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Oral Presentation 01

How do you Avoid Mistakes when Taking Digital Photographs in Your Dental Practice?

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Taking dental photographs is becoming a part of daily routine in modern dental practice for staff training, patient education, or marketing. Also, dental photographs allow assessment of treatment outcome. There are 5 common fundamental mistakes that are often made when taking digital photographs: (I) incorrect patient positioning; (II) incorrect camera positioning, (III) incorrect camera settings; (IV) incorrect mirror positioning, and (V) no communication. Most of the times, digital photographs are taken while the patient is sitting on the dental operator chair. With the way most dental operator chairs are designed, the patient will always be sitting on an angle that is not parallel to the person taking the digital photograph. This may cause possible fatigue or create photographs that may look inconsistent. It is recommended to have both the patient and the photographer sit face to face on the same linear plane. One way to do this is to have the patient sit on an “assistant” chair, while the photographer sits on the “dentist” chair. It is critical to always make sure the camera position is the same for every photograph taken (except for the occlusal photographs). If both the patient and the photographer are correctly positioned, then the camera will also be positioned correctly, thereby eliminating or avoiding this mistake. There are two basic settings that are important to remember: the “F stop” and “lens” setting. The former is responsible for the amount of light that enters the camera, and the latter is responsible for “magnification ratios” or “field of view”. When taking most of the photographs, it is recommended that the “F stop” setting be somewhere between 22 and 32. The lens setting is designed to capture images of a certain magnification. The best magnification ratio is 1:3 for most photographs. These ratios must be consistent for before and after images. The most difficult photographs to capture are the occlusal shots. Many times, we see images that do not show enough teeth, have incorrect angles, or show too much soft tissues

(lips). This can be due to a number of reasons, but the most common one is mirror positioning. Place the mirror gently, resting directly on the opposite arch, and take your photograph. In most cases, patients have not experienced taking so many photographs of their mouth in one appointment. When taking these photographs, it is highly important to maintain proper communication with your patient. It is much easier to take photographs after asking your patient to move in the direction needed. Digital dental photography can be very challenging at times, but also very rewarding. These are 5 mistakes that are very common but can be easily corrected with a little guidance.

Keywords: Photography, Dental; Digital; Field of View

Oral Presentation 02

Use of Amniotic Membrane in Periodontal Tissue Engineering

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The inner layer of placenta is a good membrane for many types of therapeutic tissue engineering approaches in different fields of medicine and dentistry. It is an allogenic material in periodontal treatment owing to its favorable properties. Optimal elasticity, production of bioactive peptides, growth factors and cytokines, enhanced migration of epithelial cells, resistance to proteolytic agents, adequate permeability, optimal oxygenation of epithelial cells, inhibition of fibrosis and scar tissue formation, absence and suppression of host immune cells (and subsequent inhibition of graft rejection), antibacterial and antiviral properties, pluripotent stem cells potentially maintained for differentiation, easy clinical application, and low cost are significant and good properties of human amniotic membrane, which are useful for tissue engineering. Amniotic membrane has been successfully used in the field of periodontal therapy for root coverage, treatment of intra-bony defects, treatment of furcation defects, ridge

preservation, and biological dressing of oral ulcers. There is one study with good results which assessed the efficacy of lyophilized amniotic membrane as a graft material to improve tissue management around teeth. It appears that amniotic membrane is a good substitute for attached gingiva in periodontal treatments.

Keywords: Placenta; Membranes, Periodontium; Tissue Engineering

Oral Presentation 03

Relationship of Primary Stability and Long-Term Implant Success

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Although dental implant surgery is incredibly successful with most patients experiencing a success rate of over 95%, this surgical procedure is not suitable for everyone. The success of dental implant treatment depends on several factors such as the prosthetic treatment plan, surgical procedure, choice of a reliable and good implant system, and patient's systemic and physical health. In order to have a successful dental implant treatment, healthy gingiva and sufficient bone support are imperative. After receiving dental implant, gingival health must be maintained, and oral hygiene must be observed even more than before. Multiple visits to a dentist can ensure long-term success and guarantee long-term survival of dental implant. Implant loss can be due to incorrect surgical procedure as the result of inexperience of clinician, lack of proper prosthetic treatment plan, improper prosthetic design, and incorrect force distribution after loading. Among other reasons, the choice of low-quality implant system is also very important, especially in prosthetic phase of treatment. Some types of poor-quality dental implants will never allow performing an optimal prosthetic treatment.

Keywords: Dental Implants; Dental Prosthesis, Implant-Supported; Survival

Oral Presentation 04

Scaffolds for Periodontal Tissue Regeneration

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Scaffolds are highly porous three-dimensional biomaterials with an extracellular matrix base. They can stimulate the regeneration of tissues and organs. Scaffolds serve as a temporary guide for cells in order to adhere, grow, function and synthesize. Therefore, they may regenerate new tissue. Different degradable polymers, both natural and synthetic, have been investigated for different medical applications. Synthetic polymers offer remarkable advantages over natural polymers. Biopolymers have distinctive physical, chemical, biological, and mechanical properties. Polyesters e.g., lactide, glycolide, and caprolactone are the most commonly used synthetic polymers. This review emphasizes on recent advances in various biodegradable polymeric materials. Scaffolds are used for regeneration of complex anatomical structures such as the periodontal tissue; 3D printing or rapid prototyping appears to be a pioneering technique in periodontal tissue engineering. Scaffolds should be processed to create a porous structure for efficient nutrient and metabolite transport with no change in mechanical stability.

Keywords: Tissue Scaffolds; Guided Tissue Regeneration; Periodontium

Oral Presentation 05

Barrier Membrane Exposure: What we Know

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Alveolar ridge resorption after tooth extraction is an issue which can complicate rehabilitation with dental implants. Nowadays, we have several techniques for reconstruction of alveolar ridge. One of the most popular techniques is guided bone regeneration. In this technique, we use a barrier membrane for blood clot stabilization and cell adhesion. In some cases, due to several

mechanical and biological factors during the healing process, we face exposure of membrane to the oral cavity. There is conflicting evidence regarding membrane exposure outcomes in guided bone regeneration. We searched the PubMed using the key words (“alveolar ridge augmentation” OR “ridge augmentation” OR “guided bone regeneration”) AND (“complication” OR “complications” OR “exposure”). For the other databases (Google scholar, Scopus, etc.) the searched key terms included GBR, alveolar ridge augmentation, barrier membrane exposure, soft tissue dehiscence, complication, and exposure. There are several factors which can potentially act as predisposing factors for membrane exposure including type of membrane, amount of keratinized tissue, soft tissue thickness, vestibular depth, flap flexibility, and bone defect type and size. Evaluation of soft and hard tissue biotype before and during surgery is necessary for prevention of barrier membrane exposure in guided bone regeneration.

Keywords: Barrier Membrane Exposure; Soft Tissue Dehiscence; Alveolar Ridge Augmentation

Oral Presentation 06

VISTA Technique for Treatment of Gingival Recession Defects: Indications, Technique, and Outcome

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The vestibular incision subperiosteal tunnel access (VISTA) technique was introduced in 2011 by Dr. Zadeh to treat multiple adjacent gingival recession defects. As primarily described, this procedure applies a connective tissue graft on the root surfaces, which is inserted under a full thickness tunnel through a vestibular vertical incision. The elevated tension-free gingiva is then coronally displaced to completely cover the graft and is anchored to the teeth by bonding sutures. Similar to the conventional tunnel technique, the papillae kept in place will provide greater blood supply to the flap and improve esthetics,

compared with procedures entailing raising the flaps. In addition, thick flap (consisting of the entire gingival tissue and the periosteum) in VISTA leads to better outcomes. Vertical incisions in the vestibule allow carrying the connective tissue more easily compared with the conventional tunnel technique which uses the gingival sulcus to take the graft in; and thus, the risk of gingival rupture will be lower. Positive results in terms of reducing recession depth and width, reducing tooth hypersensitivity, increasing the gingival tissue thickness, and increasing the width of keratinized tissue have been reported following VISTA. This technique was also successfully used for single recession defects around teeth or implants. Although connective tissue is the gold standard, the use of leukocyte- and platelet-rich fibrin and volume-stable collagen matrix has also been investigated, resulting in less patient discomfort. In this lecture, we will describe the VISTA technique in detail by presenting few clinical cases with follow-ups. Moreover, the modifications and the success rate of this technique are reviewed based on the available literature.

Keywords: Gingival Recession; Tooth Root; Surgical Procedures, Operative

Oral Presentation 07

Vertical Ridge Augmentation: Evidence for Success

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Optimal dental implant placement requires normal anatomy of the atrophic ridge. Alveolar ridge atrophy is an inevitable process following tooth extraction. During the past decade, several techniques have been purposed for bone augmentation to achieve maximum esthetics and function in dental implantology. Autogenous bone block augmentation, guided bone regeneration with the aid of different types

of bone substitutes, and regenerative techniques, have all shown promising results for regeneration of the alveolar ridge. In this lecture, we are going to present our clinical experience in bone regeneration by either bone block or creating a protected healing space, and merge it with the current scientific evidence. A general consensus for treatment planning of deficient alveolar ridge will be anticipated at the end of this presentation.

Keywords: Dental Implants; Alveolar Ridge Augmentation; Guided Tissue Regeneration

Oral Presentation 08

Which Parameters Should be Considered in Selection of a Bone Graft Material?

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Biomaterials are one of the three basic parts of bone tissue engineering. Autografts are still the gold standard. Allografts and xenografts, which have been introduced as alternatives, should meet the required standards. At present, natural and synthetic biomaterials also play a critical role in tissue engineering. Many of these products have confirmed their applicability in periodontics based on their predictable results. To decide which biomaterial to choose, we should consider some factors to mimic the autogenous bone structure, e.g. its crystalline structure, micro- and macro-porosity, inter-crystalline spaces, and chemical, physical, and mechanical properties. This short lecture evaluates these properties to select the best bone graft for each situation.

Keywords: Bone Transplantation; Dental Materials; Bone and Bones

Oral Presentation 09

Socket Shield: Why? When? Where?

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Numerous publications have verified that tooth extraction is followed by dimensional changes of the alveolar ridge contour. In order to overcome

the negative consequences of tooth extraction, various treatment approaches such as socket shield have been advocated and described in the literature. The aim of this technique is to keep the periodontium in the marginal area on the buccal side of the implant by partial root retention. Although socket shield technique is safe and provides better esthetic results compared with the conventional post extraction technique, further randomized clinical trials are needed to confirm such preliminary results; thus, it is still too early for its routine clinical application as a general treatment recommendation. In this review, we evaluate the indications, contraindications, advantages, and disadvantages of this technique. Also, we review technical points, which allow obtaining long-term, stable, and predictable outcomes in managing clinical situations.

Keywords: Tooth Socket; Alveolar Process; Periodontium

Oral Presentation 10

Ten-Year Management of Oligodontia

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Oligodontia is a craniofacial malformation. It is almost a rare condition affecting 0.1% to 0.2% of the population. The present study reports orthodontic management of a case of oligodontia with the main focus on surgical management following orthodontic treatment to reconstruct the edentulous areas. After the orthodontic process, several surgical interventions were employed to reconstruct the edentulous areas with dental implants. The results showed the success of treatment strategies. The final restorations were delivered, leading to high level of patient satisfaction. Accurate treatment strategies to manage oligodontia can lead to acceptable esthetic and functional results. The treatment time in such cases might be lengthy, but with a planned treatment protocol, clinicians can reconstruct the edentulous areas in a predictable manner.

Keywords: Autograft; Soft Tissue Grafting; Bone Regeneration; Dental Implants; Hypodontia

Oral Presentation 11**Modern Practical Aspect of Occlusion and Temporomandibular Disorder Therapy**Jens Christoph Turp¹, Omid Mashouf²

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There is no doubt that occlusion is an important topic in clinical dentistry. However, the competing variety of concepts about “normal” and “ideal” dental occlusion relationships has led to some confusions and controversy among dentists. The application of occlusal concepts to patients with temporomandibular disorders has created an area of discussion. In recent decades, however, a considerable part of the dogmatic heritage of this topic has been disproved. Instead, the acceptance of morphological and functional variability has gained increasing support. This change has important consequences for modern dental practice.

Keywords: Dental Occlusion; Temporomandibular Joint Disorders; Temporomandibular Joint

Oral Presentation 12**Photobiomodulation in management of implant-related nerve injuries: From bench to bedside**Neda Hakimiha¹

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Neurosensory impairments as a consequence of dental implant surgery are an important challenge for surgeons. This study aimed to investigate the efficacy of photobiomodulation therapy (PBMT) for management of such injuries based on animal and clinical studies. In order to determine the effect of PBMT on inferior alveolar nerve (IAN) injury, first an animal study was conducted on rats with IAN crush injury. The treatment plan included 810 and 980 nm-mediated PBMT (6 J/cm²). The results were analyzed by von Frey behavioral test and assessment of expression of markers related to nerve regeneration (NGF and BDNF). In the next study, a case series was done on

patients with IAN damage with 10 sessions of PBMT with 810nm laser (10J/cm²). Visual analog scale and pin prick test were used to assess nerve recovery. Both laser wavelengths were effective for neurosensory recovery of IAN in rats, although 810nm PBMT was more effective for modulation of neuroprotective markers. Moreover, in the case series, 810nm-mediated PBMT had significant effects on neurosensory recovery of IAN especially in patients with shorter duration of paresthesia. Based on the encouraging results of the animal and clinical studies, PBMT with infrared diode lasers appears to be a promising and non-invasive method to manage implant-related nerve injuries.

