Book of abstracts of the 9th Croatian Periodontology Days 2025 congress

September 25-27, 2025, Zagreb, Croatia

Organized by: Croatian Society of Periodontology

President of the Congress: Davor Kuiš

Editor of the book of abstracts: Ivan Puhar

Organizational board:
Davor Kuiš, Ana Badovinac, Marija Roguljić, Larisa Musić, Matej Tomas, Goran Žurić, Ivana Milić, Darija Vlašić Kaić, Dario Bojčić, Mia Rakić (Serbia), Antonio Linares (Spain), Andrea Pilloni (Italy)

Scientific board:
Davor Kuiš, Jelena Prpić, Domagoj Vražić, Ivan Puhar, Darko Božić, Ivan Ćatović, Mia Rakić (Serbia), Antonio Linares (Spain), Andrea Pilloni (Italy)

Invited lectures

SOLVING SOFT TISSUE PROBLEMS AROUND TOOTH AND IMPLANT SUPPORTED RESTORATIONS

Ali Çekici*
Department of Periodontology, School of Dentistry, Istanbul University, Istanbul, Turkey

Teeth or implant supported prosthetic and aesthetic restorations are in close relation with the surrounding soft tissues. It is important to manage possible complications for long term success. Treatment planning is the key to avoid such adverse outcomes. In this lecture, the causes of the most common periodontal and peri-implant soft tissue problems will be addressed. Through clinical case presentations and evidence-based approaches, attendees will gain practical insights into maintaining soft tissue health around restorations, leading to improved treatment outcomes.

Keywords: Dental Implants; Peri-Implantitis; Periodontitis

GUIDED ORTHO MUCOGINGIVAL THERAPY (GOMT) FOR IMPROVING ESTHETICS IN THE PERIODONTAL PATIENT SEVERE PERIODONTAL DISEASE AND ITS TREATMENT PRODUCES A COMPROMISED ESTHETIC SÉQUELA

Antonio Linares*
Unit of Periodontology, School of Medicine and Dentistry, University of Santiago de Compostela, Santiago de Compostela, Spain.

Mesial and distal recessions are the main actors of black triangles in the periodontal patient. The GOMT is a new interdisciplinary protocol for the treatment of class 3 / RT2 recessions in anterior teeth of periodontal patients. This innovative protocol consists of performing mucogingival surgery with tunnel connective tissue graft during orthodontic tooth movement. Not before and not after, but during. We are moving the tooth with a connective tissue graft aiming for root coverage, not only buccal but also mesial and distal where the black triangles are present. This orthodontic tooth movement is an intrusion and palatal torque of the root, similar to what occurs with the BOPT concept. Leave space for the soft tissues to advance coronally, but first thicken them.

Keywords: Esthetics; Orthodontic Appliances; Tooth Movement Techniques; Periodontal Attachment Loss

MULTIDISCIPLINARY APPROACH TO SOLVE TERMINAL DENTITION USING THE ALL-ON-4 METHOD - DIGITAL APPROACH

Damir Jelušić*
Institute Dentalna Jelusic, Opatija, Croatia

Terminal dentition or situations in which periodontally compromised teeth are extracted represent a great challenge in clinical practice. Tooth displacement, their mobility, soft tissue retraction and long clinical crowns are just some of the elements that need to be considered when planning future rehabilitation. All these aspects are defined as prosthetic aspects, against which all aspects of a surgical nature stand. Alveolar process resorption, the presence of inflammation, the possibility of implant placement, the type of implant, the size of the abutments are elements that define the direction of rehabilitation. A multidisciplinary approach to solving such complex clinical situations requires detailed diagnostics and a treatment plan. A modern approach to diagnostics and planning such complex rehabilitations is the creation of a digital clone of the patient. A clone or avatar combines all relevant information on the basis of which treatment planning is approached, as well as communication with the patient. Smile design is the first step of such a multidisciplinary approach, it represents the reference value and framework of the entire therapy. This is followed by virtual, prosthetically guided implant placement and ultimately the realization of the virtual plan. A predictable way of realizing a virtual plan actually represents the path to sure success. In doing so, we can use various aids, such as surgical guides. On the other hand, dynamic navigation currently represents the safest and most flexible way of transferring a digital plan into reality. During the lecture, a multidisciplinary concept in the realization of implant-prosthetic rehabilitation using the All-on-4 method with a completely digital approach to therapy will be presented.

Keywords: Dental Implants; Esthetics; Image Processing, Computer-Assisted

THE TIMING OF ORTHO-REGENERATIVE PERIO IN ADVANCED CASES

Daniele Cardaropoli[1*], Lorena Gaveglio[2*]
[1]*Department of Periodontology, University of Torino, Italy*
[2]*Private Practice for Periodontology and Orthodontics, Torino, Italy*

Advanced periodontitis may be characterized by the formation of infrabony defects adjacent to pathologically migrated teeth. In such cases, the ortho-perio interdisciplinary approach is an option. Literature supports tooth movement into infrabony defects aiming to defect closure, bone fill and possibly new attachment formation. Augmentation procedures also can be added. During the lecture, implications and timing for orthodontic movement into infrabony defects will be addressed.

Keywords: Orthodontic Appliances; Tooth Movement Techniques; Guided Tissue Regeneration, Periodontal

LIVE SURGERY & DISCUSSION: GUIDED SURGERY WITH SIMULTANEOUS BONE AND SOFT TISSUE RECONSTRUCTION

Darko Božić*
Department of Periodontology, School of Dental Medicine, University of Zagreb; University Hospital Centre Zagreb, Zagreb, Croatia

Digitally guided implantology is increasingly assuming its role in everyday work. However, in addition to prosthetically correct placement of implants, patients often have soft and hard tissue defects. In this surgery, it will be shown how to properly plan the implant therapy and at the same time do the reconstruction of hard and soft tissues in a simplified way without taking autogenous tissue.

Keywords: Dental Implants; Collagen; Bone Resorption; Alveolar Bone Loss

RELATION BETWEEN PERIODONTITIS AND SYSTEMIC DISEASES

Elena Figuero*
Department of Periodontology, School of Dentistry, Complutense University of Madrid, Spain

The purpose of this lecture is to present the evolution of our knowledge in the microbiology of periodontal diseases and its etio-pathogenic impact. We shall also elaborate in the scientific evidence of bacteremia in periodontitis patients and the possible impact of this

bacterial translocation in the initiation and progression of systemic diseases. We shall pay special emphasis in the relation between periodontitis and diabetes, cardiovascular diseases and neuropsychiatric diseases. Educational Objectives: Participants in this lecture should learn how to understand how bacterial translocation from the subgingival biofilm may have an impact in many systemic diseases, specifically during diabetes, cardiovascular diseases and in neuropsychiatric disorders.
Keywords: Periodontitis; Bacteremia; Diabetes Mellitus; Cardiovascular Diseases

MANAGEMENT OF PERI-IMPLANTITIS IN THE AESTHETIC ZONE

Frank Schwarz*
Department of Oral Surgery and Implantology, Johann Wolfgang Goethe-University, Carolinum, Frankfurt an Main, Germany.

The management of peri-implantitis cases in aesthetically demanding areas is a highly relevant clinical challenge due to the increased risk of mucosal recessions subsequent to the treatment. The lecture will elaborate on the remodeling process that peri-implant tissue undergoes following the surgical peri-implantitis treatment. It will further address the step-by-step surgical treatment protocol for the management of peri-implantitis cases in the aesthetic zone and the rationale for soft-tissue grafting as part of the treatment protocol. Clinical scenarios resulting in unacceptable aesthetic outcomes requiring implant removal and the "second-round" implant planning will be further discussed.
Keywords: Peri-implantitis; Esthetics; Dental Implants

HOW TO INFLUENCE THE ORAL MICROBIOME IN PERIODONTAL THERAPY: FROM RESEARCH TO DAILY PRACTICE

*Giordano Bordini**
Private practice, Milan, Italy

Recent evidence shows that periodontal disease is a consequence of destructive host immune responses to pathogenic bacterial species resulting from the dysbiosis of oral microbiota. Therefore, there has been a continuing interest in assessing the composition and assembly of the subgingival microbiota associated with health and disease. Today we have multiple mechanical and chemical strategies and validated protocols to combat this dysbiosis and treat the disease it causes. Similarly, non-surgical therapy is increasingly effective and less invasive. It is therefore necessary to know the new therapeutic solutions: combat the disease with an "ecological" approach and minimize the patient's "discomfort" during the entire treatment process up to long-term maintenance.
Keywords: Periodontitis; Bacteria; Dysbiosis; Therapy

