treatment with a fixed metal-ceramic bridge. At four year follow-up, the surgical area presented without scarring and with healthy gingiva and physiological probing depths around the prosthetic appliance. The control CBCT showed a stable odontoma particle with no recurrence and appropriate healing of the osseous defect. A periodontal surgical approach to soft and hard tissue conditions and pathologies leads to desired surgical and aesthetic outcomes. As such, it should be the approach of choice, particularly in the aesthetic region.

Keywords: Odontoma; Bone substitutes; Platelet-rich fibrin; Case reports

NONSURGICAL PERIODONTAL THERAPY AS A CORNERSTONE IN PREPROSTHETIC PREPARATION IN COMPLEX ORAL REHABILITATION CASES – TWO YEARS FOLLOW-UP

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Case presentation: A multidisciplinary approach, with a particular emphasis on preprosthetic preparation, is of utmost importance in comprehensive oral rehabilitation cases. However, this step is often bypassed due to the doctors' lack of knowledge and necessary skills and the patient's time and financial capabilities. A patient, 62 y/o, male, motivated to preserve his teeth, was referred to a periodontal specialist for a consult. The patient was not in accord with a previous treatment proposal of total exodontia and implant-supported fixed prostheses. Severe periodontitis was diagnosed by comprehensive periodontal examination, full-mouth charting, and radiological diagnostics. The patient, a non-smoker, was systemically healthy and was not under any medical therapy. The proposed alternative treatment included active periodontal treatment and subsequent maintenance of teeth for tooth-supported fixed prosthesis. Several teeth underwent endodontic treatment. Following nonsurgical periodontal therapy, a temporary bridge was made. Upon reevaluation, treatment endpoints were mostly met - specific sites were indicated for regenerative surgery. The minimally invasive regenerative surgical approach included the use of enamel matrix proteins, bone substitutes and collagen membranes. The final prosthetic appliance was delivered after an adequate healing period, in total six months from the beginning of treatment. The patient is regularly followed-up. Preserving teeth through nonsurgical (and, if needed, surgical) treatment should always be the first treatment of choice in pre-prosthetic preparation and not an alternative in cases where the patient disagrees with multiple teeth extraction and implant-prosthetic treatment. In addition, all periodontal and implant patients should regularly be followed through supportive treatment.

Keywords: Dental implants; Periodontitis; Enamel matrix proteins; Bone substitutes

DIGITAL TOOLS IN IMPLANTOLOGY AND FIXED PROSTHODONTICS-A CASE REPORT

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Case presentation: The development and improvement of digital tools in implantology and fixed prosthodontics has simplified the diagnostic procedures, planning, therapeutic performance, impression taking, design and manufacturing of temporary and final prostheses. Technologies such as CBCT, intraoral scanning, CAD/CAM and 3D printing greatly contribute to this process. The integration of these tools provides us improvements in quality of procedures, efficiency and reduced costs. In all types of procedures, detailed diagnostics and treatment planning are a must to achieve optimal results. In implant dentistry, we often find the need for augmentation of hard and soft tissues. Implantation using a template reduces the duration of procedures, gives us more time for quality augmentation, and ensures placement of the implants in perfect positions. 3D printing technology allows us to make temporary crowns in one day so that the patient is restored shortly after the procedure. Finally, tools such as intraoral scanners and CAD-CAM facilitate the creation of high-precision aesthetic prostheses. The selected case is a patient who lost a front tooth due to an accident and came with a worn out temporary bridge in the upper front maxilla. The case was solved using implants and fixed prostheses with the help of previously described techniques. By using digital tools in all phases of therapy, it is possible to reduce morbidity and duration of procedures, increase precision and obtain aesthetic results.

Keywords: Dental implants; Tooth loss; Computer-aided design

REGENERATIVE PERIODONTOLOGY THERAPY WITH THE TECHNIQUE OF PRESERVING THE WHOLE PAPILLA WITH THE USE OF BONE SUBSTITUTE MATERIAL AND HYALURONIC ACID

