

8. ORAL PRESENTATIONS

Oral Presentation No. 1

Comparison of cytokine production by SaOS-2 and immunocompetent cells cultivated on alginate surfaces doped with calcium phosphates

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Purpose: The immune response of the host tissue to a tested biomaterial contributes to determination whether the proposed material meets prerequisites for its successful application in implantology. Considering in vitro evaluation, appropriate testing methods should be chosen. Connective tissue cell line SaOS-2 and immunocompetent (mononuclear) cells obtained from buffy coats represent the cell types that are involved in wound healing, as well as the response of the body to the implant. However, their cytokine response to the identical implant material can differ.

Materials and Methods: In the present work, alginate hydrogel coatings doped with inorganic hydroxyapatite (Ti/ALG/HAP) or β -tricalcium phosphate (Ti/ALG/TCP) nanoparticles on Titanium grade 2 (Ti) were prepared. Both cell types mentioned above were used to evaluate the cytokine production when cultivated on the proposed coatings. The pristine Ti and alginate (ALG) served as control surfaces. Cytokine production was assessed by the multiplex proteomic analysis RayBio Human Inflammation Array 3 (RayBiotech, USA) preset for 40 cytokines after 3 and 7 days of cultivation.

Results: Mononuclear cells produced preferentially factors of nonspecific immunity (IL-6, IL-8, RANTES, MCP-1 and MIP) and in doses higher than detected for the positive control of the RayBio array representing 100%; the cytokine production declined in the order Ti/ALG/HAP \rightarrow Ti \rightarrow Ti/ALG/TCP \rightarrow Ti/ALG. SaOS-2 cells produced almost all selected cytokines, but their expression reached only up to 30% of the positive control of the array. The only one exception was TIMP-2 expressed in a higher extent compared to mononuclear cells (reached above 75% of the positive control). Moreover, no significant difference between Ti/ALG/HAP and Ti/ALG/TCP surfaces was observed.

Conclusions: Both cell types produced a different spectrum of cytokines. The immune response of mononuclear cells showed differences between tested materials, whereas SaOS-2 cells weren't sufficiently sensitive. Therefore, besides SaOS-2 cells, mononuclear cells should be also considered for in vitro evaluation of overall inflammatory response induced by presence of the implant. This work was supported by IGA MH CR, project No. 13297-4, by research programme PRVOUK P28/LF1/6 of MSMT CR and by the European Regional Development Fund (project BIOCEV No. CZ.1.05/1.1.00/02.0109).

Oral Presentation No. 2

Evaluating denture hygiene in head and neck oncology patients

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Purpose: Oncology patients who have undergone prosthetic oral rehabilitation should receive oral and denture hygiene instructions (DHI) and demonstrate adequate self-care. They are at increased risk of dental disease compared to the general population, especially following radiotherapy. The

aim of the study was to analyse the quality of denture hygiene in head and neck cancer patients and improve current practice.

Materials and Methods: The Denture Cleanliness Index (DCI, Mylonas et al 2014), used previously in general dental practice and a Prosthodontics department at a teaching hospital, was utilised to evaluate the quality of prosthesis hygiene of patients treated within the Head and Neck Oncology Unit at Poole Hospital (n = 33). Baseline DCI scores were obtained and patients were given tailored DHI. Patients' DCI scores were reviewed after 1-month and at 3-months. Acceptable denture hygiene was defined as a DCI score 2 or less.

Results: The mean age of patients treated was 70.4 years, ranging between 50 to 86 years old, 54.5% (n = 18) were male and 45.5% (n = 15) female. Results at baseline showed that only 24% (n = 8) of patients had DCI scores of ≤ 2 , which improved to 68% (n = 17) after 1-month, and after 3-month review increased to 87% (n = 15).

Conclusions: Providing tailored DHI and utilising the DCI resulted in a demonstrable improvement of denture cleanliness over a 3-month period of review; the first reported case over the medium term. The DCI worked well as an objective clinical measurement and patient education tool providing determination of current denture hygiene status and assessing, longitudinally, patient compliance to DHI.

Oral Presentation No. 3

Temporomandibular joint disorders from perspective of craniometric and myographic parameters

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Purpose: Understanding the development of temporomandibular joint disorders is an important condition for early diagnosis and successful treatment. Nowadays, it is well known that occlusion imbalance and muscles play an essential role in the development pathology. The aim of this research is to estimate the connection between temporomandibular joint disorders and occlusion plain inclination as well as the state of chewing muscles.

Materials and Methods: The research was based on examination of the group of 60 people, which consisted of 32 healthy volunteers and 28 patients with temporomandibular joint disorders (disc displacement with reduction). The examination consisted of fabrication of study models, kinesiography, myography of chewing muscles, vibrometry and radiography of temporomandibular joints, telerradiography in two plains (coronal and sagittal). Subsequently, the x-ray films have been analyzed via Dolphin Imaging Program and statistically evaluated.