PRACTICAL IMPLEMENTATION OF NEW THERAPEUTIC GUIDELINES IN EVERYDAY CLINICAL PRACTICE

Ivan Ćatović*
Dental Clinic Ćatović, Pula, Croatia

Periodontitis is one of the most widespread, yet preventable diseases on a global scale, which can have serious health consequences and a negative impact on quality of life. Although many clinicians decide to extract teeth and place implants, it is important to understand that the treatment of complications around implants is significantly more complex and less predictable than the treatment of periodontally affected teeth. Today, we have clear, science-based guidelines that can help us plan therapy and create standardized periodontal care. A correct understanding of the biological principles, development and progression of periodontal disease, as well as the design of simplified protocols, are key to successful treatment. This lecture will explain minimally invasive non-surgical and surgical concepts, flap design, effective materials, and how to properly implement postoperative care and the maintenance phase.
Keywords: Periodontitis; Minimally Invasive Surgical Procedures; Dental Implants

SLEEP APNEA - THE ROLE OF DENTISTS AND ORTHODONTISTS

Juan Martin Palomo*
School of Dental Medicine, Case Western Reserve University, Cleveland, Ohio, United States

With more than 80 respiratory disorders, the dentist can play a big role helping children and adults, especially regarding Obstructive Sleep Apnea (OSA). This presentation will show how the dentist can help identify and manage OSA in pediatric and adult patients, the difference between treatment and management, the potential effects or orthodontic treatment, and possible solutions. As healthcare providers, there is a lot more that we can do to our patients, but this does not mean that it need to interfere with the efficiency and the practice flow already in place.
Keywords: Sleep Apnea, Obstructive; Orthodontic Appliances; Orthodontists

PERIODONTICS 2040

Leena Palomo*
Department of Periodontology & Implant Dentistry, NYU College of Dentistry, New York, United States

Inflammation is at the heart of the oral-systemic link. As patients live longer, more vibrant lives, often managing chronic health conditions with long term medications and other strategies, they seek the quality of life by investing their periodontal care: esthetics, comfort and function. Additionally, an expanding global middle class demands quicker, cheaper and more predictable outcomes. These increasingly sophisticated cases can be treated through multidisciplinary and interdisciplinary teams with a periodontist at the center driven by evidence and science. This presentation explores patient cases which bring research and technology to chairside application.
Keywords: Inflammation; Quality of Life; Dentists

TREATMENT PLANNING FOR PATIENTS WITH STAGE IV PERIODONTITIS

Marija Roguljić*
School of Medicine, University of Split, Split, Croatia

Patients with stage IV periodontitis present a challenge to therapists because a long-term and interdisciplinary approach to treatment is required. The most significant features of stage IV periodontitis are extensive loss of supporting tissues and tooth loss as the terminal outcome of the disease. For this reason, patients consequently have impaired mastication, phonation and aesthetics. In such cases, in addition to implementing all phases of periodontal therapy with the aim of eliminating and controlling inflammation of the supporting tissues, additional therapy is also necessary: conservative, orthodontic, prosthetic or implant-prosthetic therapy. The lecture will present recommendations for treatment according to currently valid clinical guidelines and show clinical cases as examples of successful interdisciplinary interventions in patients with stage IV periodontitis.
Keywords: Periodontitis; Therapy; Dental Implants; Prosthodontics

THE GAME CHANGER IN PERI-IMPLANTITIS MANAGEMENT

Mia Rakić*
Robert K. Schenk Laboratory of Oral Histology, Department of Periodontology, School of Dental Medicine, University of Bern, Bern, Switzerland

Dental implants are gold standard treatment for replacement of the missing teeth based on their highly biomimetic concept regarding both functional and aesthetic aspects. Guided by this fact, dental implants were considered for years as counterparts of natural teeth, and were thus clinically treaded according to clinical protocols adopted from periodontology. Today, peri-implantitis is defined as a public health problem due to increasing prevalence and lack of predictive treatment which made clear that specificities of the peri-implant biology decrease the potency of periodontal protocols on implants. Implant surface is intrinsic factor in success of the osteointegration and overall implant therapy but in case of peri-implant infection. The acid environment in peri-implantitis as well as chemical and mechanical manipulations during clinical procedures can alter original surface characteristics and cause seria of serious consequences behind ineffective treatment, disease recurrence and even implant failure. This lecture will address major aspects of titanium implant surface concept, its alteration in peri-implantitis, related clinical consequences and considerations.
Keywords: Dental Implants; Peri-implantitis; Titanium

WHAT IS NEW IN PERIODONTAL DIAGNOSTICS AND TREATMENT?

Moritz Kebschull*
Division of Periodontology & Oral Rehabilitation, School of Dentistry, University of Birmingham, United Kingdom

Over the last years, state-of-the-art periodontal therapy has been re-defined by the new classification scheme and the international EFP S3-level Clinical Practice Guidelines. Based on these foundations, this lecture will go further and look at what current, up-and-coming developments are out there for the prevention, early diagnosis, improved patient stratification and better treatment of periodontal diseases - and how much data exists that these actually work. So, possibly forecasting the next generation of guidelines.
Keywords: Periodontitis; Therapy; Diagnosis, Oral

HOW MANY OF OUR PATIENTS HAVE DENTINE HYPERSENSITIVITY, EROSIVE TOOTH WEAR, GINGIVITIS AND GINGIVAL RECESSION, AND WHAT ARE THE ASSOCIATED RISK FACTORS?

Nicola Xania West*
Periodontology, Bristol Dental School, United Kingdom

The aim of this presentation is to give members of the dental team a greater understanding of the prevalence of oral condition across 7 European countries. Attendees will be able to: understand the prevalence of erosive tooth wear and dentine hypersensitivity in 7 European countries and gain knowledge on periodontal health and toothbrushing habits. Attendees will understand the importance of recognising oral diseases and conditions early; how prevalent these oral conditions are in the population and the relevance of explaining the risk factors associated with these oral conditions to patients.

Keywords: Dentin Sensitivity; Gingival Recession; Tooth Erosion; Risk Factors

ASSESSMENT OF THE EFFICACY OF ANTIMICROBIALS IN TREATING BIOFILM-INDUCED PERIODONTAL DISEASES

Rok Gašperšič*
Department of Oral Medicine and Periodontology, Faculty of Medicine, University of Ljubljana, Slovenia

The use of antimicrobial agents (antiseptics, antibiotics and probiotics) as an adjunct to conventional treatment regimens for periodontitis is currently the subject of controversy. Their use is often criticised due to the development of bacterial resistance, persistent side effects and insufficiently defined indications. Empirically prescribed antibiotic and antiseptic protocols serve as the primary means of evaluating the efficacy of antimicrobial therapy and show minimal change in average clinical measures such as probing pocket depth, which is usually less than 1 mm and whose value is questionable due to its limited direct impact on clinical practise. On the other hand, extensive research into the effect of different antimicrobials in validated in vitro models has led to new insights into the selective effect of certain formulations on symbiotic and pathobiont strains. While some antiseptic formulations inhibit the progression of dysbiosis and improve periodontal therapy, others may exacerbate dysbiosis and promote antibiotic resistance. Emerging personalised antimicrobial selection is a promising strategy to improve clinical outcomes in periodontal therapy. This presentation will provide an overview of recent advances in antimicrobial therapy for biofilm-induced periodontal disease based on findings from our current research projects.

Keywords: Periodontitis; Dysbiosis; Anti-Bacterial Agents; Probiotics

Oral presentations

HOW EFFECTIVE IS CHLORHEXIDINE IN CONTROLLING PLAQUE, GINGIVITIS AND BACTERIAL ENDOTOXIN ACTIVITY DURING ORTHODONTIC TREATMENT?

Matea Tomljanović[1,2], Matea Badnjević[1,2], Vjera Perković[1], Višnja Katić[1], Mia Uhač Ludvig[1], Stjepan Špalj[1,3*]
[1]*Department of Orthodontics, Faculty of Dental Medicine, University of Rijeka, Rijeka, Croatia*
[2]*PhD Student, Faculty of Medicine, University of Rijeka, Rijeka, Croatia*
[3]*Department of Dental Medicine, Faculty of Dental Medicine and Health, J. J. Strossmayer University of Osijek, Osijek, Croatia*

Background: Endotoxin, a complex lipopolysaccharide found in the outer cell wall of gram-negative bacteria, adheres to orthodontic brackets and contributes to inflammation of the surrounding gingival tissues. This study aimed to evaluate the effects of chlorhexidine (CHX) mouthwash and orthodontic appliance material on plaque control, gingival inflammation, and subgingival endotoxin activity during the initial phase of orthodontic treatment with multibracket fixed appliances.

Materials and methods: Sixty-eight participants (aged 12–18 years; 50% female) were randomly assigned to groups based on appliance material (metal or non-metal) and CHX usage. Clinical parameters including plaque index, gingival index, and subgingival endotoxin activity were recorded at baseline (T0) and two months after appliance placement (T1).