Keywords: Inferior Alveolar Nerve; Low-Level Light Therapy; Nerve Regeneration; Photobiomodulation Therapy

Oral Presentation 13**Deep Marginal Elevation Versus Crown Lengthening Surgery**Mojtaba Bayani¹

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Subgingival caries is a challenge for restorative dentists. Crown lengthening (CL) surgery and deep margin elevation (DME) are two distinct approaches used to manage severely carious teeth. Surgical CL has been the primary procedure to avoid violation of the biological width. In the recent years, DME has been proposed as an alternative procedure for maintaining biological width in cases with subgingival defects. In DME, a portion of direct restoration is placed only at the deep apical part of the cavity to elevate the margin to a more coronal and more adequate position for final cementation of indirect restoration. But there is a lack of high-quality trials to compare CL and DME with long-term follow-ups. Patient- and dentist-reported outcomes have not been given adequate consideration in the literature either. Based on the limited evidence, it can be concluded that for restorative purposes, CL surgery can be successful in long-term retention of restored teeth. As a general rule, DME can be

performed when the remaining sound tooth structure is in the sulcus and at the epithelium level while CL is usually required for caries that reaches the connective tissue or the bone crest. The intention of this lecture was to review the literature in search of scientific evidence regarding the consequences of DME with different materials and compare it with CL procedure.

Keywords: Crown Lengthening; Surgical Procedures, Operative; Root Caries

Oral Presentation 14

Regeneration versus Resection: The Homeostasis Concept in Periodontology

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In biology, homeostasis is the state of steady internal, physical, and chemical conditions maintained by living systems. The same concept can be implemented as a sequence of procedures in periodontology with the main target of saving teeth. In recent years where most clinicians advocate extraction of teeth and replacing them with dental implants, the homeostasis between resective and regenerative approaches can act as a tool to save teeth instead of extraction. This presentation will demonstrate clinical cases with the homeostasis approach to achieve optimal function of the teeth. The cases consist of osseous surgery versus guided tissue regeneration, esthetic and functional crown lengthening versus root coverage procedures, orthodontic extrusion versus tooth exposures, and many more.

Keywords: Regeneration; Surgery, Homeostasis; Periodontics

Oral Presentation 15

Lip-Switch Procedure

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Following tooth loss, a continuous process of alveolar ridge resorption starts. As the denture

bearing area becomes smaller, denture stability and retention decrease. Long-term use of ill-fitting dentures can further aggravate the problem by accelerating alveolar ridge resorption. As the alveolar process resorbs, the adjacent muscles are found to attach at or near the residual ridge crest. The residual gingiva is diminished and the labio-buccal vestibule and lingual sulcus become shallow. To compensate for this reduction in size and effectiveness of denture bearing area, the patient must depend increasingly on the use of lips. The lip-switch procedure (trans-positional flap vestibuloplasty) is the most useful technique in repair of full-thickness defects or deformities of the upper lip. In this procedure, a pedicled mucosal flap is elevated and sutured to the depth of the vestibule. The inner portion of the lip is allowed to heal by epithelialization. This technique provides adequate results in many cases and generally does not require hospitalization, donor-site surgery, or prolonged periods without a denture. The disadvantages include unpredictability of the amount of relapse of the vestibular depth, scarring at the depth of the vestibule, and problems in adaptation of the peripheral flange area of the denture to the depth of the vestibule. Lip-switch is an incision in labial mucosa, a thin mucosal flap is dissected from the underlying tissue, the labial mucosal flap is sutured, and the labial tissue heals by secondary intention.

Keywords: Lip-switch Procedure; Trans-positional Flap Vestibuloplasty

Oral Presentation 16

How to Manage the Sockets with Buccal Bone Loss?

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Following tooth extraction, the physiological remodeling process results in reduction of horizontal and vertical dimensions of the ridge. Resorption appears to be more pronounced at the buccal than the lingual/palatal aspects of the ridge. The buccal bone plate in the anterior region often has less than 1mm width, which leads to severe alveolar ridge collapse and soft

tissue alterations and subsequent gingival recession, papilla loss, and esthetic concerns. At least 2mm of bone on the buccal side of the implant is needed to achieve long-term stability and health of peri-implant tissues as well as optimal esthetics. Since implants placed in the sockets with a buccal bone thickness less than 1mm are at higher risk of dehiscence and horizontal resorption of alveolar crest, bone augmentation is important in such cases. This study presents various techniques for buccal contour augmentation. In some cases, guided bone regeneration was performed simultaneously with immediate or delayed implant placement. In other cases, staged ridge augmentation was performed. In such cases, various materials such as autogenous bone harvested from intraoral sources or deproteinized bovine bone mineral had been used. Because of the osteogenic potential of autogenous bone, it can accelerate new bone formation at the bone-implant interface. On the other hand, deproteinized bovine bone mineral particles have a very slow resorption rate and provide long-term volumetric stability for contour augmentation. Moreover, in some cases, soft tissue augmentation was performed to increase the soft tissue thickness and decrease the probability of marginal bone loss around implants.

Keywords: Alveolar Bone Loss; Tooth Socket; Dental Implants

Oral Presentation 17

Treatment Plan for Non-Carious Cervical Lesions Accompanied by Gingival Recession Defects

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There are various indications for treatment of non-carious cervical lesions (NCCLs) namely (I) compromised esthetics especially when the lesion is hyper-pigmented, (II) dentin hypersensitivity and patient discomfort, and (III) plaque accumulation and hygiene problems. Therefore, because of the importance of NCCL defects, in this lecture, the etiology and

diagnosis, classification of defects, different treatment plans (surgical, restorative, combination), key points in surgical and nonsurgical approaches, and review of some cases of treatment of NCCL defects will be discussed.

Keywords: Gingival Recession; Tooth Cervix; Periodontics

Oral Presentation 18

Peri-implantitis; When to Reconstruct and When to Explant?

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Peri-implantitis is among the common complications related to implant therapy and similar to periodontal diseases it's important to be aware of etiological and predisposing factors of this problem to be able to prevent and/or manage it. Depending on the severity, defect morphology and 3-dimensional positioning of implants the right decision should be made whether the implants can be maintained or are in direction for explantation. In cases that decision is on maintaining the diseased implants it's important to classify the treatment process on which it can be resective or regenerative. In this presentation the following objectives will be discussed:

- Diagnosis of peri-implantitis cases
- Evaluation of defect morphology
- Classification of peri-implantitis defects
- Proper criteria for regenerative approaches in treatment of peri-implantitis cases
- How to disinfect contaminated implant surfaces
- When to decide to remove failing implants
- What are the minimally invasive approaches to remove implants

Keywords: Peri-Implantitis; Reconstructive Surgical Procedures; Dental Implants

Oral Presentation 19

Byproduct of Stem Cell Preparation (BSC) Effects in Periodontology Problems

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This subject involves the materials harvested after cell culture and cell expansion of stem cell preparation in clean rooms. The material is called Byproduct of Stem Cell (BSC) preparation and is known to affect and accelerate or improve healing of periodontal problems. Periodontal disease is a critical cause of tooth loss and is characterized by inflammation and recession of tooth-supporting structures. Considering the association between periodontal disease and other health issues, the importance of treating this disease for improvement of general health becomes more important. The ultimate goal of periodontal therapy is regeneration of damaged periodontal tissues. The development of adult stem cell research enables clinicians to improve cell-based tissue engineering for periodontal regeneration. Stem cells and cell culture media have been tested for treatment of periodontal diseases. This lecture will present edge of knowledge of BSC materials that are applied in clinical and research settings for periodontal treatment. The references were extracted from NCBI and Science Direct websites with 'stem cell preparation protocols', 'by-product of cell culture phenomena' and 'BSC usage in periodontal problems', as key words. Guided tissue regeneration and guided bone regeneration are tissue engineering methods, but the techniques are a method of regeneration and are not related to tissue engineering techniques. A technique for BSC extraction and treatment protocols in periodontal issues in worldwide academic and clinical centers shall be presented

Keywords: Stem Cells; Guided Tissue Regeneration, Periodontal; Periodontium

Oral Presentation 20

Effect of FGF-2 on Periodontal Ligament Regeneration of Replanted Teeth: A Systematic Review of Animal Studies

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Fibroblast growth factor-2 (FGF2) is a signaling molecule that affects cell proliferation and wound healing. Tooth replantation has encountered many problems like ankylosis or root resorption, which leads to treatment failure. This systematic review aims to assess the effect of FGF2 on periodontal ligament regeneration in replanted teeth in vivo. With the query of ((fibroblast growth factor 2 OR FGF2 OR basic fibroblast growth factor) AND (replanted teeth OR transplanted teeth)), an electronic search was done in PubMed Central and Scopus databases. The full text articles in English that assessed the effect of FGF2 on periodontal regeneration of replanted teeth were included. The articles that assessed only the combination effects of factors were excluded. The treatment groups, healing time, and histologic data about root resorption, ankylosis, periodontal ligament regeneration, and cementum formation were extracted and summarized. Finally, seven articles met the inclusion criteria and were included in the study. The studies used various methods, which makes the comparison difficult. However, all of them showed higher periodontal ligament formation and lower ankylosis in comparison with no treatment group. The application of FGF2 is a favorable method for regeneration of damaged periodontal ligament and cementum in tooth replantation.

Keywords: Fibroblast Growth Factor 2, Periodontal Ligament, Tooth Replantation

Oral Presentation 21

Periodontal Approach in Root Coverage of the Non-Carious Cervical Lesion (NCCL)

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Non-carious cervical lesion is defined as the wear of gingival one-third level of the tooth due to reasons other than carries with multifactorial etiology. Gingival recession (apical shifting of gingival margin from its position at the level of the CEJ or 1mm coronally) without loss of interproximal attachment and bone is not always curable. CEJ is the most widely used

parameter to assess the root coverage result. Moreover, the ideal vertical dimension of interdental papilla determines the line of root coverage which the soft tissue margin will be stable after root coverage surgical procedure. The dentin of the anatomic crown and the one belongs to the root is similar in color that makes it impossible to measure the gingival recession especially in teeth with abrasive lesions at the level of the CEJ. This presentation provides some methods to estimate the amount of root coverage by considering all of the above-mentioned criteria and also compare the predictability of the methods of maximum root coverage.

Keywords: Gingival Recession; Tooth Cervix; Periodontics

Oral Presentation 22

Opportunities and Threats of Mobile Dental Clinics

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Dental services are not available in all parts of the country or to some people with special conditions such as the elderly and the disabled who can hardly go to the dentist. Mobile dental clinics provide easy access to dental care for such circumstances. However, performing treatments in these clinics provides some opportunities and poses some threats that we will be addressed in this paper.

Keywords: Dental Clinics; Mobile Health Units; Dentists

Oral Presentation 23

Post-Surgical Management of Dental Implants

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Appropriate postoperative care and management of peri-implant tissues are necessary for long-term success of dental implants. Since dental implant treatments are among the major dental procedures, knowledge about their maintenance is essential. In this study, we discuss postoperative monitoring of peri-implant soft and hard tissues, plaque control, oral hygiene, and occlusion. Moreover, we

suggest supportive modalities such as oral hygiene practice, scaling, and reline. According to the results, such supportive procedures are necessary for favorable long-term prognosis of dental implants.

Keywords: Dental Implants; Long-Term Success Rate; Postoperative Supportive Care

Oral Presentation 24

Assessing Periodontal Indices and Associated Factors in a Group of Employees of the Telecommunication Company in Tehran in 2019

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This study aimed to assess the periodontal health status of a group of Telecommunication Company employees in Tehran in 2019. The WHO-suggested protocol for oral health survey and a convenience sample of 426 employees comprised the basic elements of this cross-sectional study. Data regarding the employees' oral health knowledge, behaviors, and status were collected through oral examination and using a self-administered questionnaire. Statistical evaluation included the Chi-square test, t-test, and ANOVA. The participants' mean age was 45.89 (± 8.17) years, and 63% were males. The majority of the respondents were aware of the effectiveness of tooth brushing and dental flossing in prevention of oral diseases, and the relationship between oral health and general health. Twice a day toothbrushing was reported by 28% and daily dental flossing by 48% of the participants. Also, 93% were non-smokers. Almost 26% of the participants had bleeding on probing, 14% had periodontal pocket (probing depth > 4 mm), and less than 6% showed at least one site with attachment loss in indexed teeth. These employees appeared to enjoy a good level of access and utilization of dental care services considering the low percentages of periodontal indices. Better maintenance and further improvement of their oral health would require comprehensive and continuous oral health promotion programs.

Keywords: Telecommunications; Periodontal Index; Surveys and Questionnaires

Oral Presentation 25

Soft Tissue Augmentation around Teeth and Implants: Dos and Don'ts

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Gingiva is part of periodontium which is important for dental esthetics, function, and health. Soft tissues around teeth might be injured due to different reasons and need to be reconstructed. Dental implants, used to replace the lost teeth, need enough amount and thickness of keratinized tissue for long-term survival and success. There are different techniques for soft tissue augmentation around teeth and implants with special indications. The most important issues for success in soft tissue reconstruction around teeth and implants are appropriate technique selection and adhering to the related principles. In this panel discussion, we will discuss the dos and don'ts of soft tissue augmentation around teeth and implants.

Keywords: Tooth; Dental Implants; Reconstructive Surgical Procedures

Oral Presentation 26

Maxillary Sinus Floor Elevation: Why, When, How?

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One of the most challenging issues in implant dentistry is implant placement in an atrophic edentulous posterior maxilla. Sinus floor elevation has been proven to be a promising technique for reconstruction of atrophic bone in the posterior maxilla. A number of

techniques have been presented for maxillary sinus floor augmentation. Selection of the type of technique mainly depends on factors such as vertical bone height, marginal bone width, local intra-sinus anatomy, and number of teeth to be replaced, although some other factors (such as surgical training and experience) may have an impact on the outcome as well. Besides, type of bone substitute which is used in sinus floor elevation procedure is another challenging issue. Autogenous bone, allografts, and xenograft have been proposed, and even some researchers suggested sinus floor elevation without using any material. In this panel, we are going to present some cases and also different techniques for sinus floor elevation and discuss their advantages and disadvantages.

Keywords: Maxilla; Sinus Floor Augmentation; Surgical Procedures, Operative

Oral Presentation 27

Predictable Soft Tissue Augmentation: Is it Real or Myth?