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Case presentation: Regenerative periodontal therapy enjoys the privilege of constant progress with the help of new techniques and regenerative materials that enable a better outcome for the patient. Considering the technical complexity of the execution and the high cost of the materials, it is necessary to carefully select patients for such procedures. A 47-year-old female patient, non-smoker and without systemic diseases, was referred to the Department of Periodontology by the primary dentist due to inflammation and bleeding of the gingiva. Generalized periodontitis, stage III, grade B, was determined by specialist examination, detailed history, radiological analysis, and measurement of periodontal indices. We instructed the patient to perform oral hygiene correctly, and the non-surgical phase was performed using mechanical and manual instruments. After two months, the patient came for re-evaluation, which showed an improvement in all periodontal indices, but in teeth 33 and 33, and 42 and 43, the pockets were still active with bleeding during probing and purulent suppuration. The patient was referred for endodontic treatment of vital teeth 41, 42 and 32. Given that the patient was very cooperative, regular at check-ups, and with excellent oral hygiene, we were able to decide on regenerative periodontal surgery for vertical intraosseous defects in the affected areas. We chose a new regenerative technique to preserve the entire papilla with bone substitute material in combination with hyaluronic acid. At the control after 3 months, we see a stable result with further healing of the supporting tissues. Properly performed non-surgical periodontal therapy with the patient's excellent cooperation resulted in the possibility of implementing advanced regenerative therapy to improve the clinical outcome and preserve the teeth.

Keywords: Regeneration; Periodontitis; Bone substitutes; Hyaluronic acid

LOSS OF TOOTH DUE TO PERIODONTAL ABSCESS

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Case presentation: Periodontal abscess is the third most prevalent dental emergency, caused by the lack of drainage from the periodontal pocket. The patient was admitted with a painful swelling on the tooth 13. In the dental history he denied any painful symptoms before the appearance of the swelling. The tooth was crowned 7 years ago, and alongside tooth 27 it is the only remaining tooth in the maxilla. Both teeth were supporting a mobile denture. A cavity was noticed alongside the edge of the crown, and the tooth was treated with suspicion of dental necrosis. During the drilling procedure it was noticed that the tooth was vital and a periodontal abscess diagnosis was determined. Klavocin bid was prescripted, and endodontic treatment was done in two visits. Periodontal pocket depth was determined to exceed 8 mm at 6 sites. Scaling was performed with a piezoelectric device (Kavo Piezoled) and irrigation was done with 3% H2O2 and saline. Two weeks after the procedure patient was admitted with a repeated abscess of the tooth 13. Due to the recurrence of swelling, poor oral hygiene and questionable ability of the tooth to retain its role of being one of only two carriers of a denture, it was extracted. There is no question that the main cause of the tooth loss was the lack of previous periodontal treatment.
Keywords: Tooth loss; Periodontitis; Periodontal abscess

AUTOLOGOUS DENTIN GRAFT FOR ALVEOLAR RIDGE AUGMENTATION – 2 YEARS FOLLOW-UP OF CLINICAL STUDY

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Aim: The aim of this pilot clinical study was to assess efficacy and predictability of dentin particulate autograft as regenerative treatment for alveolar ridge augmentation and two stage implant placement using CBCT radiographic analysis. **Materials and methods:** The sample of presented study consisted of 8 patients, with insufficient width of alveolar ridge in lateral lower jaw. After surgical removal of third molar or periodontally compromised tooth, a dentin autograft was prepared according to manufacturer recommendations. Clean extracted teeth were dried and ground in a sterile chamber of the Smart Dentin Grinder® unit (KometaBio Inc., Cresskill, USA). The particulate teeth were immersed in a basic alcohol cleanser to dissolve all organic remnants and bacteria and dehydrated. The particles were rinsed twice with sterile phosphate-buffered saline solution. The platelet-rich fibrin (PRF) membranes were prepared. Graft material was used for ridge augmentation and covered with PRF membranes. After 5 months of healing CBCT scan were made. During implants placement homogeneous integration of dentin particulate was found. Dental implants (BEGO Semados® SC BEGO, Germany) were inserted and restored by titanuim abutment and zirconia crown. **Results:** Clinical re-entry, pripor to dental implants placement confirmed a homogeneous integration of dentin autograft and bone-like appereance in former grafted area. Six months after implants placement CBCT scans were obtained as part of the standard procedure. The radiographic images of the target areas revealed no grafted bone resorption around the implants. All patients were followed for 6, 12 and 24 months after loading through clinical follow-ups and control CBCT scans. No resorption of the autograft arround inserted implants were found. **Conclusion:** Within its limitation, the present pilot clinical study revealed that autologous dentin particulate autograft may serve as an alternative autologous bone substitute to support alveolar ridge augmentation and two-stage implant placement.
Keywords: Alveolar ridge augmentation; Dental implants: Bone regeneration; Pilot study