Results: There were no statistically significant differences in changes from T0 to T1 in endotoxin activity and periodontal indices between the metal and non-metal appliance groups, irrespective of CHX use. Multiple regression analysis indicated that, after adjusting for sex, appliance material, and CHX use, the key predictors of gingivitis at T1 were increased endotoxin activity ($p = 0.004$), higher plaque index ($p = 0.005$), and older age ($p = 0.043$).

Conclusion: The early impacts of metal and nonmetal orthodontic appliances on gingival inflammation and plaque accumulation are comparable, with changes in the extent of gingivitis linked to endotoxin levels rather than appliance type or CHX use. Although adjunctive therapies might be beneficial in reducing plaque and gingival inflammation, antiseptic mouth rinses must always be used as adjuncts for mechanical plaque control, and orthodontists should emphasize this approach to patients.

Keywords: Endotoxins; Dental plaque; Orthodontic Appliances, Fixed

PSEUDOHALITOSIS: CHALLENGES IN RECOGNITION AND DIAGNOSIS: A REPORT OF FOUR CASES

Larisa Musić[1*], Kristina Medved[2], Ivan Puhar[1], Domagoj Vražić[1], Božo Radić[3]
[1]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[2]*Clinical Hospital Merkur, Zagreb, Croatia*
[3]*Polyclinic Amruševa, Zagreb, Croatia*

Aim: To present four cases of pseudohalitosis and analyze anamnestic similarities, to emphasize the importance of timely and accurate recognition as well as an appropriate treatment approach.

Clinical procedure: Four female patients, aged between their twenties and early thirties, were referred to a periodontist by a gastroenterology specialist for examination and evaluation due to subjective complaints of halitosis persisting for at least one year. Anamnesis revealed that all patients had previously undergone multiple medical diagnostic procedures, including gastroenterological, pulmonological, otorhinolaryngological, and dental assessments, none of which identified a cause of halitosis. In all four cases, the onset of symptoms was associated with a personal or traumatic event. Clinical examination confirmed periodontal health, good oral hygiene habits, and minimal or absent tongue coating. Measurement of volatile sulfur compounds using an OralChroma device showed values below the detection threshold of the human nose, which was further corroborated by organoleptic assessment.

Results: Despite a strong subjective perception of malodor, objective parameters did not confirm the presence of halitosis. All patients were diagnosed with pseudohalitosis. Management consisted of providing detailed patient education regarding the nature of the condition and referring patients for psychological support in cases of persistent complaints.

Conclusion: This case series underscores the importance of educating physicians and dental practitioners on the most common causes of halitosis, which are predominantly of intraoral origin. Early recognition of pseudohalitosis may prevent unnecessary and extensive medical investigations and ensure appropriate patient management through education and, when required, psychological counselling.

*Part of the research funded by the project "Project Title" (project code_ACRONYM), co-financed by the National Recovery and Resilience Plan (NPOO).
Keywords: Halitosis; Diagnosis, Oral; Psychotherapy; Patient education; Odor

PERIODONTAL AND ORTHODONTIC TREATMENT OF AN ADULT PATIENT WITH PERIODONTITIS

Zorana Ivanković Buljan[1*]
[1]*Study of dental medicine, University of Mostar School of Medicine, Mostar, Bosnia and Herzegovina*

Aim: Patients with an aggressive periodontitis may lose the interproximal attachment and this is the main factor for the pathological migration of teeth. Changes the position such as proclination, rotation, spacing and extrusion the anterior teeth may compromise aesthetics. In consequence, adult patients with advanced periodontitis can require orthodontic treatment. Orthodontic treatment should be started only after the clinician is convinced that the patient is well motivated and can follow the oral hygiene instructions well.

Clinical Procedure: A multidisciplinary approach is presented to the treatment of 54-year-old man. Non-surgical periodontal therapy followed by orthodontic and prosthetic treatment were performed.

Results: Orthodontic treatment can facilitate improvement by light intrusive orthodontic forces to correct the pathological extrusion and migration of teeth.

Conclusions: Comprehensive treatment of patients with advanced periodontitis requires adequate timing and a multidisciplinary approach to eventually restore occlusal harmony with stable periodontium and satisfying aesthetics.

Keywords: Periodontitis; Orthodontic Appliances, Fixed; Patients

ORTHODONTIC FORCED ERUPTION PROCEDURE FOR THE PURPOSE OF PROSTHETIC REHABILITATION OF A TRAUMATIZED TOOTH

Andrej Katalinić[1*], Marina Dujmović Beg[1]
[1]*Orthodontics specialist practice, Rijeka, Croatia*

Aim: The aim was to describe a case of a complicated crown fracture of an endodontically treated tooth that was successfully managed through orthodontic extrusion and prosthetic rehabilitation.

Clinical Procedure: A 58-year-old male patient presented to the dental clinic due to a

crown fracture of the lower left first premolar (tooth 34). Clinical examination revealed a complicated fracture of tooth 34 below the gingival level, and a retroalveolar RVG image was taken. Radiographic analysis confirmed a properly endodontically treated root.
Instead of extracting the root, the patient was offered orthodontic extrusion followed by prosthetic rehabilitation. An orthodontic band was cemented onto the lower left first molar (tooth 36), and a lever arm (TMA wire .017 x .025) was bend and adapted for the orthodontic extrusion of tooth 34. A gingivectomy was performed on tooth 34, and a loop made of stainless steel was adhesively attached to the central visible part of the root. The adapted lever arm was then tied with a ligature to the loop after being previously activated.
Results: The lever arm adapted for orthodontic extrusion was activated four times over a total period of two months. After a stabilization period of three months, a fixed prosthetic restoration was fabricated.
Conclusion: Orthodontic extrusion, also known as forced eruption, is a non-invasive, non-surgical therapeutic procedure for preserving the thickness of periodontal tissue. This approach avoids tooth loss through extraction and serves as an excellent therapeutic method for maintaining occlusal functionality. Retaining a functional tooth root is, in all respects, superior to a dental implant. Unlike implants, preservation of the periodontium maintains the natural function of the tooth, including its ability to adapt to masticatory forces and its inherent defense against bacterial infections. This method also reduces the risk of complications associated with dental implant placement (such as mucositis and periimplantitis). Nevertheless, it is undeniable that implant-prosthetic rehabilitation can adequately restore both function and aesthetics in cases of tooth loss.
Keywords: Forced Eruptions; Orthodontic Extrusion; Orthodontic Appliances, Fixed

MAPPING DENTAL BIOFILMS: FROM PLAQUE INDEX THROUGH PLANIMETRIC ASSESSMENT TO VOLUMETRIC ANALYSIS

Luka Fijavž[1*], Katja Povšič[2], Haris Munjakovič[2], Adrian Kašaj[3], Rok Gašperšič[2]
[1]*Medical Faculty, University of Ljubljana, Ljubljana, Slovenia*
[2]*Medical Faculty and University Medical Center Ljubljana, University of Ljubljana, Ljubljana, Slovenia*
[3]*Faculty of Medicine and University Medical Center Mainz, Johannes Gutenberg University, Mainz, Germany*

Objectives: Plaque indices (e.g. Turesky Modification of the Quigley-Hein Plaque Index (TMQHPI)) and planimetric approaches are established methods for quantifying dental plaque. However, they all rely on the use of disclosing agents and tend to overestimate thin biofilm layers, while neglecting its thickness. This study showcases a novel digital workflow using superimposed serial intraoral scans (IOS) for the volumetric analysis and visualisation of plaque accumulation. We hypothesise that the novel volumetric quantification will show a weak correlation with existing plaque indices and planimetric quantification.
Methods: Fifteen participants suspended oral hygiene for four days (T4). Plaque accumulation at T4 was visualised using a two-tone dye (pink and purple, new and mature plaque, respectively) and scored using the TMQHPI. IOS (3Shape Trios 4) were performed at entry, after professional cleaning (T0) and at T4. Volumetric plaque quantification was performed on serial digital 3D model pairs (T0 and T4) in GOM Inspect. The results were expressed as volumetric plaque index (VPI; mm3) and adjusted volumetric plaque index (AVPI; plaque volume per ROI; mm3/mm2). A planimetric analysis of plaque (total, pink, purple and colour-coded maps of plaque thickness with a cut-off value of 10 µm) was performed using machine learning.
Results: The conventional planimetric assessment revealed an average of 2.47 times greater plaque coverage than the plaque coverage determined with the volumetric colour map as a function of plaque thickness, with the maximum plaque volume reaching 2.00 mm^3 per tooth surface. Early plaque accumulation was mainly caused by pink (new) plaque, while purple (mature) plaque made the largest contribution once the plaque covered more than one third of the tooth surface. Both VPI and AVPI showed strong correlations with TMQHPI (Pearson's r = 0.66 and 0.73, respectively), while Passing-Bablok regressions revealed that purple plaque surfaces contributed more to increased VPI values. The planimetric increase in pink plaque tended to overestimate plaque quantity.
Conclusions: Mature and newly formed plaque coexist, but contribute differently to plaque surface area and volume. Volumetric analysis allows both quantification and thickness-based visualisation of plaque, providing a clinician-friendly alternative to conventional methods. Moreover, volumetric assessment and colour-coded maps provide more accurate insights into plaque accumulation.
Keywords: Dental plaque; Image Processing; Oral Hygiene