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In addition to periodontal pocket reduction, one objective of periodontal surgery is correction of anatomical defects that may enhance plaque/biofilm accumulation, and impair esthetics. Lack of keratinized attached gingiva around the dentition may make it difficult for the patients to practice good plaque/biofilm removal. Surgical correction of such anatomical defects by gingival augmentation is an example of utilizing periodontal plastic surgery to alter the gingival anatomy. Periodontal plastic surgery can also help improve gingival esthetics where there is excessive gingival margin recession, and prevent future progression of recession defects. Numerous periodontal plastic surgical procedures are currently available, and the future of tissue engineering would allow minimally invasive surgical procedures. Periodontal plastic

surgery would accordingly be defined as “surgical procedures performed to prevent or correct anatomical, developmental, traumatic or disease-induced defects of the gingiva, alveolar mucosa, or bone” (Proceedings of the 1996 World Workshop in Periodontics 1996). Among the treatment procedures that may fall within this definition are various soft and hard tissue procedures aimed at gingival augmentation, root coverage, prevention of ridge collapse associated with tooth extraction, and augmentation of the edentulous ridge. The focus of our panel is mainly on gingival augmentation procedures to enhance soft tissue thickness and its dimension, manage complications, discuss root coverage procedures, recent updates, indications and contraindications and finally importance of augmentation of edentulous ridge, and best evidence and techniques to improve ridge defects.

Keywords: Surgery, Plastic; Reconstructive Surgical Procedures; Tooth Root

Oral Presentation 28

Allograft or Xenograft: From Concept to Application

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This panel discussion will focus on the use of xenografts and allografts in periodontics and implant dentistry from the biological and clinical points of view. We will try to go through the biological aspects of xenografts and allografts to understand their advantages and disadvantages and also for coming to a conclusion regarding their proper use in the clinical setting. We will try to answer the questions asked by the panel participants to the best of our ability.

Keywords: Allografts; Heterografts; Periodontics

Oral Presentation 29

Challenges of Implant Placement Protocols: Immediate, Early, or Delayed?

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Following tooth extraction, a series of physiological changes take place in the alveolar bone surrounding the extraction socket. These include bone formation in the socket as well as volumetric resorption which leads to modifications in the dimensions and contours of the alveolar ridge. It is recommended that a careful examination be carried out before and immediately after tooth extraction in order to assess the applicability of different therapeutic strategies of implant placement or socket preservation. However, a series of case-specific factors may guide the clinician's choice towards one of the various techniques. An immediate implant placement protocol, characterized by implant placement at the time of tooth extraction. An early implant placement protocol, characterized by implant placement 4-8 weeks after tooth extraction. A delayed implant placement protocol, characterized by implant placement 12-16 weeks following tooth extraction. Each technique has its own specific indications, advantages, and limitations, which will be discussed in this panel. Without evidence-based scientific and objective knowledge, we cannot formulate proper treatment plans and achieve optimal, stable results over time. Thus, in this panel, we will focus on summarizing the scientific evidence and provide clinical recommendations relevant to these therapeutic alternatives that can assist in the decision-making process.

Keywords: Dental Implants; Periodontics; Immediate Dental Implant Loading

Oral Presentation 30

Computer-Assisted Implantology: Dealing with Challenges and Opportunities

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This panel explores the approaches proposed in the field of computer-assisted implant-supported prostheses attempting to refine the controversial and challenging concepts. Multiple simple, complicated, and complex cases are discussed focusing on different situations in the context of the software, and anatomical, surgical and prosthetic considerations. Every single comment from our colleagues in the remaining time is commendable and we are proud to have you as a member of our team.

Keywords: Therapy, Computer-Assisted; Dental Implants; Case Management

Oral Presentation 31

Current Challenges for Tissue Reconstruction in the Esthetic Zone

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The science of periodontology and implant dentistry is advancing rapidly, and many topics from biology to clinical practice are being criticized and re-evaluated. Scientific documentation in the field of periodontology has a longer history, and many therapists have reached a relative agreement on the choice of effective treatments. Challenging issues in the field of tissue reconstruction and implantology are more

frequent because the basic data and long-term clinical studies in these two areas have been limited. Therefore, in the first panel of the congress, we will address a mixed challenging topic in the esthetic zone. With the help of experts and based on the available evidence, a clear picture of the existing opinions and documents on each topic will be provided to the colleagues.

1. Which one is a more challenging issue in surgical phase of esthetic implantation: single or multiple implant placement?

2. What kind of dental implants do you prefer for esthetic/immediate implantation?

3. Which one is an absolute contraindication for immediate implant placement in the esthetic zone?

4. Which of the following treatments should be done in all immediate implantations to predict the ultimate outcomes?

5. Which material do you recommend for gap filling/contour augmentation?

6. Which material do you recommend for phenotype biomodification procedures?

7. Which surgical procedure is efficient for papilla reconstruction?

8. What kind of bone defects could be managed with particulated bone graft+barrier membranes?

9. Is there any difference in hard tissue augmentation techniques and their success rate for the anterior maxilla and posterior sites?

10. What is the most challenging issue of implant therapy for young adults?

Keywords: Dental Implants; Esthetics, Dental; Reconstructive Surgical Procedures

Oral Presentation 32

Optimal Timing Sequence of Different Surgical Procedures

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One of the prerequisites for the success of periodontal/implant treatment is a treatment plan tailored to the clinical condition of each

case. In many clinical cases, several different treatments are needed in different fields. Apart from choosing the right techniques, it is important to know which treatment should be done before the other and which treatment is a prerequisite for the success of subsequent one. The choice of timing should be based on biological principles and accurate knowledge of the tissue repair process. The main purpose of this panel is to present the accepted schedule of the selected working group based on clinical documentation. Obviously, in cases where the documentation is flawed or controversial, expert opinions based on clinical experience are invoked. The required healing time for about 20 conditions from tooth socket healing, alveolar ridge reconstruction, soft tissue augmentation, papilla maturation, and sinus grafting to loading protocols, etc. will be discussed.

Keywords: Reconstructive Surgical Procedures; Dental Implants; Periodontics

Oral Presentation 33

Exposure of Impacted Teeth: Closed or Open Approach?

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Based on classifications of impacted canines in recent articles, which are almost dependent on the severity of impaction, different surgical methods for exposure of canines and applying orthodontic forces are chosen by orthodontists and periodontists which mainly fall into 2 categories: open and closed. Both of these techniques have their own pros and cons, and there have been long lasting discussions about them among surgeons and orthodontists. Esthetic aspects, possibilities of re-exposure, periodontal attachment considerations, and orthodontic feasibility are the main topics in this era. In this panel, after a lecture defining these methods, skilled specialists are going to share their experiences about indications

of these methods from both orthodontics and periodontics aspects and there will be a free discussion and question and answer session at the end. The required healing time for about 20 conditions from tooth socket healing, alveolar.

Keywords: Tooth, Impacted; Cuspid; Orthodontics; Surgical Procedures, Operative

Oral Presentation 34

How to Manage Peri-implantitis?

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Contemporarily, the prevalence of peri-implantitis is increasing worldwide, and correct treatment of peri-implantitis is a major essential requirement; but there is so much controversy about the treatment approaches. In this panel, non-surgical treatments of peri-implantitis (mechanical debridement, chemical treatment, and photodynamic therapy), surgical treatments (regenerative and resective treatments of peri-implantitis), surface decontamination techniques, and implantoplasty will be discussed. Also, due to the importance of presence of keratinized tissue around implants, soft tissue surgery and its indications will be argued.

Key Words: Peri-implantitis; Reconstructive Surgical Procedures; Dental Implants

Oral Presentation 35

Lasers for Gingival Depigmentation, Decontouring, and Treatment of Peri-Implant Disease: Reality or Fantasy?

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The laser technology and laser applications are growing rapidly in medical sciences, and particularly in dentistry. During the past decades, there has been an increased interest in minimally invasive surgery, and considering the limitations and complications of conventional scalpel surgery, laser surgery can be proposed as a novel modality in surgical field. Different laser types with different wavelengths and capabilities are available. Correct selection of the wavelength and parameters of laser is highly important to create sustainable beauty with minimal damage. Herein, we will discuss the proper applications of this technology by presenting special cases requiring some cosmetic surgical procedures such as gingivectomy, increasing the length of the clinical crown in smile design, and correction of gingival hyperpigmentation. Moreover, by the increase in utilization of dental implants, the prevalence of peri-implant diseases is also on the rise. Considering the complexity of peri-implant diseases and specific limitations in their management, paying attention to new technologies may help in this regard. In the second part, clinical cases and their management with laser-assisted techniques will be discussed and compared with the conventional methods. We will also discuss the dos and don'ts without prejudice, because this technology has its own limitations and possible complications (in case of incorrect use). Finally, we will try to draw a scientific and clinical conclusion by providing a proper understanding of the advantages and weaknesses of this technology.

Keywords: Peri-implantitis; Lasers; Pigmentation

Oral Presentation 36

How to Manage “Gummy Smile”?

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Correction of gummy smile is taken into consideration to improve the facial aesthetics. The excessive gingival display might be due to different etiologies including lip hypermobility or short lip, vertical maxillary excess and delayed or altered passive eruption. In the present section, patients with a variety of aesthetic needs ranged from straightforward treatments to patients with complicated situations are evaluated from periodontal, prosthodontic and maxillofacial surgery viewpoints.

Keywords: Gingiva; Esthetics; Periodontics; Prosthodontics; Surgery, Oral

Oral Presentation 37

Three-Dimensional Radiographic Analysis of the Socket-Shield Technique to Preserve Maximum Tissue in Immediate Implant Replacement of two Traumatized Central Incisors: A Case Report

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Extraction socket healing occurs through a remodeling process that leads to vertical and horizontal tissue loss. The socket-shield technique has demonstrated histological and clinical evidence of preventing soft and hard tissue alteration following tooth extraction. This study describes a case with severe trauma to central incisors leading to fracture of teeth #11 and #21 and labial displacement of tooth #21. Immediate implant placement using the socket-shield technique was performed where buccal root membranes were prepared to preserve maximum soft and hard tissue after tooth extraction. The 3D analysis of alveolar bone was done using cone-beam computed tomography before, 2 weeks after, and 12 months after implant placement. The 3D radiographic analysis of alveolar bone showed minimal loss of buccal bone volume in both peri-implant areas. The socket-shield procedure appears to be a promising surgical technique for maximum tissue preservation in immediate implant

replacement of traumatized and displaced anterior teeth.

Keywords: Socket-Shield; Tissue Preservation; Immediate Implant Placement

Oral Presentation 38

Non-Invasive Bone Tapping Drill as an Effective Instrument in Maxillary Sinus Floor Elevation Via the Crestal Approach: Clinical Note and Case Report

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Increased maxillary sinus pneumatization may contribute to reduction of alveolar bone in the maxillary posterior region. In the situation of limited bone height (4-5 mm), the crestal approach is less invasive than the lateral approach for sinus floor elevation. A variety of modified techniques have been proposed for the crestal approach, all of which are based on reducing invasiveness and subsequent surgical complications. The use of bone tapping drill which has a cylindrical design with a round end and is included in some implant surgical kits may minimize the possibility of membrane perforation due to its non-invasive design. The purpose of this study is to present a minimally invasive technique using a bone tapping drill combined with platelet rich fibrin in transcresal sinus floor elevation.

Keywords: Maxilla; Sinus Floor Augmentation; Surgical Procedures, Operative

Oral Presentation 39

Platelet-Rich Fibrin in Combination with Collagen-Based Matrices for Enhancing the Keratinized Oral Mucosa by Means of Open Healing Concept

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Several treatment modalities have demonstrated their potential to increase the width of keratinized tissue around teeth/implants. Collagen-based matrices such as acellular dermal matrices are among such treatment modalities. This case series

introduces a novel surgical technique using a collagen-based matrix and platelet rich fibrin (PRF) to create keratinized mucosa before or after implant placement according to the open healing concept. The cases were successfully treated with PRF-collagen matrix sandwich graft technique with a 54-month follow-up. The outcomes encourage a novel combination of PRF+collagen-based matrix to increase keratinized tissue around natural teeth or dental implants. Within the limits of these case presentations, this technique might present a viable alternative to autogenous gingival graft when it is necessary to increase the dimensions of keratinized attached mucosa. Further research is necessary to shed more light on the effectiveness and underlying biological mechanisms of this approach.

Keywords: Platelet-Rich Fibrin; Mouth Mucosa; Case Management

Oral Presentation 40

A Modified Technique to Enhance Soft Tissue

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Having adequate keratinized and attached gingiva is one of the prerequisites to have healthy gingiva and periodontium. Keratinized and attached gingiva are imperative for resistance to trauma, especially when the tooth serves as an abutment for partial denture or is going to be restored or undergo orthodontic treatment. Free gingival graft is one of the most documented procedures to increase keratinized tissue. Acellular dermal matrix (ADM) has been used as a substitute for this procedure with less morbidity but too much shrinkage. We will herein introduce a modified combination approach to tackle these problems. Eleven patients with bilateral shortage of keratinized tissue were enrolled and divided into ADM and ADM with strip free gingival graft groups. After 3 and 6 months, the amount of keratinized and attached tissue gain in the combined group was significantly more than that the ADM group. Using a combination of strip free gingival graft and ADM is a promising approach to gain keratinized and attached tissue with less

morbidity for patients especially when an extensive area needs to be grafted.

Keywords: Keratinized tissue; Attached tissue; Acellular dermal matrix; Strip free gingival graft

Oral Presentation 41

Platelet-Rich Fibrin and Acellular Dermal Matrix in Vertical Soft Tissue Augmentation

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Initial thickness of soft tissue is proven to be beneficial for implant placement, due to preserving the biological width and therefore preventing subsequent bone loss. This randomized controlled trial aimed to compare the efficacy of platelet-rich fibrin (PRF) and acellular dermal matrix (ADM) for increasing vertical soft tissue thickness around dental implants. A total of 20 consecutive patients, comprising of 13 females and 7 males, were randomly allocated to PRF and ADM groups. Putty impressions were made from each patient. Titanium implants were inserted into the posterior mandible through a full-thickness flap elevation. According to the group allocation of patients, the crestal bone was covered with either two layers of PRF membrane or one layer of ADM membrane (0.6-1 mm thick), prior to soft tissue closure. Soft tissue thickness was measured before implant placement and 3 months later, at reentry. This was accomplished using a #15 endodontic file and electronic caliper. When evaluated at 3 months post-implantation, all 20 implants were successfully osseointegrated. The crestal tissue thickness in PRF and ADM groups increased from 1.66 ± 0.23 mm to 3.3 ± 0.75 mm, and 1.52 ± 0.22 mm to 2.58 ± 0.47 mm, respectively. This increase was statistically significant in both groups ($P < 0.05$). Tissue thickness after 3 months in the PRF group was significantly greater than that in the ADM group ($P < 0.05$). Application of both PRF and ADM

can lead to significant tissue gain around dental implants.