Results: The results of the research demonstrate the significant dissimilarities between craniometrical and myographic parameters of healthy volunteers and patients with temporomandibular joint disorders. The most indicative distinction was revealed in the asymmetry of occlusion plain which proves the essential impact of this parameter on the emergence of pathology. It was also noticed that the pathology of temporomandibular joint could be in the first place connected with the tones m. masseter.

Conclusions: Determination of the average craniometrical and myographic figures is of profound importance mainly in treatment of the patients with temporomandibular joint disorders as well as for the prevention of these disorders.

Oral Presentation No. 4

Short dental implants success in edentulous posterior maxilla

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Purpose: The purpose was to evaluate the influence of available bone height and implant dimensions on load-carrying capacity of implants in posterior maxilla.

Materials and Methods: 3.3–5.4 mm diameter, 4.5–8.5 and 13.5 (reference) mm length implants were studied. 3-D models of maxilla with implants were analyzed in FE software ANSYS 15. 20-node FEs total number was up to 2,920,000. 118.2 N oblique loading was applied. Ultimate functional load (UFL) was proposed as a criterion to evaluate the influence of bone size and implant dimensions on implant load-carrying capacity. To calculate UFL values, 100 MPa ultimate strength of cortical bone and von Mises strength theory were used.

Results: Implant load-carrying capacity was substantially dependent on implant diameter and available bone height. Comparing to the smallest implant, UFL increase for the largest implant was 2.8 fold. Diameter increase from 3.3 to 5.4 mm caused UFL increase from 97% for 4.5 mm implant to 75% for 8.5 mm implant. Length increase from 4.5 to 8.5 mm resulted in UFL rise from 64% for 3.3 mm implant to 43% for 5.4 mm implant. UFL reduction was also studied relative to conventional implants. For 4.5, 5.5, 6.5, 7.5 and 8.5 mm implants, it was 49%, 40%, 34%, 27% and 21%, respectively.

Conclusions: Bone stresses can be distributed efficiently using short implants by selecting proper diameter and length, without bone graft in poor bone sites. Load-carrying capacity of short implants greatly depends on their size. Implant size is of utmost importance for clinicians in implant selection.

Oral Presentation No. 5

The virtual prosthodontic patient: Integrating facial, intraoral and CBCT datasets

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Purpose: To report clinical outcomes of a novel digital virtual patient workflow combining fully guided immediate implant placement with CAD/CAM fabricated, screw-retained, implant-supported provisional prosthesis in full mouth fixed-prosthesis upper cases.

Materials and Methods: Twenty upper edentulous patients in need for a complete implant-retained fixed prosthesis were recruited. Pre-operative extraoral facial scans (Pritidenta, Leinfelden, Germany), digital intraoral impressions (TrueDef, 3M ESPE, Germany) and CBCT (Accuitomo 170, Morita, Japan) were digitally combined using three-dimensional software tools to create a virtual patient replica. A complete CAD/CAM milled, screw-retained prosthesis based on the digital planning data was then fabricated for each patient (Avadent, Tilburg, The Netherlands). A surgical guide based on the ideal virtual prosthetic setup (CoDiagnostix 9, DentalWings, Dusseldorf, Germany) was then milled and supported on three mini-implants. Fully guided implant placement using the Straumann® Guided Surgery system was performed and 5–6 implants in the edentulous upper jaw were inserted. The provisional prosthesis was subsequently immediately loaded. Digital extra- and intra-oral scans were repeated following prosthesis insertion and clinical fit between preoperative planning and post-operative result was assessed.

Results: Twenty provisional prostheses on 5–6 implants were placed with clinically acceptable fit. Following loading, prosthesis failure was noted in three cases.

Conclusions: Preliminary results of this novel digital surgical/prosthetic workflow combining the information from facial, intraoral and CBCT scanners are promising. Further research is needed to address the issues of guided surgery accuracy and the precision of the registration procedure of facial, intraoral and CBCT information and the virtual prosthetic setup design.

Oral Presentation No. 6

Retrospective study of extensive ceramic veneers – 7 year results

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Purpose: Retrospective evaluation of extended anterior ceramic veneers in the upper and lower jaw 7 years after placement in a private practice.

Materials and Methods: 33 patients (19 female/14 male) were restored with adhesively luted extended veneers that were fabricated using heat-pressed ceramic (Cergo, DeguDent, Hanau/Germany). A single dentist restored 107 teeth (maxilla, n = 71; mandible, n = 36). Adhesive cementation was performed using an etch and rinse adhesive (Optibond FL, Kerr Hawe) and a dual-curing composite cement (Variolink, Ivoclar Vivadent/Calibra, Dentsply DeTrey).