COMBINED THERAPEUTIC APPROACH OF PREGNANCY EPULIS: FROM NON-SURGICAL THERAPY TO SURGICAL EXCISION

Andrea Labetić[1*], Bernarda Mrak[1], Gracia Ćelić[1], Ana Šutalo[1], Stjepanka Lešić[1], Darko Božić[1,2]
[1]*University Hospital Centre Zagreb, Zagreb, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: To present a case of pregnancy-associated gingivitis and epulis, and to emphasize the importance of timely diagnosis, non-surgical treatment, and surgical intervention after delivery.
Clinical procedure: A patient in the third trimester of pregnancy was referred for her first specialist periodontal examination. She was a non-smoker, with no systemic diseases, no history of allergies, and was not taking any medications. Clinical examination revealed no pathological probing depths, although oral hygiene was unsatisfactory. A diagnosis of pregnancy gingivitis was established.
Supragingival instrumentation of soft and hard deposits was performed, and a mouth rinse containing 0.05% cetylpyridinium chloride (CPC) was prescribed, with instructions for use over two weeks. Oral hygiene instructions were also provided.
At the first follow-up, one month after the initial visit, the condition remained unchanged. Supra- and subgingival debridement was repeated under local anesthesia with 2% lidocaine and 1:200,000 epinephrine.
Following delivery, a periodontal surgical excision of the lesion was performed. Tissue specimens measuring 0.5 × 0.5 × 0.1 cm and 0.6 × 0.4 × 0.2 cm were submitted for histopathological analysis. The findings revealed hyper- and parakeratotic, hyperplastic stratified squamous epithelium with underlying stroma containing small blood vessels surrounded by mononuclear inflammatory infiltrate, consistent with a diagnosis of epulis.
Results: One month after surgical excision, the lesion had completely resolved. Additional supragingival instrumentation was performed. After six months of follow-up, the lesion did not reoccur, and oral hygiene was satisfactory.
Conclusion: Pregnancy gingivitis and epulis are common lesions associated with hormonal changes during pregnancy, further aggravated by local irritants. Lesions usually regress after delivery, and successful management includes non-surgical therapy, surgical excision when indicated, as well as regular follow-up and patient education to maintain oral health.
Keywords: Gingivitis; Pregnancy; Inflammation

MANAGEMENT OF AN ENDODONTIC-PERIODONTAL LESION THROUGH ENDODONTIC AND PERIODONTAL THERAPY - A CASE REPORT

Ivana Milić[1*], Julijana Tenodi Marakovič[1]
[1]*Dental Policlinic Zagreb, Zagreb, Croatia*

Aim: Endodontic-periodontal lesions can be classified as primarily endodontic, periodontal, or "true" combined lesions. Depending on the type, endodontic, periodontal, or combined therapy is performed. This case report illustrates that correct choice of techniques can lead to successful management of such lesions.
Case report: A 40-year-old female patient was referred to the Dental Polyclinic Zagreb with complaints of pain and mobility of tooth 32. Clinical examination revealed probing depths exceeding 4 mm, with values up to 12 mm in the region of tooth 32, which showed extreme mobility. Pulp vitality testing confirmed the tooth was non-vital. Based on periodontal and radiographic findings, generalized periodontitis stage III was diagnosed.
Following endodontic treatment of tooth 32 and splinting of teeth 32 and 33 with a Ribbond strip, non-surgical periodontal therapy and systemic antibiotic treatment were delivered (amoxicillin 500 mg and metronidazole 400 mg, three times daily for seven days). After three months reevaluation was performed, followed by regenerative surgical therapy of the remaining intrabony defect at tooth 32 with placement of a bone substitute (CopiOs Cancellous Xenograft) and a resorbable membrane (CopiOs Extend). The postoperative healing process was uneventful. Follow-up examinations were scheduled weekly and later monthly for a period of six months.
Results: After 12 months, radiographic examination showed a reduction in the bone defect and probing depths decreased to 3 mm.
Conclusion: After adequate endodontic and periodontal therapy, combined with regenerative surgical intervention, the tooth retained its function with visible recovery of the bone defect. Therefore, the correct choice of techniques and procedures in the treatment of endo-perio lesions represents the foundation of successful therapy.
Keywords: Endodontics, Periodontics, Bone Substitutes

IMPLANT FRACTURE IN THE MANDIBULAR MOLAR REGION: CASE REPORT OF IMPLANT-PROSTHETIC REHABILITATION WITH SIMULTANEOUS HARD AND SOFT TISSUE AUGMENTATION

Marko Blašković[1*], Dorotea Blašković[1], Domagoj Vražić[2], Željka Kačarević Perčić[3]
[1]*Dr. Blašković Dental Polyclinic, Rijeka, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[3]*Department of Dental Medicine, Faculty of Dental Medicine and Health, J. J. Strossmayer University of Osijek, Osijek, Croatia*

Aim: To present a case of implant loss in the mandibular right first molar region (tooth 46) due to implant fracture, followed by the placement of a new implant with simultaneous hard and soft tissue augmentation.
Clinical procedure: The patient presented with suppuration around implant 46, placed four years earlier. The initial treatment plan included the preservation of the implant through surgical regenerative peri-implantitis therapy. However, immediately before surgery, a radiograph revealed implant fracture, which led to a change of treatment plan. The fractured implant was removed using a trephine bur (Helmut Zepf, Seitingen-Oberflacht, Germany). After four months of spontaneous healing, a new Megagen AnyRidge ø4.5 mm implant (Megagen, Daegu, South Korea) was placed. On the buccal surface of the bone defect, a resorbable NovaMag membrane (Botiss, Zossen, Germany) was fixed with four resorbable NovaMag fixation screws XS (Botiss, Zossen, Germany). A composite bone graft was inserted into the defect. The coronal portion of the graft was covered with a xenogeneic collagen matrix Mucoderm (Botiss, Zossen, Germany). After 6 months of healing, a healing abutment (Megagen, Daegu, South Korea) was placed, followed two weeks later by a temporary crown used to shape the emergence profile. Approximately 3 months after implant uncovering, the temporary crown was replaced with a definitive zirconia-ceramic crown on a ti-base ZrGEN abutment (Megagen, Daegu, South Korea).
Results: The treatment resulted in several improvements compared to the initial situation: 1. Increased implant diameter, 2. Screw-retained prosthetic reconstruction, 3. Simultaneous augmentation of hard and soft tissues around the new implant, and 4. Properly contoured definitive crown.
Conclusion: Simultaneous hard and soft tissue augmentation provided a favorable, predictable, and long-term stable outcome of implant-prosthetic rehabilitation.
Keywords: Bone regeneration; Tissue Conditioning, Dental; Dental Implants

BIOFILM DIVERSITY AND BONE HEALING WITH D-PTFE MEMBRANES IN SOCKET PRESERVATION

Marija Čandrlić[1*], Barbara Franović[2], Dragana Gabrić[3], Marko Blašković[4], Željka Perić Kačarević[5], Olga Cvijanović Peloza[2]
[1]*Department of Dental Medicine, Faculty of Dental Medicine and Health, J. J. Strossmayer University of Osijek, Osijek, Croatia*
[2]*Department of Anatomy, Faculty of Medicine, University of Rijeka, Rijeka, Croatia*
[3]*Department of Oral Surgery, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[4]*Department of Oral Surgery, Faculty of Dental Medicine, University of Rijeka, Rijeka, Croatia*
[5]*Department of Anatomy, Histology, Embryology, Pathological Anatomy and Pathological Histology, Faculty of Dental Medicine and Health, J. J. Strossmayer University of Osijek, Osijek, Croatia*

Aim: This randomized controlled clinical trial aimed to evaluate microbial biofilm characteristics and bone healing outcomes after socket preservation using two high-density d-PTFE membranes.
Materials and methods: Thirty-nine patients requiring tooth extraction and subsequent implant placement were randomly assigned to socket preservation with a composite graft (50% autogenous bone, 50% bovine xenograft) covered by either Permamem® or Cytoplast™. Membranes were removed after 4 weeks and analyzed by scanning electron microscopy (SEM), quantitative real-time polymerase chain reaction (qPCR), and next-generation sequencing (NGS). Bone biopsies were harvested after 6 months and examined histologically, both qualitatively and quantitatively.
Statistical analysis: Data were analyzed using descriptive statistics. Group comparisons for bacterial quantification and histomorphometry were performed with the Mann–Whitney U test. Statistical significance was set at $p < 0.05$.
Results: SEM revealed multispecies biofilms on both membranes, with Cytoplast™ showing denser extracellular matrix networks. qPCR confirmed a significantly higher overall bacterial load on Cytoplast™. NGS demonstrated greater microbial diversity and a more uniform microbial community on Cytoplast™, including higher levels of periodontopathogens such as Fusobacterium nucleatum and Veillonella parvula. In contrast, Permamem® was associated with higher relative abundance of Streptococcus oralis. Histological evaluation showed comparable findings between groups, with no foreign body reactions or inflammation. Histomorphometry revealed similar proportions of new bone (43.2% vs. 45.2%), residual biomaterial (39.7% vs. 35.7%), and soft tissue (17.0% vs. 19.1%) without statistically significant differences.
Conclusion: Both membranes supported successful bone regeneration. However, Cytoplast™ showed a denser and more diverse biofilm with the presence of periodontopathogens. Although histological bone healing outcomes are comparable, membrane type may influence early microbial dynamics, with potential implications for peri-implant health and infection risk.
Keywords: Biofilms; Bone Regeneration; Polytetrafluoroethylene

WHAT ARE THE LIMITS OF PERIODONTAL REGENERATION? MUCOGINGIVAL SURGERY FOR THE REPAIR OF MULTIPLE INTRABONY DEFECTS: A CASE REPORT.