Keywords: Dental Implants; Guided Tissue Regeneration; Platelet-Rich Fibrin; Acellular Dermal Matrix

Oral Presentation 42

Effect of Omega-3 and Ibuprofen on Human Osteoclasts

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Several inflammatory cytokines are released during chronic periodontitis, which can affect several cells particularly osteoclasts. High expression of some genes such as TRAP and MMP1 is a characteristic of mature and active osteoclasts. Osteoprotegerin (OPG) is another receptor for RANKL and a potent inhibitor of osteoclastogenesis that acts as a decoy receptor for RANKL M-CSF release by fibroblasts and endothelial cells, and RANKL expression by osteoblasts. Cell culture was done using human osteoclast precursors according to the manufacturer's protocol. Next, mRNA was extracted using Rneasy mini kit following the manufacturer's protocol. Real-time polymerase chain reaction was conducted to quantify the level of gene expression. The results showed that omega-3 and ibuprofen decreased osteoclastic activity by reducing the expression of TRAP and MMP-1. The use of omega-3 fatty acid and ibuprofen may reduce osteoclastic activity indicating the importance of using supplements in treatment of chronic periodontitis.

Keywords: Chronic Periodontitis; Omega-3 Fatty Acid; Ibuprofen; TRAP; MMP; Human Osteoclast

Oral Presentation 43

Assessment of Soft and Hard Tissue around Single Implants Based on Gingival Biotype in the Posterior Region of the Mouth

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Due to the growing acceptance of dental implants by patients, use of dental implants to replace the missing teeth is currently a standard treatment option. Achieving optimal esthetics is a goal in dental implant treatment, which depends on three factors: proper position of implant, the amount of bone in the buccal surface of implant, and soft tissue condition around the implant. This study was conducted on 48 single-unit implants selected from the patients of a private office one year after implant placement, and the gingival biotype of patients was evaluated using the trans-gingival probing method. After classifying the gingival biotype of patients, the periodontal status around the posterior dental implants was evaluated by assessment of bleeding on probing, pocket probing depth, plaque index, and gingival index in each of the thin and thick gingival biotype groups, and then the extent of bone resorption around the implant (bone loss) was determined radiographically. Parallel periapical radiographs were obtained to measure the rate of bone resorption. The relationship between gingival biotype and bone loss, bleeding on probing, pocket probing depth, and gingival index was significant ($P < 0.05$), while the relationship between gingival biotype and plaque index was not significant ($P > 0.05$). The hard tissue condition was better in cases with thick soft tissue biotype around dental implants than thin biotype.

Keywords: Dental Implant; Gingival Biotype; Peri-Implant Soft and Hard Tissue

Oral Presentation 44

Socket Shield in Implant Therapy: A Review and Case Series

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Tissue loss and volumetric changes of alveolar bone following tooth extraction are a challenge for clinicians. Although augmentation procedures are successful to compensate such changes, they sometimes are invasive, expensive, and time consuming. Thus, it is important to develop methods to preserve the tissue. Hurzeler et al, in 2010 described the socket shield technique, and

Gluckman and Salama in 2017 further developed it. In this technique, the buccal portion of root and its periodontal ligament maintain the buccal wall of the socket, and implant is placed palatal to the shield. Fifteen cases of socket and pontic shield (8 patients) in the esthetic zone and their short-term follow-up and additional interventions to manage early complications are reported in detail through photographs. Comprehensive review of the literature was also conducted. All implants were integrated successfully. Clinical and radiographic parameters were satisfying. Soft tissue and bone condition was completely healthy. Minor complications such as internal shield exposure occurred in three cases which were resolved by simple microsurgical soft tissue grafting. More recently, a previously published literature review concluded that this technique potentially offers promising outcomes, reducing the need for invasive bone grafts, but clinical data to support it are still very limited. A lack of prospective randomized controlled trials on this topic is evident. Use of socket shield in areas of esthetic demands appears to be a proper modality and leads to more esthetic outcomes. However, more trials and case-control studies are needed.

Keywords: Partial Extraction Therapy; Dental Implants; Fresh Socket; Socket-Shield; Root-Membrane

Oral Presentation 45

Alveolar Ridge Splitting Using a Micro-Saw with Immediate Implant Placement in the Interforaminal Region of the Mandible: A Technical Note and Review of Literature

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The alveolar ridge split technique is a biologically oriented method, taking advantage of the osteogenic and osteoconductive dynamics of native bone. Some clinicians introduced a ridge expansion technique using hand osteotomes to create localized expansions of the developing osteotomy sites, while others introduced the bone flap in conjunction with hand chisels to achieve expansion of the existing

ridge. These two techniques make use of the elasticity of the bone ridge, and are recommended in presence of soft quality of bone; however, they have mechanical limits when the residual bone is highly mineralized. The aim of this paper is to present and discuss ridge splitting in the anterior mandible using a micro-saw for horizontal bone augmentation with simultaneous implant placement. A review of literature was also conducted. Under local anesthesia, a crestal incision was made, and a partial thickness mucoperiosteal flap was reflected. After cutting the ridge with a micro-saw into two parts at the interforaminal region, osteotomes and chisels with increasing dimensions were cautiously used to expand the alveolar ridge to facilitate immediate placement of implants. Fracture of the buccal alveolar plate occurred in one region, which was stabilized with osteosynthesis screws. Low-level laser was applied at multiple points to decrease pain and swelling, and induce osteogenesis. A cone-beam computed tomography scan was performed 4 months after the split, which revealed successful bone augmentation and implant osseointegration. The alveolar ridge split technique with a micro-saw is a predictable procedure with the major advantage of simultaneous bone augmentation-implant placement, which provides reduced treatment time and cost.

Keywords: Alveolar Ridge; Dental Implant; Ridge Split; Micro-Saw; Mandible

Oral Presentation 46

Periodontal Indices, Body Mass Index, and Vascular Age

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This study aimed to investigate the relationship of chronic periodontitis with body mass index (BMI) and vascular age through the pulse wave imaging method. In this cross-sectional study, 491 patients were evaluated. Patients were

divided into periodontitis (n=61 patients) and healthy control (n=430) groups according to bleeding on probing, gingival index (GI), and the Community Periodontal Index of Treatment Needs score. Moreover, vascular age as well as patients' BMI were measured. Vascular age was measured by the pulse wave imaging system with a bio-impedance device. Statistical analyses were performed using SPSS version 22 ($\alpha=0.05$). The age range was 35 to 60 years with a mean age of 42.15 ± 6.20 years in the healthy group and 48.51 ± 7.46 years in the periodontitis group. The mean BMI and HDL variables did not differ significantly between periodontitis and healthy groups. The mean velocity, fasting blood sugar, triglycerides, cholesterol, and LDL were significantly higher in the periodontitis group. The healthy group had the highest frequency of zero GI, while the periodontitis group had the highest frequency of low GI, and the healthy and patient groups had the second highest frequency of low and moderate GI, respectively. The risk of periodontal disease increased with age. Moreover, patients with periodontitis had higher velocity, cholesterol, fasting blood sugar, and triglycerides, indicating a higher risk of cardiovascular disease in periodontitis patients.

Keywords: Cardiovascular Diseases; Periodontitis; Vascular Age

Oral Presentation 47

Effect of Low-Level Laser Therapy on Gene Expression by Periodontal Ligament Stem Cells

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This study aimed to evaluate the effect of low-level laser therapy (LLLT) on the expression of RUNX2, ON, Col-1 and ALP genes in periodontal ligament stem cells (PDLSCs). PDLSCs were obtained from Dental Research Institute of Tehran University. Laser with 635nm wavelength and 0, 1, 3, or 5 J/cm² energy density was irradiated to the osteogenic medium at 0 and 48 hours. For polymerase chain reaction test, first the RNA of RUNX2, ON, Col-1 and ALP genes was extracted, and then reverse

transcriptase test was performed. The expression levels of the genes were evaluated in comparison with GAPDH. Regarding ALP, after 7 days of irradiation, only 5J/cm² energy density of laser promoted the expression of ALP in PDLSCs. However, after 14 days of irradiation, no increase in ALP activity occurred. Expression of Col-1, OPN, OCN, and RUNX2 proteins in the irradiated groups was higher than in the control group. Our results confirmed that LLLT (635 nm) promotes gene expression of osteogenic proteins including Col-1, OPN, OCN, and RUNX2. Therefore, LLLT may be effective in enhancing the osteoblastic differentiation potential of PDLSCs.

Keywords: Low-Level Laser Therapy; Periodontal Ligament Stem Cell; Gene Expression

Oral Presentation 48

Effect of Topical Injection of Platelet-Rich Plasma on Secretion Of IL-6, IL-8, Nitrous Oxide, Prostaglandin E2, RANKL and OPG Biomarkers in Gingival Crevicular Fluid During Orthodontic Tooth Movement in Dogs

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The aim of this study was to investigate the effect of local injection of platelet-rich plasma (PRP) on secretion of interleukin (IL)-6, IL-8, nitrous oxide, prostaglandin E2 (PGE2), RANKL, and OPG biomarkers in gingival crevicular fluid during orthodontic movement in dogs. This study was performed on six male dogs. After extraction of maxillary first premolars, a nickel-titanium spring (200 g) was placed between the second premolar and canine teeth. In each dog, a mixture of thrombin-calcium chloride and PRP was randomly injected in the case group. Thrombin-calcium chloride was injected with placebo (0.9% sodium chloride solution) in the

control group. After paraclinical data collection, data were analyzed by SPSS using ANOVA and independent t-test. A significant increase was observed in secretion of OPG and RANKL biomarkers (P<0.001), PGE2 (P=0.04), nitrous oxide (P=0.003), IL-6 (P=0.046) and IL-8 (P=0.003) in gingival crevicular fluid during orthodontic tooth movement. Elevated levels of these mediators accelerated orthodontic tooth movement (P=0.04). Injection of PRP increased the levels of IL-6 and IL-8, nitrous oxide, PGE2, RANKL, and OPG in gingival crevicular fluid during orthodontic tooth movement in dogs.

Keywords: Orthodontic Tooth Movements; OPG; RANKL; IL-6; IL-8; Nitrous Oxide; Prostaglandin E2; Gingival Fluid

Oral Presentation 49

Efficacy of a New Mouthwash Containing Sea Salt (HamiDent®) in Gingivitis Patients: A Pilot Study

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The aim of the present study was to evaluate the effectiveness of a new sea-salt mouth rinse solution containing sea salt, hydrolyzed thyme extract, peppermint, and xylitol, in comparison with conventional oral hygiene measures in gingivitis patients in terms of clinical parameters. A total of 90 patients suffering from gingivitis with an age range of 21-43 years were chosen. The patients were divided equally into two groups of oral hygiene with and without sea-salt (HamiDent®) mouthwash, and their clinical periodontal parameters were measured prior to phase one periodontal therapy. All patients underwent scaling and polishing for the purpose of standardization at baseline. Both groups followed the same oral hygiene instructions. Clinical parameters recorded were gingival index (Löe and Silness) and plaque index (Quigley-Hein Index modified by Turesky et al) that were measured at baseline and after 3 months. The results showed that there was a significant.

Keywords: Mouthwashes; Gingivitis; Oral Health

Poster 01

Effect of Advanced Platelet-Rich Fibrin on Periodontal Regeneration

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Periodontal disease is characterized by connective tissue attachment loss. Platelet concentrates can be used as an autologous substance in periodontal regeneration. Platelets contain active proteins that are chemotactic factors for stem cells and promote healing by regeneration. This review study focuses on the role of advanced platelet-rich fibrin (A-PRF) in periodontal regeneration. Data of this review were collected from 25 articles published from 2019 to 2022 in valid international journals indexed in PubMed. A-PRF releases growth factors for up to 10 days, which is more than platelet rich fibrin and can promote tissue regeneration. A-PRF can be used as a transporter biomolecule and can be combined with other regenerative biomaterials. A-PRF has a biological connector role, provides a scaffold with high maximum traction and viscoelastic strength, and has bioactive agents and signaling molecules that stimulate the surgical site cellularity. It has a more effective role in regenerative treatments because of continuous release of cytokines and growth factors. A-PRF can increase the efficacy of regenerative treatments of human intrabony periodontal defects and furcation defects, improve clinical attachment level, protect the Schneiderian membrane, and decrease pocket depth. A-PRF can improve the outcome of regenerative periodontal treatments by acceleration of healing.

Keywords: Advanced Platelet Rich Fibrin; Periodontal Regeneration; Growth Factors

Poster 02

Gummy Smile Treatments and Their Process of Change Over Time: A Review

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Nowadays, excessive gingival display or gummy smile has become a major esthetic concern for many patients. To boost the confidence of patients and improve their smile line, finding the source of this problem is necessary to select the most efficient treatment plan. However, as it is the patient who finally selects the treatment, sometimes an early-response treatment is selected as the treatment of choice. The aim of this study is to review gummy smile treatment options and their alterations during the years. Two databases (PubMed and Scopus) were searched for relevant articles up to June 2022. According to the inclusion and exclusion criteria, a total of 34 relevant case reports were retrieved and reviewed. Botulinum toxin injection, crown lengthening, gingivectomy, gingivoplasty, hyaluronic acid injection, laser therapy, lip repositioning, micro-autologous fat transplantation, orthodontic procedures, and orthognathic surgery are the treatment options that have been reported for gummy smile cases so far. Some of these methods can also be used together to obtain more favorable results. For the time being, patients have accelerated the development of fast-response treatments by resorting to such methods. Although treating the main cause of gummy smile is important, long-term methods such as orthodontic treatments are less commonly advocated. Patients prefer faster, less invasive methods with minimal postoperative side effects, even if they should be repeated from time to time.