Igor Kosmina[1*]
[1]*Dentum, Adria Dental Group, Zagreb, Croatia*

Aim: To present the advantages of using mucogingival procedures in conjunction with periodontal regenerative techniques for the treatment of periodontitis. This approach leads to predictable outcomes, with better soft tissue quality and increased periodontal regeneration. This approach aims not only at disease resolution but also at functional and esthetic rehabilitation of periodontally compromised sites, thus improving the overall state and manageability of periodontal disease.
Clinical procedure: After diagnosis, initially from clinical analysis through periodontal charting, plaque and bleeding indexes, and a thorough anamnesis, to a CBCT scan. The patient was 37 years old, a smoker and had a history of periodontitis in the family, classifying it as Stage 3 and Grade C generalized periodontitis. In the presurgical phase the patient went through SRP treatment and oral hygiene instructions. The surgical procedure was done in one session. Hopeless teeth 18 and 37, were extracted and ground into dentin autograft. In the mandible the worst defects were around the anterior, especially mesial to 43 with a probing depth of 13 mm, and 41, 42 with 8 mm. A modified coronally advanced flap was used, with some papilla preservation elements from MIST. The defects were cleaned and roots debrided, EDTA was applied, and then EMD. The defects were filled with dentin autograft mixed with EMD. From the distal of tooth 43 to the mesial of tooth 41 a de-epithelialized CTG was placed as per the Soft Tissue Wall technique to contain the material and stabilize the flap. In the maxilla the defects ranged from tooth 13 to tooth 26, the worst areas had probing depths of around 8 mm, around teeth 13,12,24,26, and 6,7 mm around the rest. The flap and procedure were almost identical, except for the central papilla. Everything was sutured with 6/0 PGA-PCL sutures.
Results: Gingival architecture was unchanged and the biotype improved. Probing depth was a maximum of 3 mm, with no bleeding. Radiographs showed almost complete bone fill.
Keywords: Periodontitis; Guided Tissue Regeneration, Periodontal; Bone Resorption

REGENERATIVE THERAPY OF INTRABONY DEFECT AND OPEN DEBRIDEMENT OF RESIDUAL POCKETS IN PATIENT WITH STAGE IV PERIODONTITIS

Gracia Ćelić[1*], Ana Šutalo[1], Andrea Labetić[1], Stjepanka Lešić[1], Darko Božić[1,2]
[1]*University Hospital Centre Zagreb, Zagreb, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: To present results of the regenerative therapy of intrabony defect using a combination of hyaluronic acid and bovine bone substitute.
Clinical procedure: A 44-years old patient was referred to the Department of Periodontology by a general dentist because of periodontitis. The clinical examination revealed pathological probing depths and an intraosseous defect on tooth 22. The patient was systemically healthy, a non-smoker, denied allergies and did not take any medications. Before the beginning of therapy, detailed oral hygiene instructions were given to the patient. After non-surgical therapy, residual pockets were present in the upper incisors area (12-23). A regenerative surgical approach was chosen to eliminate residual pockets and intrabony defect mesially on tooth 22. A simplified papilla preservation technique (SPPT) without vertical incisions was used. The preoperative mesial probing depth on tooth 22 was 12 mm. The two-walled intrabony mesial defect on tooth 22 was filled with a combination of hyaluronic acid and bovine bone substitute material. The area was sutured with 6-0 monofilament nonabsorbable sutures.
Results: 6 months after the procedure, probing depths on all teeth were measured. Probing depth in the incisior area was now less than 5 mm, while the mesial probing depth on tooth 22, where a bone substitute was used in combination with hyaluronic acid, was 5 mm.
Conclusion: The use of hyaluronic acid in combination with bovine bone substitute material successfully treats bone defects. When there are persistant residual pockets present, open debridement successfully reduces probing depths.
Keywords: Periodontitis; Debridement; Hyaluronic Acid;

APPLICATION OF BOTULINUM TOXIN IN THE TREATMENT OF GUMMY SMILE

Marina Tomišić[1*], Ivan Delić[2], Barbara Ptačnik[2]
[1]*Clinical Hospital Center Rijeka, Rijeka, Croatia*
[2]*Polyclinic Delić, Rijeka, Croatia*

Aim: Gummy smile, or excessive gingival display (EGD), is a condition in which the visibility of the gingiva during smiling exceeds 3 mm. The prevalence in the population is on average 7% in men and 14% in women. In recent years, due to increased aesthetic demands, requests for treatment of the gummy smile have become more common. The etiological factors of gummy smile are multifactorial, so the treatment options vary. In patients with EGD where the cause is hypermobility of the upper lip, the treatment of choice is the application of botulinum toxin type A products, due to simplicity and low risk of complications.
Clinical Procedure: Patient complained about poor aesthetics of the perioral region. From the anamnesis and clinical examination, it was determined that the cause of the compromised esthetics was excessive gingival display (3 mm). The following measurements and tests were performed: measurement of the length of the clinical crown of the incisors, width of keratinized gingiva, frenulum attachment, overjet, overbite, lip position at rest and during smiling. After these tests, the findings indicated hypermobility of the upper lip. It was decided to treat the hypermobility with botulinum toxin type A (BoNTA). In this case, the product Bocouture (Merz Pharmaceuticals) was used. The product was diluted with 0.9% NaCl solution in a ratio of 2 ml to 50 units. A 30G needle (0.3x13 mm) and a 1 ml syringe were used. The injection site was the „Yonsei point", positioned at the center of the triangle formed by the muscles m. zygomaticus minor, m. levator labii superioris alaeque nasi, and m. levator labii superioris. By injecting into this point, all three muscles are treated simultaneously, achieving the desired effect with a single injection. Before the injection, the site was treated with EMLA 5% topical anesthetic and marked with a dermatological pencil. The patient received 5 IU of botulinum toxin on each side, for a total of 10 IU.
Results: Two weeks after botulinum toxin application, the patient noticed a significant reduction in EGD, which was reduced to 0 mm.
Conclusion: Botulinum toxin type A has a significant effect in reducing excessive gingival display, and is the treatment of choice. The application is relatively simple for an experienced practitioner, the patient experiences no pain during or after the procedure, the results are fast and predicable. Downside is short durability of results, so therapy must be repeated every 4 months.
Keywords: Gingiva; Botulinum Toxins; Esthetics

THE EFFECT OF HYALURONIC ACID ON POSTOPERATIVE PAIN IN THE TREATMENT OF MULTIPLE GINGIVAL RECESSIONS

Anđelina Šekelja Mašić[1*], Darko Božić[2], Ervin Marušić[3]
[1]*Community healthcare center "Zagreb – East", Zagreb, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb; University Hospital Centre Zagreb, Zagreb, Croatia*
[3]*Dentivo, Private practice, Matulji, Croatia*