Keywords: Botulinum Toxins; Dental Esthetics; Gingivectomy; Lasers; Smiling; Transplantation

Poster 03

Implantable Microneedle Arrays in Periodontology

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Microneedle arrays (MNAs) are minimally invasive devices, which have attracted extensive interest in cutting-edge biomedical

applications. MNAs are micron-scale needles which can pass through the stratum corneum layer of the skin into the epidermis for controlled drug release, site-targeted and on-demand drug delivery, tissue regeneration, and disease diagnosis. This review focuses on the latest advancements in MNA technology for periodontal treatments. After evaluation of various types of MNAs, classification of materials used for fabrication of MNAs was studied and analyzed. The great potential of 3D printing technology for prototyping and production of MNAs is discussed. Finally, clinical translation for the future perspective in the field of MNAs in periodontal therapies is summarized showing their great potential for periodontal applications.

Keywords: Microneedle array; 3D printing; Drug delivery; Periodontology

Poster 04

Local Drug Delivery in Periodontitis

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Periodontitis is a common microbial disease that results in progressive damage of supporting structures of the teeth and subsequent tooth mobility and tooth loss. Local delivery of therapeutic agents is an adjunct method to non-surgical mechanical treatment of periodontitis which leads to inhibition or elimination of pathogens and modulating the inflammatory response of periodontal tissues. The present review aims to summarize the evidence on the efficacy of various drugs for local delivery in treatment of periodontitis. A literature search was conducted for studies published between 2010 and 2021 in PubMed, Scopus, and Web of Science databases. Of 776 articles identified, 93 articles were randomized controlled trials and clinical trials, which were included in this review. There are multiple drugs that are locally used in management of periodontitis

including antimicrobials agents (chlorhexidine, satranidazole, ornidazole, azithromycin, clarithromycin, minocycline, tetracycline, doxycycline, metronidazole, ciprofloxacin, and moxifloxacin), anti-inflammatory drugs (ibuprofen, ketoprofen, aceclofenac, amitriptyline, atorvastatin, simvastatin, and rosuvastatin), agents stimulating osteoblastic activity (metformin and boric acid), drugs preventing osteoporosis (alendronate), and herbal medications (curcumin, green tea catechins, *Garcinia mangostana*, *Azadirachta indica*) in the form of mouthwash, gel, chips, fibers, nanospheres, and microspheres. Local drug delivery can improve the outcome of non-surgical treatments in periodontitis.

Keywords: Periodontitis; Drug delivery systems; Anti-bacterial Agents; Herbal Medicine; Adjunctive Therapy

Poster 05

Esthetic Crown Lengthening Surgery: A Decision-Making Tree

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At present, higher number of patients seek cosmetic dental procedures including crown lengthening surgery as a way to rectify either tooth dimensions or excessive gingival display. Excessive gingival display could happen as a result of altered passive eruption, vertical maxillary excess, dentoalveolar protrusion, gingival overgrowth, short lip, and hypermobile lip. In cases with excessive gingival display, the abovementioned factors can act alone or together. Another indication of esthetic crown lengthening is patient complaints of short crowns that are far from ideal proportions in width and height. A literature search was performed in PubMed and Embase databases. To achieve better understanding of situations that esthetic crown lengthening surgery is indicated, cases requiring crown lengthening are discussed one by one with tailored treatment plans for

each situation. Accordingly, we propose a decision-making tree to help clinicians choose the best treatment modality by understanding what needs to be treated. Most of the articles about esthetic crown lengthening surgery have specifically focused on excessive gingival display. Patients without excessive gingival display in need of esthetic crown lengthening surgery are often overlooked. Also, smile arc and its association with patient's incisal edge position is another missed item in the current literature. In our decision-making tree, we considered these items and how they could affect treatment planning. Clinicians should have comprehensive knowledge about all the aforementioned factors that play a role in assessing the need for esthetic crown lengthening surgery. Furthermore, the surgeon should consult with a prosthodontist to distinguish the extent of surgical and restorative treatments prior to surgery.

Keywords: Esthetic Crown Lengthening; Altered Passive Eruption; Subnasal Lip Lift; Lip Repositioning

Poster 06

Complications of Cemented Implant Restorations

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Cement-retained implant-supported prostheses are widely used for replacement of the missing teeth. However, they show some complications in comparison with screw-retained restorations such as difficulty in retrieving the restoration and poor biocompatibility of the cement. The aim of this review article was to address the complications of dental implant-supported cement-retained restorations. A comprehensive PubMed and Google Scholar search was conducted for articles published from 1980 to 2021. The inclusion criteria for articles were in vitro and in vivo studies, review articles, studies on complications of restorations with a minimum follow-up of 3 years, and clinical reports. The exclusion criteria were finite element analyses and studies in languages other

than English. Cement type, methods for limiting excess cement, and use of customized abutments are important to prevent periodontitis. Based on the information obtained from peer-reviewed articles, different available cements show different retentions. These qualities might not be necessarily the same in implant-supported and tooth-supported cement-retained restorations.

Keywords: Dental implants; Cement; Cement-Retained Restoration

Poster 07

Vitamin D and Calcium in Gingival Disease

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The aim of this study was to investigate the relationship of serum levels of vitamin D and calcium with the severity of gingival disease in patients with end-stage renal disease undergoing hemodialysis. In this case-control study, 43 patients diagnosed with chronic kidney disease undergoing hemodialysis were evaluated regarding probing depth, clinical attachment loss, gingivitis index, plaque index, and bleeding on probing. The patients were assigned to a case group with gingival disease, and a control group without gingival disease. Serum levels of vitamin D and calcium were then measured. Data were analyzed by the Chi-square test and independent t-test. The difference in the mean serum levels of vitamin D between the case and control groups was statistically significant ($P < 0.001$). The difference between the mean serum calcium levels in the case and control groups was also statistically significant ($P < 0.001$). There was no statistically significant difference in the mean age and body mass index between the case and control groups ($P > 0.05$). There was no significant difference between the two groups in terms of gender ($P = 0.432$). Serum levels of vitamin D and

calcium were lower in hemodialysis patients with gingival disease than in hemodialysis patients without gingival disease.

Keywords: Vitamin D; Calcium; Chronic Renal Failure; Periodontal Disease

Poster 08

Antimicrobial Nanoparticles in Periodontal Treatments

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The oral cavity is constantly exposed to a multitude of microorganisms that cause various periodontal diseases. Due to the unique physical and chemical properties of antimicrobial nanoparticles, and their promising results for drug delivery and antibacterial treatments for periodontal disease, they can serve as a coating for implants preventing the accumulation of bacteria, and aiding in their osseointegration. Many efforts have been made to use nanoparticles to design different drug delivery systems for treatment of diseases. In this study, articles published in the recent decade on the use of antimicrobial nanoparticles for treatment of periodontal disease were retrieved from PubMed, Google Scholar, and Web of Science databases, and reviewed. The results showed that the superior antimicrobial properties of nanoparticles in the oral cavity have created a favorable perspective in treatment of periodontal disease. The antimicrobial and biodegradable nanoparticles such as silver, iron oxide, and copper nanoparticles all have antibacterial properties that make them a good coating for dental implants. In addition, gold nanoparticles along with advances in periodontal drug delivery systems have paved the way for suitable and effective treatments. Studies have shown that nanoparticles combined with polymers or coated on biomaterial surfaces have superior antimicrobial properties in the oral cavity. Although this technology is in the early stages of development, it has been able to play an important role in dentistry.

Keywords: Nanotechnology; Antimicrobial Nanoparticles; Periodontal diseases; Oral cavity

Poster 09

Gummy Smile: Management and Treatment

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Dentists today has to meet the patients' increasing demands for esthetics. This quest for beauty is a new development in dentistry, forcing practitioners to try to discern the elements that determine facial esthetics and to set out rules and principles. Excessive gingival display in smiling may make the smile displeasing or even repulsive. Correction of "gummy smile" is a prime treatment objective in response to patient demands. The assessment should include seeking the etiology of gummy smile that will determine the optimal treatment, which is usually orthodontic treatment or orthodontic plus surgical treatments. This study aims to answer the question which modality is best suitable for which cases. This paper reports the treatments of 20 patients. Although moderate gummy smile (<4mm) can be quite acceptable and esthetically pleasing if the gingiva is healthy, more pronounced cases are not well tolerated and require treatment. When gummy smile is basically due to strong vertical alveolar growth at the site of incisors, isolated orthodontic treatment can provide satisfactory results, especially with the development of bone anchorage, extending the potential of classic orthodontics. Maxillofacial surgery, however, is indispensable when the etiology is related to excessive vertical growth of the maxilla as a whole. Case studies have shown that according to the type of treatment, the esthetics and dentoalveolar and skeletal consequences may differ. According to the etiology, patients can receive the best treatment option.

Keywords: Gummy Smile; Surgical Treatment; Orthodontic Treatment

Poster 10

Papilla Reconstruction Techniques in the Uncovering Phase: A Review

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In modern implant therapy, the quality of final esthetic results is as important as achieving stable osseointegration. The key determinant for a successful dental implant in the esthetic zone is the ability to create a stable gingival architecture at the gingival margin and interproximal papilla, which is indistinguishable from that of the neighboring natural teeth, particularly in patients with a high smile line. Factors that determine the future papillary fill are crestal bone level, keratinized tissue thickness, crown shape, implant position, and height of the contact points, among others. Absence of interproximal papilla creates a “black triangle” which is a significant problem in dental implant esthetics, and also causes food impaction, interproximal airflow, and speech problems. It is a common problem that is difficult to manage. The second-stage surgery should create a peri-implant condition in which biologic, functional and esthetic needs are met. Different incision and flap designs have been proposed to improve the papillary conditions around dental implants in the uncovering phase. In this study, we review and discuss the indications and advantages of each technique, which may be useful in clinical decision making based on the existing conditions.

Keywords: Interproximal Papilla; Uncovering Phase; Flap Design

This study aimed to evaluate the temperature changes of the root surface during scaling and root planing with irradiation of 2780nm erbium, chromium: yttrium, scandium, gallium, garnet (Er,Cr:YSGG) laser and ultrasonic scaler. Sixty-four extracted teeth with calculus on their root surface were selected for this interventional in vitro study. The teeth were divided into two groups. In group 1, the teeth were scaled with ultrasonic scaler. In group 2, the teeth were scaled with Er,Cr:YSGG laser with 2780nm wavelength, 1.5W power, 15 Hz frequency, 705mJ/s energy density, 50% water, 60% air, and H mode. Scaling was done in noncontact mode at a distance of 1mm from the tooth surface with horizontal movements. We measured the root surface temperature with a thermocouple (K type, 10°C accuracy). Data were analyzed by independent t-test at 95% confidence level. In the laser group, the mean initial temperature of the teeth was 19.8±2.78°C, and the secondary temperature was 18.60±2.01°C. The temperature difference in this device was -1.27±1.42°C. The mean initial temperature of the teeth in ultrasonic scaler group was 24.88±1.52°C, and the secondary temperature was 25.56±1.47°C. The temperature difference in this device was 0.68±0.65°C. This difference was statistically significant (P<0.01). After using the laser and ultrasonic scaler, we encountered a decrease and an increase in temperature, respectively, and the temperature difference between the two devices compared to each other was statistically significant.

Keywords: Er,Cr:YSGG Laser; Ultrasonic Device; Root Surface Temperature

Poster 11

Scaling with Ultrasonic and Er,Cr: YSGG Laser

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Poster 12

Periodontal Grafting in Orthodontic Patients

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Orthodontic treatment goals are focused on creating a balanced occlusion and aligned teeth

in conjunction with steady extraoral soft tissue inside a biologically and anatomically tolerable environment. Alveolar housing dictates the dentition and is critical for periodontal support of the teeth. When the alveolar bone boundaries are violated, the outcome may be unfavorable and it can be a risk factor for periodontal disease and attachment loss. Based on searches in the US nation library of medicine (PubMed), Cochrane library of Cochrane collaboration (CENTER), and hand search of other literature, some relevant systematic reviews, random clinical trials, and case control studies published from May 2008 to January 2021 were found eligible for this review. At least, 2mm of keratinized gingiva and 1mm of attached gingiva are required prior to initiating orthodontic treatment. Based on clinical assessments and treatment plan, soft tissue and hard tissue may be augmented before orthodontic treatment. These procedures, based on patient's current situation, can be performed before, during, or after orthodontic treatment. In summary, dentoalveolar bone volume and borders determine the limitations of tooth movements. Increasing the available dentoalveolar boundaries and provision of adequate soft tissue with surgical augmentation procedures can yield a stable periodontal outcome after orthodontic treatment.

Keywords: Periodontal Disease; Alveolar Bone Grafting; Attached Gingiva; Orthodontic Limitations; Dentoalveolar Morphology

Poster 13

Adherence and Perspective of Internists Regarding Periodontal and Dental Health in Diabetic Patients

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Periodontal disease can affect blood sugar control, and uncontrolled diabetes mellitus can lead to periodontal disease. This study aimed to assess the adherence and perspective of internists regarding periodontal and dental health in diabetic patients. In this cross-sectional study, a questionnaire comprising of questions regarding demographics, the need for continuing education courses on oral health, knowledge, attitude, and performance of physicians was utilized. This questionnaire has been previously used in a study conducted in the United States. The questionnaire was translated to Persian and its validity and reliability were confirmed. Next, 134 internists participating in a national congress filled it out. The response rate was 97%. Data were analyzed using the linear regression model in SPSS. The mean and standard deviation of the scores of adherence and perspective of internists were 57 ± 26 , 61 ± 12 , and 37 ± 28 , respectively, out of 100. Among the participants, 81% confirmed the need for periodontal examination training for physicians. The total score of performance was significantly higher in internists with academic positions ($\beta=0.177$, $P=0.047$), older age ($\beta=0.234$, $P=0.011$), higher mean weekly working hours ($\beta=0.185$, $P=0.043$), and those who had passed a course regarding dental and periodontal examination ($\beta=0.190$, $P=0.035$). This study showed that internists had low level of adherence and perspective regarding periodontal and dental health in diabetic patients. This casts light on importance of enrichment of education in this regard.