Aim: Hyaluronic acid (HA) is a natural polysaccharide present in periodontal tissues, whose clinical use has not been sufficiently investigated. The coronally advanced flap (CAF) is the standard technique for treating multiple gingival recessions. The aim of this study was to evaluate the effectiveness of cross-linked HA gel in reducing postoperative pain in patients with multiple gingival recessions. To the best of our knowledge, this is the first such study.
Materials and methods: The study included 42 patients with multiple adjacent Miller Class I and II recessions, randomly allocated into two groups: experimental (CAF+HA) and control (CAF). Postoperative pain was assessed using the Schiff test and Wong-Baker VAS scale, while oral health-related quality of life was measured with the OHIP-14 questionnaire. Measurements were performed before surgery, during the first 7 postoperative days, and at 1, 3, and 6 months.
Statistical analysis: The statistical analysis was conducted using a mixed-model analysis of variance (ANOVA). In the case of significant interactions between factors, differences between the groups and across time points were further examined using one-way ANOVA and repeated-measures ANOVA, respectively. For multiple comparisons among time points, the Bonferroni adjustment was applied. All analyses were performed at an overall significance level of 0.05 using SPSS Statistics, version 26.0 (IBM, Armonk, NY, USA).
Results: Postoperative pain decreased in both groups, with the largest reduction observed in the early days in favor of experimental group. VAS scores showed a significant reduction over time ($p<0.001$), with a marginally significant difference in favor of CAF+HA ($p=0.079$) at day 5. The Schiff test confirmed reduced hypersensitivity in both groups, more pronounced in CAF+HA, though without consistent significance. OHIP-14 scores indicated improved quality of life in both groups, again greater in CAF+HA, but not statistically significant. Ibuprofen 600 mg was the most frequently used analgesic; the control group consumed it 3–4 times more often on days 2 and 3 postoperatively.
Conclusion: The addition of hyaluronic acid to the CAF procedure may reduce postoperative pain and hypersensitivity, improve quality of life, and decrease the need for analgesics. However, further randomized clinical trials with larger sample sizes and longer follow-up are needed to confirm these findings and define optimal application protocols.
Keywords: Hyaluronic Acid; Gingival Recession; Quality of Life

ROLE OF A O-R POWERED TOOTHBRUSH WITH A PRESSURE SENSOR IN MAINTAINING ROOT COVERAGE AFTER PERIODONTAL PLASTIC SURGERY: A CASE REPORT

Lana Frntić[1*], Klara Ćurković[1], Larisa Musić[2]
[1]*Student, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: To present the long-term outcome of surgical root coverage in a patient with a thin periodontal phenotype and gingival recessions, and to highlight the role of an oscillating-rotating electric toothbrush with a pressure sensor in maintaining post-surgical soft tissue stability.
Clinical procedure: The patient's dental history included orthodontic treatment and traumatic toothbrushing with a manual toothbrush. A coronally advanced flap (CAF) procedure was performed in the mandibular right canine-premolar region. Tooth 43 was treated with CAF alone, while tooth 44 received CAF combined with a connective tissue graft (CTG). Following initial healing, the patient was instructed to replace the manual toothbrush with an oscillating-rotating (O-R) electric toothbrush equipped with a pressure sensor to minimize traumatic brushing forces.
Results: At 14-month follow-up, complete root coverage was maintained at both treated sites. The gingival margins remained stable, with no signs of inflammation or recession recurrence, irrespective of the use of CTG. The patient reported improved comfort and confidence in daily plaque control with the powered toothbrush.
Conclusion: The use of an O-R powered toothbrush with a pressure sensor may contribute to the long-term stability of surgically treated gingival recessions by reducing traumatic brushing habits. This case underscores the importance of tailored oral hygiene instructions and appropriate device selection in patients with a thin periodontal phenotype.
Keywords: Gingival Recession; Toothbrushing; Surgical Flaps; Connective Tissue; Oral Hygiene

TAILORING ORAL HYGIENE TO PATIENT CAPABILITIES IN AN OLDER ADULT WITH PERIODONTITIS: A CASE REPORT

Marta Plehandžić[1*], Iva Biloš[1], Marija Pavić[1], Krešimir Tomas[1], Petra Zovko[1], Amir Ćatić[2], Larisa Musić[3]
[1]*Student, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[2]*Department of Fixed Prosthodontics, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[3]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: This case report presents the clinical oral hygiene management in an older adult patient with stage III, grade C periodontitis, and emphasizes the importance of tailoring oral hygiene strategies to individual abilities and needs.
Clinical procedure: A 72-year-old female patient was referred for treatment with a diagnosis of generalized periodontitis, presenting with very high levels of plaque. Her oral hygiene history revealed exclusive use of a manual toothbrush and no interdental adjunctive devices. Through motivational interviewing, the patient expressed strong motivation to maintain her natural dentition. Oral hygiene instructions were individualized according to her dexterity and physical capacity. Larger-diameter interdental brushes were identified as manageable for her, and plaque disclosure was used to guide personalized training. Instruction was performed in front of a mirror to ensure proper technique and training support in using interdental brushes and an oscillating-rotating powered toothbrush equipped with a pressure sensor.
Results: The patient demonstrated high compliance, maintaining excellent plaque control and motivation at follow-up visits. This directly contributed to the stabilization of periodontal parameters and enhanced the effectiveness of periodontal treatment.
Conclusion: Effective oral hygiene is a cornerstone of successful periodontal therapy. In older adults, individualized oral hygiene programs - adapted to physical capabilities and supported by motivational strategies - can significantly improve adherence and ensure optimal treatment outcomes.
Keywords: Periodontitis; Oral hygiene; Toothbrushing; Aged; Dental Devices, Home Care

COMBINED APPLICATION OF AUTOGENOUS AND XENOGENEIC SOFT TISSUE GRAFTS FOR THE TREATMENT OF MULTIPLE GINGIVAL RECESSIONS: A CASE REPORT

Oleksii Petrash[1]*, Ana Đerek[1], Maja Perkušić[1], Larisa Musić[2]
[1]*Private dental medicine practice, Zagreb, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: To present the treatment outcome of the combined use of autogenous and xenogeneic soft tissue grafts in the treatment of multiple gingival recessions using the multiple coronally advanced flap (MCAF) technique.
Clinical procedure: A 26-year-old male patient was referred for treatment due to gingival recessions. Clinical examination revealed generalized gingivitis and multiple Miller Class I / Cairo RT1 recessions in both arches. Medical history indicated the use of a soft manual toothbrush, with self-reported excessive brushing force and bleeding. Prior to surgery, biofilm disclosure and re-instruction in oral hygiene were performed, along with the introduction of an electric toothbrush equipped with a pressure sensor. The treatment of choice was the bilaminar technique – MCAF (teeth 21–24) combined with site-specific application of soft tissue grafts. A xenogeneic collagen matrix (Botiss Mucoderm®) was used buccally at teeth 22 and 23 to minimize patient morbidity and reduce the size of the autologous donor site. At tooth 24, an autologous connective tissue graft (CTG) harvested from the palate was applied due to the presence of a pronounced mucosal buccal frenum, ensuring postoperative mechanical stability and enhancing the predictability of healing in that region.
Results: Postoperative recovery was uneventful, with complete root coverage achieved. The patient reported greater discomfort at the palatal donor site (VAS score 4) compared to the primary surgical site (VAS score 2). At six-month follow-up, gingival margins remained stable with satisfactory esthetic integration of soft tissues.
Conclusion: The combination of autogenous and xenogeneic grafts within the bilaminar MCAF technique may represent a rational therapeutic option for managing multiple recessions, allowing an individualized approach based on local morphological and biomechanical characteristics. The application of a collagen matrix can significantly reduce patient morbidity and yields outcomes comparable to those obtained with CTG, which remain the gold standard for soft tissue augmentation.
Ključne riječi: Gingival recession; Oral surgical procedures; Connective tissue; Xenograft; Mouth mucosa

ASSESSMENT OF ANXIETY IN PERIODONTAL PATIENTS BEFORE AND AFTER NON-SURGICAL THERAPY USING A MODIFIED ANXIETY SCALE

Lucija Koturić Čabraja[1]*, Walter Dukić[2], Matea Lapaš Barišić[3]
[1]*Private practice, Zagreb, Croatia*
[2]*Department of Paediatric and Preventive Dentistry, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[3]*Private practice, Zagreb, Croatia*

Aim: Dental anxiety is a common occurrence among patients in dental practices during various dental procedures. Periodontitis is an inflammatory disease of the periodontal ligament, the progression of which can lead to severe complications and even complete tooth loss. Today, an effective method of initial periodontal therapy is used, which is scaling and root planing (SRP). The aim of this study was to assess dental anxiety in 31 patients with periodontitis using the MDAS scale.
Materials and methods: In this study, 31 subjects (12 women and 19 men) completed the MDAS questionnaire before and after SRP treatment, as well as a questionnaire on socioeconomic and demographic data. The study was conducted in a polyvalent dental practice in Zagreb, and the procedure was performed by a specialist in periodontology.
Statistical analysis: Statistical analysis was performed using SPSS (IMB; USA) software, using non-parametric Krusal-Wallis analysis of variance for group comparisons. Scale reliability was determined by Cronbach's alpha test and correlation test (Spearman rho).
Results: Anxiety after the procedure was statistically significantly lower than before the procedure (p=0.005), with 48% of patients experiencing reduced anxiety levels and 12% of patients showing extreme anxiety/phobia. Patients who had visited the dentist within the last 3 months had lower MDAS scores compared to those whose last visit was within 6 months (p=0.027). No statistically significant differences were found between anxiety levels and age, gender, level of education, monthly income, oral hygiene, or different dietary habits (p>0.05). Considering that the sample is currently small, it can be expected that borderline statistical values in the correlation between anxiety and questionnaire data may change with further research.
Conclusion: This study showed that patients who had visited the dentist within the last three months had significantly lower levels of anxiety compared to those who last visited within six months, which means that regular dental check-ups at shorter intervals have a positive effect on dental anxiety levels. With further research involving a larger number of participants, it may be possible to connect different questionnaire data with the level of dental anxiety in patients.
Keywords: Periodontitis; Anxiety; Fear; Therapy