Keywords: Periodontal Disease; Diabetes Mellitus; Professional Practice; Internist

Poster 14

Crown Lengthening Versus Deep Margin Elevation

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Localized subgingival margins can complicate restoration of carious teeth especially when they

compromise the ferrule needed to restore the teeth. There are various clinical approaches to expose the subgingival margin mostly in a subtractive manner such as surgical exposure and apical displacement of the supporting tissue, which results in clinical attachment loss and exposure of anatomical features such as root concavities and furcation area. Once these areas are exposed to the oral cavity, maintenance of the gingival margin becomes challenging. This presentation aims to discuss a technique which was primarily called “cervical margin relocation” in 1998. The concept is additive, and suggests coronal relocation of restoration instead of apical relocation of periodontium. The name was changed to “deep margin elevation” later, which refers to the ability to achieve proper isolation after removal of carious tissue and bonding of several layers of composite to the deep margin. Considering the improvements in adhesive restorations, their durability, and relationship with the periodontal tissue, nowadays it is possible to restore teeth that would be scheduled for extraction before because they used to be considered non-restorable. Like other treatment modalities in dentistry, this technique has its own indications and technical considerations; therefore, it is of utmost importance to learn the technique properly and prepare the required equipment meticulously.

Keywords: Dental adhesive; Crown Lengthening; Periodontium

Poster 15

Does Periodontal Disease Affect Dentin and its Bonding Properties?

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The present study aimed to compare the bond strength, chemical changes, microhardness, and microleakage of healthy and periodontally-involved dentin. Normal molar teeth and molar teeth with chronic periodontitis were collected, and each group was divided into two subgroups that were restored with Herculite XR (Kerr) and

Tetric N Ceram (Ivoclar). Rod-shaped specimens from each group underwent microtensile bond strength test. To evaluate chemical changes, dentinal discs were prepared from teeth in the two groups for the Fourier-transform infrared spectroscopy. Dentinal discs from cemento-enamel junction were prepared and Vickers hardness number (VHN) of each type of teeth was evaluated. For microleakage test, standardized box-only cavities were prepared in teeth in the two groups and restored. Their microleakage was evaluated by the dye penetration test. Data were analyzed by ANOVA, Tukey’s test, t-test, and Mann-Whitney U test ($\alpha=0.05$). The microtensile bond strength of normal dentin was significantly higher than that of periodontally-involved dentin ($P=0.000$). Fourier-transform infrared spectroscopy showed a significant reduction in mineral content of periodontally-involved dentin ($P<0.05$). The VHN of normal dentin at all depths was significantly higher than that of periodontally-involved dentin ($P<0.05$). The highest microleakage was noted in periodontally-involved teeth restored with conventional composite, but the difference was not significant ($P>0.05$). Due to decreased mineral content, the bond strength decreased to periodontally-involved dentin. Although periodontal disease significantly decreased VHN of dentin, it had no significant effect on cervical microleakage after bonding to different composite resins.

Keywords: Bond Strength; Dentin; Microhardness; Microleakage; Periodontal disease

Poster 16

Improvement of Implant Osseointegration by Drugs

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Titanium implants have a wide range of applications in orthopedic and dental treatments. They have ideal biophysical properties. The most important feature of titanium implants is their osseointegration, which is a unique phenomenon because it stops epithelial growth without contact inhibition. Much research has been done on

improving osseointegration and evaluating the effect of various factors on it. Many patients receiving dental implants take various systemic drugs; thus, it is important to evaluate the effect of these drugs on osseointegration. The purpose of this review is to classify the systemic drugs that improve osseointegration. A PubMed electronic search was performed to identify relevant articles. The searched key words included “dental implant”, “osseointegration” and “systemic drug”. Animal studies in English were reviewed. Fourteen articles met the criteria. Drugs such as vitamin D, parathyroid hormone, prostaglandin E2 receptor agonist, sclerostin antibody, calcitonin, bisphosphonates, OPG-Fc, simvastatin, and strontium ranelate were studied, among others. These drugs improve osseointegration by affecting the bone metabolism. Some of these drugs increase bone mass by increasing the activity of osteoblasts. Other drugs, such as bisphosphonates, inhibit the function of osteoclasts and reduce bone resorption. It is important to know that most of these drugs have side effects, and further studies are needed regarding drug prescription to enhance osseointegration.

Keywords: Dental Implant; Systemic Drugs; Osseointegration

Poster 17

Application of Low-Level Laser Therapy in Patients with Periodontal Issues

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Soon after the discovery of lasers in the 1960s, it was realized that laser therapy could be used as an adjunct treatment to improve many conditions. Despite more than 50 years of experience with low-level laser therapy (LLLT) in dentistry, there are still some concerns about its effectiveness. The effectiveness of LLLT has been reported in several studies; however,

there is controversy among the studies. This study was conducted to review the effects of LLLT on mucositis, pain, wound healing, and hemostasis. An electronic search was performed, based on some criteria such as date of publication and study type. A total of 53 studies were identified mainly published between 2012 and 2021. The analysis of the selected studies showed some improvements in prevention and treatment of oral mucositis following the use of 632 nm to 980 nm laser wavelengths. Also, several studies found that LLLT can shorten the time of complete hemostasis after dental procedures, mainly by using 810 nm to 980 nm laser wavelengths. Many studies demonstrated the effect of LLLT on wound healing and postoperative pain after periodontal surgeries, but there were areas of controversy in the results. LLLT has the potential to improve mucositis, pain, wound healing, and hemostasis. However, many factors such as laser wavelength, spot size, and exposure time can affect the clinical outcome. Therefore, studies with long-term follow-ups are required.

Keywords: Wound Healing; Mucositis; Photobiomodulation; Nd:YAG; Postoperative Pain; Low-Level Laser Therapy; Dentistry

Poster 18

Papilla Reconstruction Using Hyaluronic Acid Gel

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Interdental papilla reconstruction with injectable hyaluronic acid (HA) is a nonsurgical alternative for interdental papilla deficiencies. However, based on the fact that the variety in study designs can directly affect the outcome, a more precise look into the available data is required. The current study focused on various body of evidence on application of interdental papilla filling with HA to amend black triangles in the esthetic zone. Electronic search was conducted in

Science Direct, Google Scholar, Update, Wiley Online Library, and PubMed with keywords of dental papilla, interdental papilla, esthetic zone, hyaluronic acid, and black triangle between 2010 and 2021. Articles that were more relevant to the subject were selected. HA can be employed to amend esthetic defects in the papillae. Future studies should assess the effect of HA on the stability of tissue enhancement in black triangles.
Keywords: Dental Papilla; Esthetic Zone; Hyaluronic Acid

Poster 19

Frequency Distribution of Gingival Biotypes and Related Factors

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Gingival biotype can be influenced by genetic factors, tooth-related factors, and biological factors. This study aimed to assess the frequency distribution of facial gingival biotypes and related factors. In this study, 300 patients (128 males and 172 females) with a mean age of 36.2 ± 13.27 years were selected by simple random sampling. Patients' characteristics including age, gender, smoking status, dental and keratinized gingiva anatomy, and oral hygiene parameters were recorded, and their associations with gingival biotype (determined by the transparency method) were investigated. The collected data were analyzed by SPSS 24 using t-test, Mann-Whitney test, ANOVA, and Pearson's correlation coefficient. $P < 0.05$ was considered significant. The frequency of thin gingival biotype was higher than that of thick gingival biotype. There was a significant relationship between gingival biotype of the upper central incisor area and age ($P < 0.001$), vibratory brushing ($P = 0.019$), and keratinized gingiva width ($P = 0.021$). There was also a significant relationship between the gingival biotype of lower central incisor area and gender ($P = 0.036$), vibratory brushing ($P = 0.010$), vertical brushing ($P = 0.009$), and keratinized gingiva width ($P = 0.011$). Moreover, a significant direct relationship was

found between gingival biotype of the upper and lower central incisor areas ($P < 0.05$). No relationship was found between the frequency and duration of brushing, dental flossing, plaque index, tooth shape, and smoking with gingival biotype ($P > 0.05$). Gingival biotype was correlated with age, gender, and keratinized gingiva width, as well as some brushing-related factors such as the brushing technique.

Keywords: Gingival Biotype; Keratinized Tissue; Oral Hygiene

Poster 20

New Surgical Techniques for Maxillary Sinus Floor Augmentation: A Review Study

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Maxillary sinus floor augmentation has been proposed as a predictable approach to augment the posterior maxilla. In this regard, two key methods have been presented namely the direct method and the indirect method. Therefore, the present study aimed to review the abovementioned two methods, their merits and drawbacks, and their success rate. Electronic databases such as Google Scholar, Science Direct, PubMed Central, Springer, and Wiley Online Library were searched to obtain a list of randomized controlled studies conducted from 2008 to 2021. Initial search revealed 122 studies, 33 of which satisfied the inclusion criteria of qualitative analyses. The articles were selected by two independent reviewers and included in the review regarding new surgical approaches for maxillary sinus floor augmentation. Analyses showed the existence of five methods for indirect sinus surgery and two methods for direct sinus surgery. Imaging examinations were used to identify the residual alveolar bone (RAB) height, and patients with a RAB height ≤ 5 mm were chosen for the direct procedure. Moreover, cases with a RAB height of 6-8 mm were considered for augmentation. Less invasiveness of the closed method in comparison with the open method was

found to be one of the advantages that enables simultaneous implant placement with 10mm length or longer in a shorter operative time. Moreover, the closed method offers more acceptable postoperative time and maintenance of sinus cavity integrity in comparison with the open technique. This review introduced more acceptable benefits of the current surgical approaches for maxillary sinus floor augmentation.

Keywords: Alveolar Bone Height; Direct Sinus Lift; Indirect Sinus Lift; Sinus Floor Augmentation

Poster 21

Alveolar Bone Height, Direct Sinus Lift, Indirect Sinus Lift, and Sinus Floor Augmentation

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Immediate implant placement has the advantage of reduction of restorative treatment time. The aim of this study was to evaluate the failure, dimensional changes, and esthetic outcome of immediate dental implant placement with and without guided bone regeneration. The following databases were searched: PubMed, Scopus, Cochrane Library, and Research Gate, and a total of 528 articles were found. After reading the abstracts and titles, 473 items were excluded. The remaining articles (n=55) were assessed for full-text eligibility. Twenty-five studies were included in the review. A risk assessment for implant failure between the regenerative and non-regenerative procedures was performed. In addition, review of the change in alveolar bone width and esthetic outcome was conducted. We selected 22 clinical trials and three reviews, examining a total sample of 2110 implants. Immediate implant placement with a regenerative procedure showed similar implant survival rate and no influence of the overall ridge width during healing. There was a risk of mucosal recession and adverse soft tissue esthetics with immediate implant placement. However, this risk may be reduced by avoiding the buccal position of implant in the extraction socket. The thickness of

buccal bone wall apparently had a significant effect on volumetric alterations of the edentulous ridge following tooth extraction. Due to the high risk of bias and small sample size of the included studies, further clinical studies are warranted to draw definitive conclusions.

Keywords: Dental Implant; Buccal Gap; Guided Bone Regeneration

Poster 22

Different Implant Uncovering Techniques

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A sufficient band of attached keratinized mucosa (KM) surrounding an implant improves the long-term prognosis, facilitates oral hygiene procedures, and minimizes complications. The pink gingival esthetic score of an implant-supported restoration is an essential factor for patient satisfaction. Implant uncovering stage is an important time to enhance the peri-implant attached KM and esthetic results. The aim of this study was to provide a review of the literature to help determine the appropriate surgical approach for uncovering of implant to provide/preserve the attached KM and to create inter-implant papilla during the second-stage implant surgery. A comprehensive search of electronic databases and a hand search of the literature were performed to identify studies regarding different implant uncovering techniques to enhance KM and inter-implant papilla height. Selected articles were classified based on the type of surgical approach. Two main topics were addressed in this review: different surgical approaches with clinical indications for the second-stage implant surgery to provide/preserve the attached KM and to create inter-implant papilla. There is no recommendation for a specific technique for the second-stage implant surgery, and decision making depends on location in the jaw and the clinical situation. Over-time modifications of different surgical approaches improve the predictability, efficacy, and esthetic results of some surgical approach. Different techniques

with surgical indications for managing of the peri-implant soft tissue during the second-stage implant surgery were presented in this review to help clinicians select the appropriate surgical approach for each specific case.

Keywords: Dental Implants; Gingiva; Esthetics

Poster 23

HIV and Periodontal Disease

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Human immunodeficiency virus (HIV) infection remains a global health problem of unprecedented dimensions. Among the HIV-associated conditions, oral lesions are recognized as prominent features. Studies regarding the co-existence of HIV and periodontal disease provide a better understanding of both diseases. Articles published in English from 2000 to 2021 in PubMed/Medline and Google Scholar databases were search electronically, using "HIV infection" and "periodontal diseases" as search terms. A total of 21 articles were selected after applying all the inclusion and exclusion criteria, and critical review of the retrieved articles. A combination of periopathogenic microorganisms has been shown to have synergistic effects on tissue destruction. Furthermore, systemic spread of the local microbiota and inflammatory products of periodontal disease may have adverse effects on both the progression of HIV infection and effectiveness of antiretroviral therapy. Studies detected a greater prevalence of periodontal pathogens such as *Aggregatibacter actinomycetemcomitans*, *Fusobacterium nucleatum*, *Porphyromonas gingivalis*, *Prevotella intermedia*, *Tannerella forsythia*, and *Treponema denticola*, as well as a combination of these species in HIV-infected patients compared with non-HIV-infected individuals. AIDS patients present high levels of circulating prostaglandin E2, which appears to suppress the specific antigen response of both Th1 and Th2 lymphocytes. There is little information about the role of prostaglandins in the etiology of periodontitis in HIV-infected patients.

Establishment of highly active antiretroviral therapy may provide a protective effect, keeping the pathogenic subgingival microbiota under control in such patients.