PRESERVATION OF PERIODONTAL TISSUE IN IMMEDIATE IMPLANT PLACEMENT IN THE AESTHETIC ZONE – A CASE REPORT

Antonio Šango[1,2*], Ivan Petropoli[1], Ana Šango[3]
[1]*Private dental office Dental Petropoli, Rijeka, Croatia*
[2]*Clinical Hospital Center Rijeka, Rijeka, Croatia*
[3]*Faculty of Dental Medicine, University of Rijeka, Rijeka, Croatia*

Aim: To present the procedure of immediate implant placement and provisional prosthetic rehabilitation in the aesthetic zone after extraction of the upper lateral incisors, while preserving the natural contour of periodontal tissues and achieving a predictable functional and aesthetic outcome.
Clinical procedure: A male patient, born in 1980, was referred due to the impossibility of adequate endodontic and prosthetic treatment of teeth 12 and 22. Following atraumatic extraction performed with preservation of the buccal bone plate, JDentalCare JD Icon Plus implants were placed during the same session. They were anchored bicortically, and the achieved primary stability of 60 Ncm enabled immediate prosthetic loading. Due to the markedly vertical orientation of the alveoli, without the usual palatal inclination, longer implants had to be used: in the region of tooth 12: 4.3 × 18 mm, and in the region of tooth 22: 4.3 × 15 mm. The vestibular alveolar space was filled with a xenograft (The Graft, Purgo) in order to preserve hard tissue volume. Immediately after surgery, an intraoral scan was performed, and provisional crowns were fabricated and delivered the same day. The patient wore them for 4 months, and after the osseointegration period was completed, a new scan was taken and definitive ceramic crowns were placed.
Results: The natural contour of the soft tissues, particularly the interdental papillae, as well as the hard tissues, was preserved. The implants remained stably integrated throughout the loading period. A highly satisfactory aesthetic and functional outcome was achieved, with pronounced patient satisfaction.
Conclusion: Immediate implant placement with provisional prosthetic loading represents a reliable therapeutic option in the aesthetic zone, provided that surgical, periodontal, and prosthetic principles are consistently respected. The presented case confirms that proper planning, careful execution, and an individualized approach make it possible to achieve predictable functional and aesthetic results.
Keywords: Dental Implants; Dental Restoration; Bone Substitutes

ALVEOLAR BONE EXPOSURE AFTER ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION IN A PATIENT WITH AML: CASE REPORT AND DIAGNOSTIC–THERAPEUTIC ALGORITH

Stjepanka Lešić[1]*, Ana Šutalo[1], Gracia Čelić[1], Andrea Labetić[1], Marko Granić[2], Domagoj Vražić[3]
[1]*University Hospital Centre Zagreb, Zagreb, Croatia*
[2]*Department of Oral Surgery, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[3]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: Oral complications following allogeneic hematopoietic stem cell transplantation (allo-HSCT) include mucositis, opportunistic infections, and oral graft-versus-host disease (GVHD), whereas multiple sites of alveolar bone exposure are rare and clinically challenging. The differential diagnosis includes non-MRONJ osteonecrosis, actinomycosis, invasive fungal infections, and GVHD-associated lesions. The aim was to present the clinical course and a multidisciplinary diagnostic–therapeutic approach in a patient with AML and multiple foci of alveolar bone exposure after allo-HSCT.
Clinical procedure: A 22-year-old patient with AML (46XY t(6;9), FLT3-ITD+) was treated with the CLIA-VEN protocol plus midostaurin and underwent allo-HSCT from an unrelated donor. The early post-transplant course was complicated by sepsis, respiratory failure, and mucositis. Twenty months after transplantation, while in complete remission (Karnofsky 100) and with no exposure to antiresorptives, the patient developed alveolar bone exposure at multiple sites: mandibular incisors and premolars, as well as maxillary canines and premolars, accompanied by erythema and bleeding on probing.
Results: The diagnostic and therapeutic algorithm included laboratory evaluation, CBCT of the maxilla and mandible to assess sequestra, biopsy, and microbiology (H&E, PAS/GMS, Actinomyces, fungal cultures). Atraumatic sequestrectomy with soft tissue closure was planned, together with targeted antimicrobial therapy and local antisepsis.
Conclusion: Multiple alveolar bone exposures after allo-HSCT require a comprehensive diagnostic approach. The combination of CBCT imaging and histopathological verification is crucial to distinguish infection from aseptic osteonecrosis, while multidisciplinary

therapy minimizes complications and helps preserve oral function.
Keywords: Osteonecrosis; Bone; Stem Cell Transplantation; Graft vs Host Disease

MUCOADHESIVE POLYMERIC HYDROGEL AS AN ADJUNCTIVE IN NON-SURGICAL TREATMENT OF PERIODONTITIS: A REPORT OF 4 CASES

Larisa Musić[1*], Lana Frntić[2], Nikica Marinić[3], Domagoj Vražić[1], Ivan Puhar[1]
[1]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[2]*Student, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[3]*Private dental medicine office, Slavonski Brod, Croatia*

Aim: This case report presents the outcomes of non-surgical periodontal treatment and a novel adjunctive agent, the mucoadhesive polymeric hydrogel, Sterify Gel. Its primary mode of action is physical occlusion of the instrumented pocket.
Clinical procedure: Four systemically healthy patients (two smokers, two non-smokers) diagnosed with stage III periodontitis were treated following the guidelines on treatment of periodontitis, step I and II. Subgingival instrumentation was performed using machine-driven and hand instruments, and the hydrogel was afterwards applied in all pockets ≥6 mm.
Results: After 3 months, at reevaluation, all four patients demonstrated significant improvement in all periodontal parameters. The percentage of closed pockets (≤4 mm without bleeding on probing) was greater than 85% in all four patients.
Conclusion: The adjunctive use of Sterify Gel in non-surgical periodontal treatment showed promising clinical results. This approach may reduce the need for surgical interventions in patients with stage III periodontitis. Further randomized controlled studies with larger sample sizes are required to confirm its superiority over subgingival instrumentation alone.
Keywords: Periodontitis; Subgingival curettage; Anti-Infective Agents, Local; Polymers

GENERALIZED PERIODONTITIS IN A PATIENT WITH COWDEN SYNDROME

Ana Šutalo[1*], Stjepanka Lešić[1], Gracia Ćelić[1], Darko Božić[1,2], Ana Andabak Rogulj[3], Bruno Špiljak[3]
[1]*University Hospital Centre Zagreb, Zagreb, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[3]*Department of Oral Medicine, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: CS is an autosomal dominant disorder characterized by multiple hamartomas and an increased risk of developing malignant diseases. It is caused by mutations in the PTEN gene, which regulates cell growth and apoptosis. Oral manifestations include papillomatous lesions of the tongue, gingiva and buccal mucosa, often with a cobblestone appearance, fissured tongue, macroglossia and a high-arched palate. The aim was to present a case with oral manifestations of Cowden syndrome (CS) and periodontitis and to highlight their potential impact on periodontal health.
Introduction: Case Report: A 56-year-old patient was referred to the Department of Periodontology at the School of Dental Medicine in Zagreb due to periodontitis. He doesn't take any medications and reports no allergies. He smokes 6–8 cigarettes per day. Clinical examination confirmed the diagnosis of generalized periodontitis, stage IV, grade C. Multiple papillary lesions were observed on the gingiva, buccal and palatal mucosa. The patient was referred to the Department of Oral Medicine where a diagnosis of Cowden syndrome was established and he was referred for internal medicine evaluation and genetic testing. Histopathological analysis of the biopsy sample revealed characteristics of papilloma and negative HPV typing. The patient was instructed on proper oral hygiene and initial periodontal therapy was carried out.
Discussion: There are no available clinical studies that directly confirm the association between CS and periodontitis. However, oral mucosal changes may hinder the maintenance of oral hygiene, potentially affecting periodontal health. Regular dental check-ups with a focus on plaque control are recommended.
Conclusion: Although the link between CS and periodontitis has not been thoroughly investigated, oral changes associated with the syndrome may have a secondary impact on periodontal health.
Keywords: Periodontitis; PTEN Phosphohydrolase; Cowden

SELF-REPORTED CHANGES IN ORAL AND RESPIRATORY SYMPTOMS AMONG USERS AFTER SWITCHING FROM CONVENTIONAL CIGARETTES TO HEATED TOBACCO PRODUCT (IQOS)