Keywords: HIV Infection; Periodontal Diseases; Highly Active Antiretroviral Therapy

Poster 24

Efficacy of Lasers for Treatment of Peri-Implantitis

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Peri-implantitis, a biological dental implant complication, has been defined as an inflammatory disease of the soft tissues surrounding the implant, which is accompanied by bone loss that exceeds normal physiological bone remodeling. The etiology of this disease has been identified to be the bacterial biofilm forming on the surface of implant that interacts with the host tissue, and leads to destruction of the supporting bone. In addition to conventional treatment modalities (mechanical and chemical), different lasers have also been proposed for treatment of peri-implant conditions. Laser irradiation at specific wavelengths appears to provide a bactericidal effect against periopathogenic bacteria, cause a reduction in lipopolysaccharides, and effectively remove bacterial biofilm and calculus. In vitro microbiological studies have demonstrated a promising outcome by ablation of more than 95% of biofilm microorganisms on all types of titanium surfaces. In addition, short-term clinical studies have shown a reduction in bleeding on probing, pocket depth, and clinical attachment loss. In regenerative treatments, Er:YAG laser irradiation has resulted in the highest amount of re-ossification (44.8%) in submerged healing of ligature induced peri-implantitis compared with plastic curettes with metronidazole gel and ultrasonic device. Recent clinical results have also indicated that nonsurgical and surgical treatments of periodontitis and peri-implantitis with laser may lead to significant clinical improvements in bleeding on probing, probing depth reduction, and clinical attachment gain.

Keywords: Dental Implants; Laser; Peri-Implant Tissue Disease

Poster 25

Effect of Low-Level Laser on Osteoblast Culture

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In vivo and in vitro studies have shown controversial results regarding the influence of laser irradiation on cell activities. In vitro studies on the effects of low-level laser therapy (LLLT) on osteogenic models suggest that it has a stimulatory effect. It has been shown that LLLT can increase cell proliferation. Rat osteoblasts were cultured in α -minimum essential medium for 14 days, and incubated at 37°C with 5% CO₂. They were exposed to indium-gallium-aluminum phosphide therapeutic laser irradiation with 685nm wavelength, 35mW power, and 25, 77, and 130J/cm² energy density, representing a low, medium, and high dose, respectively. The cells were divided into four groups of control (group 1, no irradiation), 25 J/cm² for 7 seconds (group 2), 77J/cm² for 22 seconds (group 3), and 130 J/cm² for 37 seconds (group 4). The growth curve and cell viability at 4, 7 and 11 days were assessed by counting the cells with a hemocytometer. Osteoblast culture growth curve and cell viability were the same for the applied doses. Morphologically, well-defined nodules were noted in all groups. The percentage of stained area was significantly higher in 25J/cm² group in comparison with 77J/cm² group. Laser did not influence cell proliferation and growth; although the pattern of extracellular mineralization process may be altered by LLLT in vitro.

Keywords: Osteoblast; Low-Level Laser Therapy; Cell Culture; Osteoblast Culture

Poster 26

Crown Lengthening Surgery OutcomesMina Taheri¹, Nourin Khorramshahi²*1. Department of Periodontics, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran**2. Dental Student, School of Dentistry, International Campus, Tehran University of Medical Sciences, Tehran, Iran*

Dental restorations are expected to restore function, esthetics, and tooth form simultaneously. This can be achieved only by a harmony between the soft and hard tissues. Crown lengthening surgery (CLS) is mostly performed as a pre-restorative procedure or for esthetic reasons. Whether the aim is to achieve esthetics or increase the supra-gingival tooth structure, the outcome of this treatment, its predictability, and prognosis are concerning. Thus, in this study, we aimed to review the clinical outcomes of CLS. We conducted a search using specific keywords in Medline, Wiley Online Library, and Scopus databases for articles published from 2000 to 2020; only original articles and systematic reviews discussing the CLS outcomes were included, CLS results in a significant increase in clinical crown length. Studies reported the mean crown length changes to vary from 1.4mm to 3.3mm at the 6-month follow-up. These values seem to have decreased from the immediate post-operative values due to tissue rebound. Tissue rebound, being a potential obstacle for delayed restoration, has been reported to affect the surgically decreased gingival width for up to 12 months, while most of the changes occur in the first 6 months. Although CLS increases the risk of furcation involvement, long-term survival studies of teeth undergoing CLS favor it over dental implants. While CLS outcomes may differ depending on surgical techniques, tissue type, and patient factors, it seems that the best outcomes are achieved when CLS is accompanied by early dental restoration.

Keywords: Gingiva; Crown Lengthening; Oral Surgical Procedures

Poster 27

Adjunctive Laser to Nonsurgical Periodontal TherapyNegar Kanouni Sabet¹, Elaheh Vahab²*1. Department of Periodontics, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran**2. Dental Student, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran*

Clinical application of lasers in treatment of periodontal disease has been ongoing for over 25 years. Yet, there is still controversy among

clinicians regarding the application of dental lasers for treatment of periodontal disease as a valid and cost-effective approach to patient care. Search of the PubMed, Scopus, and Google Scholar databases from 2006 to 2021 using specific keywords led to 14 publications including clinical trials and systematic reviews that are summarized in this review. There was no statistically significant difference regarding pocket depth and bleeding on probing. There was only a tendency for greater reduction of pocket depth in the diode laser group in one clinical trial for deep pockets at 3 months, which was not statistically significant. In another randomized clinical trial, use of laser as an adjunct to non-surgical periodontal therapy resulted in no significant reduction in any of the clinical parameters, with the exception of bleeding on probing, which was statistically significant. Available evidence on adjunctive therapy with lasers is limited due to the small number of long-term controlled studies, and the heterogeneity of study designs. A high variability of clinical outcomes at 6 months was noted in this regard. Some studies reported that laser has antimicrobial and healing effects superior to those of traditional periodontal therapy. Two articles included patient-reported outcomes and 10 reported on the absence of harms. Depending on the type of laser and the cost of purchase, laser can be a significant investment for clinicians.

Keywords: Laser; Periodontics; Diode Laser; Photodynamic Therapy; Periodontitis Treatment; Antimicrobial

Poster 28

Applications of High-Intensity Lasers in Periodontics

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Laser is an innovative tool in modern dentistry. In the past two decades, high-intensity laser therapy has gained the spotlight due to not having the drawbacks of conventional periodontal therapy.

Although high-intensity laser therapy is assumed to be suitable for accurate incision of soft and hard tissues, ablation, hemostasis, reduction of postoperative pain and infection, and debridement, there is a significant conflict in studies using a wide variation of laser parameters such as different wavelengths and energy densities. In case of considering laser application, dental clinician should be aware of the laser effects, and know what type of laser is most suitable for use for the intended purpose, and how to use it technically based on the available literature. After initial screening, 55/152 potentially relevant articles were identified through electronic searching. The relevant keywords were searched in PubMed Central, Science Direct, Wiley Online Library, Springer, and Google Scholar. Then, eligible English articles published between 2013 and 2021 were extracted by three independent reviewers. Articles were included in this review if they reported outcomes of periodontal high-intensity laser therapy. The results showed the most favorable effects of diode, Nd:YAG, Er:YAG, Er;Cr:YAG, and CO₂ lasers for frenectomy, gingivectomy, osteotomy, and root biomodification at specific wavelengths, power densities, frequencies, and pulse mode. Various lasers have been suggested for the above conditions. The choice of the method depends on efficacy and affordability. The present study indicated superior utilization of different laser types compared with the conventional periodontal treatment.

Keywords: Frenectomy; Gingivectomy; Osteotomy; Root Biomodification; High-Intensity Laser

Poster 29

Efficacy of Herbal Medicine for Periodontal Disease

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Gingivitis is an inflammatory infectious disease caused by dental plaque bacteria. Proper removal of microbial plaque by mechanical procedures is not possible in some cases, especially in the

elderly and disabled patients, who may not be able to efficiently remove the dental plaque. Also, chemical mouthwashes may have some side effects. Therefore, finding a new treatment approach would be beneficial. Herbal therapies are used worldwide to treat different health conditions. This study aimed at searching and compiling scientific evidence regarding medicinal herbs to treat gingivitis and periodontitis. An electronic search of the literature was conducted mainly through PubMed, Scopus, Wiley Online Library, and Google Scholar databases. Studies in English were considered for inclusion if they evaluated medicinal herbs for gingival and periodontal inflammation or periodontal pathogens. Totally, 197 full-text articles were evaluated and finally, based on the inclusion criteria, 22 articles were selected. There are various medicinal herbs with antibacterial and anti-inflammatory properties, which can significantly decrease gingival and periodontal inflammation, bleeding on probing, plaque index, probing depth, and count of major periodontal pathogens, and promote clinical attachment level gain. The introduced herbal products could be an effective and safe alternative to chemical products.

Keywords: Anti-Inflammatory Agents; Gingivitis; Herbal Mouthwashes; Periodontal Diseases

best treatment options for dental clinicians. A literature review was conducted in electronic databases including PubMed, Science Direct, and Google Scholar for relevant articles. Randomized controlled trials, clinical trials, and literature reviews about different peri-implantitis treatments that were in English were included from 2011 to 2021. Different interventions based on 65 recently published controlled trials and review articles were classified into three groups based on the severity of peri-implantitis: (1) adjunctive anti-infective agents; (2) non-surgical therapies combined with various adjunctive treatments; (3) surgical procedures aiming to decontaminate the implant surface and improve the anatomy of peri-implant tissues. Peri-implantitis usually responds to non-surgical treatments in early stages, which are performed in various ways of decontamination with different instruments. Also, surgical approaches usually lead to clinical improvements. In this study, we compared these interventions and proposed a classification for clinicians to select the treatment of choice according to the observed clinical parameters.

Keywords: Bone Regeneration; Dental Implants; Peri-Implantitis; Periodontal Debridement; Photochemotherapy

Poster 30

Peri-Implantitis Treatment Techniques: A Review

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Peri-implantitis is an inflammatory condition that involves the peri-implant mucosa and results in peri-implant tissue destruction and bone loss. Continuous peri-implant inflammation and progression of peri-implant mucositis can result in peri-implantitis and eventual loss of implant and the supporting bone. Therefore, it is imperative to choose an appropriate treatment strategy. This study aimed to do a review on different techniques for management of peri-implantitis and find the

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Design, Fabrication and In-Vitro Evaluation of a Guiding Device for Determination of Position and Angulation of Dental Implants in a Completely Edentulous Ridge Model

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Ideal placement of dental implants reduces surgical complications and subsequent prosthetic and functional problems. Therefore, the purpose of this study was to design, fabricate, and evaluate the efficiency of a guiding device to determine the position

and angulation of implant placement. After designing, construction of an initial resin sample, and elimination of preliminary problems, the final sample was made using 6061t6 aluminum alloy by a computer numerical control machine. Instrument evaluation was performed by placing 16 dental implants in two edentulous models. DICOM image analysis of implants was then performed by NNT Viewer software. Statistical one-sample t-test was used to compare the findings regarding distance and angular deviation variables. The mesiodistal deviation in angle of guiding device placement with the default for implants with 0 and 15-degree angulation was 3.31 ± 1.2 degrees and 0.97 ± 0.56 degrees, respectively. Also, the mean deviation of distance compared with the default was 1.00 ± 0.75 mm. Although statistical analysis showed a significant difference in accuracy of angle and distance of placement, the results were clinically acceptable. Our device enabled implant placement with a maximum angle deviation of less than 5 degrees. Also, distance deviation from the study default was less than 1mm in 56% of the cases, and less than 1.5mm in 75% of the cases.

Keywords: Dental Implant; Implant Angulation; Guided Surgery

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A Review on Implant Uncovering Techniques

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Implant insertion is basically performed by two methods: one-stage and two-stage. The latter method needs a second-stage surgery to uncover the fixture that has been submerged under soft tissue. Different methods and techniques which have been designed and introduced for implant exposure have been widely investigated in the literature and classified according to

benefits and advantages they provide for soft tissue healing and formation. Essentially, the implant exposure techniques can be classified into four groups: (1) Methods to simply remove the soft tissue above the crestal portion of implant just to open a path for prosthetic procedures; (2) methods that increase the buccal soft tissue thickness of implant; (3) methods attempting to thicken the soft tissue over or around the implant platform and reconstruct the adjacent papillae, if possible, and (4) methods to provide keratinized mucosa on the buccal surface of implant. It is important to consider stable biological results for peri-implant tissue in the long-term; this can be partially achieved by selection of a proper technique for implant uncovering.

Keywords: Implant Exposure; Uncovering; Soft Tissue Management

Poster 33

Education Through the Social Media in Implant Treatment

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Health education is considered as an important measure taken to prevent oral and dental diseases and promote the level of public health. This study aimed to comparatively investigate the impact of education by the social media with ordinary methods regarding oral health among the candidates for implant treatment. In this study, 75 patients were selected among those referred to private dental clinics in Tabriz seeking dental implant treatment. Patients were studied in five groups including one case and four control groups. Similar educational contents were provided to the control groups through person-to-person training, lecture, videotape, and pamphlet, and also to the case group through the social media. The patients' plaque index scores were calculated before the intervention, and

at 1 week, 2 months, and 3 months after oral hygiene instruction. The results were analyzed by descriptive statistics and Kruskal Wallis, and Mann-Whitney tests. At 3 months, the reduction in plaque index in the social media group was 93.0 for the case group and 53.0, 32.0, 44.0, and 23.0 for the person-to-person training, lecture, videotape, and pamphlet groups, respectively. The reduction in plaque index in the social media group was significantly greater than that in all control groups. Education decreased the plaque index in the short-term (one week) in the control group, but in the long-term, the impact of social media was greater than other methods.

Keywords: Social Media; Implant; Dental Plaque Index

Poster 34

Applications of Platelet-Rich Fibrin in Periodontology

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Platelets, which contain growth factors, play a critical role in cell migration, proliferation, and differentiation, angiogenesis, and tissue regeneration. This study aimed to evaluate the applications of platelet-rich fibrin in periodontal treatments. A literature search was performed in Medline via PubMed, EMBASE, and Cochrane databases to find studies about the use of platelet-rich fibrin in periodontology. The search covered the period of 2011 to 2021. A total of 40 potentially relevant studies were identified. Some studies were irrelevant or their full-text was not available; after their exclusion, 15 articles were reviewed. Similar results were found in the reviewed clinical trials. The clinical and radiographic results obtained in the follow-ups scheduled at regular intervals showed no discomfort, an increase in clinical attachment level, a decrease in pocket depth, and excellent bone regeneration, suggesting a good outcome. According to systematic reviews, platelet-rich fibrin can be used for gingival recession and treatment of furcation and intrabony defects;

while, platelet-rich plasma is mainly used for hard and soft tissue procedures, and concentrated growth factor is mainly used for bone regeneration. We concluded that platelet-rich fibrin can be used for periodontal regeneration, and is an ideal biomaterial for routine clinical use in regeneration of bone defects and management of endo-perio lesions. The use of platelet-rich fibrin alone or in association with other biomaterials (such as bone grafts, soft tissue grafts, and pharmacological agents) is safe and results in promising clinical and radiographic improvements.