Ivana Mišković[1,2*], Jelena Prpić[1,2], Davor Kuiš[1,2], Aleksandar Pupovac[2], Ella Sever[1]
[1]*Clinical Hospital Center Rijeka, Rijeka, Croatia*
[2]*Faculty of Dental Medicine, University of Rijeka, Rijeka, Croatia*

Aim: Heated tobacco products are promoted as a less harmful alternative to conventional cigarettes. However, research on their health effects, particularly in the oral cavity and respiratory system, is still limited. The aim of this study was to assess self-reported changes in oral and respiratory symptoms among users after switching from conventional cigarettes to IQOS.
Materials and methods: The study included 90 participants: 30 conventional cigarette smokers, 30 IQOS users, and 30 non-smokers. Of the 30 IQOS users, 27 (90%) were former conventional cigarette smokers. Only participants who had been using IQOS for at least one year were included in the study. Participants completed a smoking habits questionnaire consisting of 20 questiones.
Statistical analysis: Data were analyzed using Fisher's exact test. After switching to IQOS, 63% of participants (95% CI: 45.5–78.1) reported an improvement in symptoms, which was statistically significant ($p < 0.001$). Improvement in taste was reported by 40% (95% CI: 24.6–57.7), reduction in halitosis by 57% (95% CI: 39.2–72.6), and less frequent coughing by 63% (95% CI: 45.5–78.1).
Results: Among the 63% of participants, improvements were observed compared to the period when they smoked conventional cigarettes, including better taste perception (40%), reduced halitosis (57%), and less frequent coughing (63%).
Conclusion: Although participants reported improved taste, less halitosis and reduced coughing after switching to IQOS, it should be emphasized that all tobacco products, including heated tobacco products, are harmful to human health. The only safe way to avoid smoking-related symptoms is to completely stop using tobacco products. Further studies with objective measurements on larger samples are needed.
Keywords: Tobacco Products; Electronic Nicotine Delivery Systems; Halitosis; Taste; Smokers

COMPARISON OF TWO TECHNIQUES – CAF AND TCAF – FOR SURGICAL TREATMENT OF SOLITARY GINGIVAL RECESSIONS: A CASE REPORT

Svenia Antić[1*], Larisa Musić[2]
[1]*Private dental office, Galižana, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim:This report aims to compare the aesthetic and surgical outcomes of solitary gingival recession coverage on maxillary canines using two techniques: the conventional coronally advanced flap (CAF) and the tunnelled coronally advanced flap (TCAF).
Clinical procedure: Two patients presented with similar Miller Class I/Cairo RT1 recessions on tooth 13. In one patient, a CAF with a trapezoidal design, two vertical incisions, and coronal advancement was performed. In the second patient, a TCAF was performed, using a single vertical releasing incision and tunnelling of the adjacent papilla to preserve soft tissue morphology. Postoperative care was identical.
Results: Complete root coverage was achieved in both patients. At early healing, the TCAF site displayed a superior esthetic outcome, with preservation of the mesial papilla and only one vertical incision, reducing visible surgical lines. In contrast, the CAF site, although clinically successful, showed more apparent incision marks. At 18-month follow-up, gingival margins remained stable in both patients, with the esthetic advantage of TCAF maintained over time.
Conclusion: Both CAF and TCAF provided predictable and long-term stable root coverage. However, the TCAF technique offered clear esthetic benefits by reducing surgical scarring and preserving papillary architecture. While vertical incision lines in the keratinized tissue are generally not noticeable to the patient, they can be detected on close clinical inspection. In the TCAF case, one less scar is present, making the result more harmonious, particularly in the mesial, more visible area. For patients with high esthetic demands, TCAF may therefore be the preferred approach.
Keywords: Gingival recession; Oral surgical procedures; Connective tissue; Mouth mucosa

UNESTHETIC OUTCOME OF A FREE GINGIVAL GRAFT FOR PERI-IMPLANT KERATINIZED TISSUE AUGMENTATION: CASE REPORT

Matija Borovac[1]*, Klara Križan[2], Larisa Musić[3]
[1]*Private dental medicine practice, Zagreb, Croatia*
[2]*Student, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[3]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: To present the clinical outcome of surgical treatment with a free gingival graft (FGG) used to increase the width of keratinized tissue in the peri-implant region, with emphasis on the unesthetic treatment result.
Clinical procedure: A 30-year-old male patient was referred by a prosthodontic specialist for augmentation of the keratinized tissue (KT) band in the 24 and 25 implants region prior to delivery of the definitive prosthetic restoration. Clinically, a narrow buccal KT band was present, accompanied by a pronounced mucosal fold and a more coronally positioned junction between alveolar and peri-implant mucosa. The surgical procedure involved an FGG harvested from the palatal premolar region in order to reduce the distance between donor and recipient sites, thereby minimizing patient morbidity.
Results: During the maturation phase, the expected postoperative contraction of the graft was observed, along with pronounced hypertrophy of the palatal rugae transferred with the graft. This finding may be attributed to their increased vascularization compared to conventional palatal donor sites. The functional outcome was satisfactory; however, the esthetic result was unfavorable. Due to a low smile line and the absence of subjective complaints, the patient did not perceive the esthetic deficit and declined further corrective treatment.
Conclusion: This case highlights the importance of careful donor site selection for FGG. Although harvesting palatal tissue from the premolar palatal area may reduce morbidity and the risk of injury to major palatal blood vessels, the likelihood of an esthetically unpleasing outcome remains significant.
Keywords: Oral surgical procedures; Connective tissue; Mouth mucosa

SOFT TISSUE AUGMENTATION AROUND IMPLANTS WITH A XENOGENEIC COLLAGEN CROSS-LINKED MATRIX

Miren Zaverski[1]*, Darko Božić[2]
[1] *Orto-nova, d.o.o., Rijeka, Croatia*
[2]*Department of Periodontology, School of Dental Medicine, University of Zagreb; University Hospital Centre Zagreb, Zagreb, Croatia*

Aim: To evaluate the effect of soft tissue augmentation with a xenogeneic cross-linked collagen matrix on buccal soft tissue thickness and stability around dental implants.
Clinical procedure: Ten patients received single or multiple dental implants in healed molar and/or premolar sites. Depending on implant stability, a healing abutment was placed either at the time of implant placement or during uncovering. At healing abutment placement, a xenogeneic cross-linked collagen matrix was folded and positioned beneath the buccal flap, close to the implant neck. The flap was then sutured (5/0) to the lingual side around the healing abutment to achieve primary closure. Intraoral scans were performed at baseline, 3 months, and 6 months.
Results: A total of 10 patients with 12 implants were followed for 6 months. Healing was uneventful in all cases. Buccal soft tissue thickness increased by 0.96 mm at 3 months and by 1.37 mm at 6 months compared to baseline. The width of buccal keratinized tissue remained unchanged between baseline and 6 months.
Conclusion: Soft tissue grafting around dental implants is essential for improving peri-implant soft tissue quality, quantity, and esthetics, thereby supporting long-term implant success. Xenogeneic matrices represent a valuable option for preventing soft tissue shrinkage after tooth extraction and implant placement.
Keywords: Connective Tissue; Collagen; Dental Implants

DOES GINGIVAL OVERGROWTH AFFECT PATIENT-REPORTED OUTCOMES DURING ORTHODONTIC TREATMENT?

Monika Pavoković[1]*, Marina Lapter Varga[2], Larisa Musić[3]
[1]*Community Healthcare Centre of Virovitica-Podravina county, Virovitica, Croatia*
[2]*Department of Orthodontics, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*
[3]*Department of Periodontology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia*

Aim: Gingival overgrowth is frequently observed during orthodontic treatment. This study aimed to evaluate whether gingival overgrowth, measured by the Ellis et al. photographic scoring method, was associated with patient-reported outcome measures (OHIP-14, VAS).
Materials and methods: A total of 123 participants (aged 10–21 years; 45% female) were evaluated for gingival overgrowth using the Ellis et al. index. Treatment duration was recorded. OHIP-14 and VAS were used to evaluate impact of gingival overgrowth on OHRQoL and aesthetic appearance, respectively.
Results: The median Ellis Index score was 13 (range 5-28). Overall, 13.8% of participants showed little or no gingival overgrowth (scores 0-1), while 64.2% had scores above the clinical threshold (>38.6%), warranting surgical excision. The median OHIP-14 severity score was 10 (range 2-29), and the median VAS score was 6 (range 0-10). Females reported significantly higher OHIP-14 scores compared with males ($p < 0.001$). No significant correlations were found between Ellis Index score or treatment duration with OHIP-14 or VAS.
Conclusion: Gingival overgrowth severity, as measured by the Ellis Index, was not significantly associated with PROMs in orthodontic patients. However, females reported worse OHIP-14 outcomes than males. Combining clinical indices with PROMs may provide a more comprehensive understanding of treatment impact in orthodontic care.
Keywords: Gingival overgrowth; Orthodontic Appliances; Patient Reported Outcome Measures; Visual Analog Scale