Keywords: Platelet Rich Fibrin; Periodontology; Regeneration; Intrabony Defect; Endo-Perio Lesion

Poster 35

Impact of Bleaching Agents on Tooth-Supporting Tissues

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This study aimed to review the impact of bleaching agents on soft and hard tissues supporting teeth. An electronic search was conducted in Medline, PubMed, Embase, Ovid, and Cochrane Library for articles published from 1996 to 2020. A manual search of relevant books and scientific journals was also carried out using the key words “tooth”, “teeth”, “color”, “white”, “bleach”, “gingiva”, “bone marker”, “peroxide”, and “resorption”. Bleaching techniques are excellent when they are performed correctly by professionals and well-educated dental clinicians, and lead to patient satisfaction. However, external root resorption is one of the adverse effects of intracoronary bleaching that has been reported, which is increasingly rare but becomes apparent in case of tooth loss, which occurs quite frequently. Its incidence widely differs in the literature ranging from 1% to 13%. Hydrogen peroxide generates a cytotoxic and tissue-damaging effect. Recent

studies have shown an increase in the activity of inflammatory cytokines and metalloproteinases when using bleaching techniques. Interleukin-1b plays a central role in immune and inflammatory responses and the bone remodeling process. It is a cytokine that is present in most of the inflammatory processes, and its increase has been linked to a number of pathological processes, such as periodontitis and marginal bone loss. It has been shown that non-vital bleaching results in a significant rise in RANK-L and interleukin-1b levels in periodontal tissues around bleached, nonvital teeth, which continues even for 6 months after the procedure.

Keywords: Bleaching; Bone Marker; Gingiva; Peroxide; Resorption

Poster 36

Short Implants Versus Longer Implants in the Posterior Alveolar Region

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This meta-analysis compared clinical outcomes including the survival rate, marginal bone loss, and technical and biological complications of short implants (<7mm) and long implants (≥7mm) placed in the posterior region. Electronic search of databases including the PubMed, EMBASE and Cochrane Library was performed along with a manual search for articles published prior to November 29, 2019. Only randomized controlled clinical trials comparing short implants and standard implants in the same study after an observation period of at least five years were included. The results indicated that although the survival rate of short implants may be lower than long implants in the maxilla, the survival rate of short implants in the mandible was similar to that of long implants, and short implants can result in a lower rate of biological complications.

Keywords: Short implants; Bone augmentation; Survival; 5-Year; Meta-Analysis

Poster 37

Effect of Photodynamic Therapy on Gingival Recession in Patients with Peri-Implant Mucosal Inflammation: A Randomized Controlled Clinical Trial

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Depending on the severity of peri-implantitis, surgical or nonsurgical treatments may be indicated. The efficacy of photodynamic therapy (PDT) as an adjunctive technique for bacterial decontamination of implants with peri-implantitis has been evaluated. The aim of this study was to evaluate gingival recession in patients with peri-implant mucosal inflammation after receiving mechanical debridement (MD) alone or in combination with PDT. A total of 49 patients with peri-implant mucosal inflammation were selected and randomly assigned to 2 treatment groups: (I) MD and (II) MD + PDT using 805 nm laser and indocyanine green. Clinical parameters including bleeding on probing, probing depth, and gingival recession were evaluated at baseline, 2 weeks, and 3 months. Application of PDT as an adjunct to MD did not result in any additional improvement of gingival recession in patients with peri-implant mucosal inflammation.

Keywords: Peri-Implantitis; Photochemo-Therapy; Gingival Recession

Poster 38

Probiotics in Non-Surgical Periodontal Therapy

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Probiotics are currently known to enhance the outcome of conventional periodontal treatment by reducing the level of inflammatory mediators as well as the microbial load. We aimed to

review the current findings regarding the efficacy of probiotic administration in combination with nonsurgical periodontal treatment. An electronic search was conducted in Science Direct, Google Scholar, Update, Wiley Online Library, and PubMed using the following keywords: “Bone Grafting”, “Bone Regeneration”, “Bone Ring Technique”, “Dental Implants”, and “Vertical Defect” for articles published between 2010 and 2021. Eligible articles that were more relevant to the subject were selected. Based on the current findings, it is suggested that in chronic periodontitis, administration of probiotics can improve manual debridement. Needless to say, to gain the best result, further research is required to address the optimal dosage, route of administration, and microbial strain.

Keywords: Chronic Periodontitis; *Lactobacillus*; Periodontal Debridement; Probiotics

Poster 39

Carotenoids, Plant-Based Diets, and Periodontal Health

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Nutrition has a great impact on the periodontium. It has been found that vegetarians and vegans have lower risk of periodontitis. The huge difference in carotenoid intake between these groups and omnivores might be one of the reasons for this finding. Although vegans, vegetarians, and omnivores have equal total retinol equivalent intake, carotenoid consumption differs a lot because a variety of colorful vegetables contain carotenoids but not retinol. However, carotenoids are not only the precursors of retinol, they also have their own unique properties. Moreover, there are dozens of different carotenoids, and each one has its own metabolic activity. In particular, carotenoids can reduce free radical processes

in periodontal tissue, protecting it from damage and, thereby, reducing inflammation. A literature search was conducted in PubMed and eLibrary databases in English, Iranian and Russian languages. Low carotenoids, especially β -cryptoxanthin and β -carotene serum levels were associated with higher frequency of periodontitis in 60- to 70-year-old Western European males. A Japanese study on old people showed that higher intake of α -carotene and β -carotene as well as vitamins C and E was correlated with a reduction in periodontitis severity. Positive effect of lycopene was also found in an Indian study in full mouth scaling and root planing of the oral cavity in patients with moderate periodontal disease. The use of carotenoids can be a harmless and successful method for prevention and treatment of periodontitis, and their importance should not be underestimated.

Keywords: Periodontitis; β -cryptoxanthin; β -carotene; α -carotene; Lycopene; Vegetarian; Vegan

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New Findings on Growth Factor Application in Periodontal Regenerative Therapy: A Narrative Review

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Periodontal regeneration can be defined as complete restoration of the lost periodontal tissues to recapitulate wound healing as they develop. Growth factors can promote the healing of the supporting apparatus. There are several studies conducted on the efficacy of different types of growth factors such as platelet-derived growth factor (PDGF) and fibroblast growth factor (FGF)-2. However, predictable reconstruction of normal structure and functionality of tooth-supporting apparatus remains challenging. This study aims to review the efficacy of the application of different growth factors in periodontal regenerative therapies. Three databases (PubMed, Scopus, and Google

Scholar) were searched for English-language literature published in the past 5 years. The weighted mean difference between baseline and 6 months after periodontal treatment for clinical attachment level (CAL), probing pocket depth, and bone fill was calculated. PRGF with guided tissue regeneration or bone grafts can enhance the improvement of horizontal and vertical CAL and gingival index. Additionally, FGF-2 combined with guided tissue regeneration and deproteinized bovine bone mineral scaffold has shown greater radiographic bone fill. FGF-2 can improve angular bone resorption. Platelet-rich fibrin plus coronally advanced flap can significantly ameliorate CAL and gingival parameters; hence, they can be used in gingival recession sites. Moreover, applying platelet-rich fibrin with allograft can improve probing pocket depth and CAL in intrabony defects. A combination of different growth factors compared with a single growth factor, has a higher effect on periodontal regeneration along with different approaches of regenerative periodontal surgery, including guided tissue regeneration or bone graft procedures.

Keywords: Intercellular Signaling Peptides and Proteins; Guided Tissue Regeneration; Bone Transplantation; Furcation Defects

Poster 41

Attached Gingiva, is There a New Definition?

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To overcome the shortcomings of one single definition for attached gingiva (AG) both in description and reporting, this study aimed to present a modified definition that applies to both healthy and diseased teeth and implants. The keywords “attached gingiva” (AG), “mucogingival junction” (MGJ), “free gingival groove”, “biological width”, and “Attachment Apparatus” were searched in PubMed-MEDLINE, Google Scholar, and Science Direct

databases until May 2021 to identify relevant articles. The new definition for AG consists of two parts: Part A is when the biologic width is supracrestal (epithelial attachment and gingival fibers) and is attached to a healthy tooth or tissue-level implant, and the zone of AG is measured from the base of the sulcus to the MGJ. Part B is when the biologic width is subcrestal -as with infrabony defects around periodontally involved teeth, periodontally involved tissue-level implants, and bone-level implants placed at or below the bone crest- and the zone of AG is measured from the bone crest (not the base of the sulcus) to the MGJ. Based on the position of biologic width in relation to crestal bone, we proposed a different definition for attached gingiva. This approach allows us to report and describe AG more definitively as it applies to each case or treatment regarding the supra or subcrestal position of biologic width.

Keywords: Attached Gingiva; Mucogingival Junction; Biological Width

Poster 42

Effects of Platelet-Rich Fibrin on Soft Tissue Regeneration

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Platelets play a decisive role in periodontal regeneration by delivering growth factors. The aim of this narrative review was to better understand the clinical procedures where platelet-rich fibrin (PRF) may be utilized to enhance tissue/bone formation. The literature was searched for studies about PRF and its role in soft tissue regeneration. The publications were retrieved from PubMed, Cochrane, Google Scholar, and Scopus for the period of 2015 to 2022. A total of 15 studies were found. After removing irrelevant studies, 6 articles were reviewed. Based on the studies, the effects of PRF on wound healing were investigated. PRF causes greater deposition of type I collagen by fibroblasts and confers

protection against proteolytic degradation of endogenous fibrogenic factors which are effective in wound healing. Also, PRF is able to induce further growth of fibrocytes (the type of cells effective in soft tissue regeneration) and gingival fibroblast proliferation after 24 hours. In endothelial cells, PRF activates mitogenesis through extracellular signals and induces the secretion of vascular endothelial growth factor, which is effective in angiogenesis. This study found that PRF plays an important role in faster healing of damaged tissue and periodontal regeneration.

Keywords: Platelet-Rich Fibrin; Regeneration; Soft Tissue; Growth Factors

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Comparative Evaluation of Root Coverage with Connective Tissue Graft Associated with Coronally Advanced Flap Versus Connective Tissue Graft Associated with the Tunnel Technique: A Randomized Clinical Trial

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This randomized clinical trial aimed to compare coronally advanced flap (CAF) versus the tunnel technique (TT) for treatment of gingival recession. Twenty-four patients with gingival recession were randomly divided into CAF and TT groups. In both groups, clinical indices such as probing depth, height and width of recession, keratinized tissue width, clinical attachment level, gingival biotype, and root coverage were evaluated before and 3 and 6 months after the procedure. Root coverage in the CAF group was 97.22% ± 9.62%, which was significantly higher than that in the TT group (77.22% ± 24.28%; P=0.015). Both techniques had the same efficacy in terms of reducing the probing depth and increasing the gingival connective and keratinized tissues, and no significant

difference was observed. However, the improvement of clinical attachment level (P=0.016) and reduction of height (P=0.039) and width of gingival recession (P=0.048) in the CAF group were much higher than those in the TT group. The CAF technique was observed to be more effective than the TT technique at the 3- and 6-month follow-ups. However, further investigations are still recommended.

Keywords: Connective Tissue Graft; Coronally Advanced Flap; Root Coverage; Tunnel Technique

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Importance of Soft Tissue around Dental Implants: A Narrative Review

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Today, dental implants are among the most common treatments for edentulous patients. This study reviews the importance of soft tissue and conventional techniques for its reconstruction around dental implants. Databases including PubMed, Scopus, Google Scholar, and Web of Science were searched to find relevant articles using the following key words: soft tissue, keratinized tissue, width, thickness, reconstruction, augmentation, marginal bone loss, and survival. Several factors influence the success and survival of dental implants. Nowadays, there is evidence on the necessity of having sufficient amount of keratinized tissue both in terms of width and thickness. Lack of sufficient amount of keratinized tissue could lead to marginal bone loss and might finally result in implant loss. The long-term success and survival of dental implants depend on the width and thickness of surrounding soft tissue. There are various techniques to preserve and reconstruct the soft tissue around dental implants such as platelet rich fibrin, connective tissue graft and its substitutes, and free gingival graft.

Keywords: Soft tissue; Dental implant; Evidence

Poster 45

Toronto Bridge; an Implant Restorative Alternative

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The Toronto bridge is an implant-supported prosthesis that can rehabilitate fully and partially edentulous ridges. The Toronto prosthesis is usually indicated in cases with increased inter-ridge distance as a result of resorption. The key benefits of this restoration are retrievability and acceptable esthetic results, even in severely angulated implants. It decreases the shock absorbed by dental implants in high stress-bearing areas and has both the advantages of a screw-retained prosthesis and cemented bridges. The Toronto bridge consists of a substructure and a superstructure that can be fabricated conventionally using wax-up or digitally

with computer-aided design/computer-aided manufacturing (CAD/CAM). In this paper, we describe prosthetic management of a 57-year-old male with a completely edentulous mandible. The patient was rehabilitated with implant-supported Toronto prosthesis (due to alveolar resorption and insufficient bone) following surgical placement of implants. The prosthesis included 12 individual crowns (fabricated from zirconia) on the metal substructure supported by 7 dental implants. The metal framework was screwed onto the implants and had two parts: (I) gingiva with pink porcelain to mimic the soft tissue, (II) twelve abutments with opaque porcelain coverage supporting the zirconia crowns to improve esthetics. The step-by-step method of fabrication of this prosthesis is discussed. The Toronto bridge could be helpful in cases with an unreasonable inter-alveolar distance and jaw resorption.

Keywords: Dental Prosthesis, Implant-Supported; Dental Implants; Mandibular Prosthesis