Results: After 7 years, the Kaplan-Meier survival rate (in-situ criteria) was 93.6% (95% – Confidence interval [95%-CI]: 0.89; 0.98). The observed failures were caused by ceramic fractures for 7 restorations and biological failure for 1 restoration. Among the restorations, 84.3% (95%-CI: 0.76; 0.93) were in still service without any required clinical intervention and were rated successful after 7 years. Interventions were necessary in 14 cases (8 recementations, 2 endodontic treatments, 2 composite fillings (caries), 2 polishings of minor fractures). The clinical performance was not influenced by the veneer position (maxilla/mandibula, survival p = 0.56/success p = 0.30). The veneers that covered surfaces with over 50% exposed dentine exhibited a significantly increased risk (Hazard ratio 3.71, p = 0.0041) for requiring a clinical intervention; however, no effect on the survival rate for these veneers was observed (p = 0.35).

Conclusions: Following 7 years of clinical service, extended anterior veneer restorations made using a pressable ceramic exhibited comparable survival and success rates for the upper and lower jaw. Large areas of exposed dentin (>50%) were associated with lower success rates.

Oral Presentation No. 7

Effect of thermal and mechanical cycling on dentin bond strength

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Purpose: The aim of this study is to evaluate the effects of cyclic thermal and mechanical loads on dentin bond strength of a self-etch resin luting cement.

Materials and Methods: Inlay cavities were prepared on eighteen mandibular third molars (6 × 3 × 2 mm). Restorations were fabricated by using feldspathic porcelain (Vita VM9). Bonding achieved by using a dual-cure, self-etch resin luting cement (Clearfil Esthetic Cement). The teeth were then randomly divided into 3 groups: Group I: Control group (no thermal or mechanical cycling). Group II: Thermal cycling (thermocycling for 5,000 cycles). Group III: Mechanical load cycling (1,200,000 cycles).

Two I-shape-sectioned longitudinal cuts were made from each tooth (n:12) and a total of 36 specimens were subjected to tensile forces at a crosshead speed of 1 mm/ min, and the maximum load at fracture was recorded. The fracture site was observed with a stereomicroscope (Olympus, SZ-PT) to identify the mode of failure. A tooth from each cementation group was selected and interfaces observed under SEM (435 VP; Leo).

Results: One-way ANOVA has revealed that there were significant differences among the groups ($p < 0.05$). Tukey's HSD analysis showed that; the mean MTBS of Group III was significantly lower than Group I and Group II ($p < 0.05$). There were no significant differences between Group I and Group II ($p > 0.05$).

Conclusions: Within the limitations of this study mechanical loads seem to be effective on bonding stability while temperature alterations were not significantly influent. Additionally, the principal failure type is interfacial for all groups.

Oral Presentation No. 8

Micro-shear bond strength according to dentin cleansing methods before recementation

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Purpose: The aim of this study was to determine the efficiency of Erbium, Chromium: Yttrium-Scandium-Galium-Garnet (Er,Cr:YSSG) laser in different output powers for removing permanent resin cement residues and therefore its influence on micro-shear bond strength (μ SBS) compared to other cleaning methods.

Materials and Methods: 90 extracted human molars were sectioned in 1 mm thickness. Resin cement was applied to surface of sliced teeth. After the removal of initial cement, 6 test groups were prepared by various dentine surface treatment methods as follows: no treatment (group 1), ethylenediaminetetraacetic acid (EDTA) application (group 2), Endosolve R application (group 3), 1.25 W Er,Cr:YSSG laser irradiation (group 4), 2 W Er,Cr:YSSG laser irradiation (group 5) and 3.5 W Er,Cr:YSSG laser irradiation (group 6). The topography and morphology of the treated dentin surfaces were investigated by scanning electron microscopy (SEM) ($n = 2$ for each group). Following the repetitive cementation, μ SBS between dentin and cement ($n = 26$ in per group) were measured with universal testing machine and the data were analyzed by Kruskal Wallis H Test with Bonferroni correction ($p < 0.05$). Fracture patterns were investigated by light microscope.

Results: The efficiency of surface treatment methods was revealed by SEM. Mean μ SBS \pm sd (MPa) for each group was 34.9 ± 17.7 , 32.1 ± 15.8 , 37.8 ± 19.3 , 31.3 ± 12.7 , 44.4 ± 13.6 , 40.2 ± 13.2 respectively. Group 5 showed significantly difference from group 1, group 2 and group 4. Also group 6 was found statistically different from group 4.

Conclusions: 2 W and 3.5 W Er,Cr:YSSG laser application were found efficient in removing resin residues.

Oral Presentation No. 9

Evaluation of shear bond strength of two resin cements on different CAD/CAM materials

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Purpose: This study investigated the bond strength of two resin cements (Panavia F 2.0; P and Multilink N; M) to different CAD/CAM materials: Resin nano ceramic (Lava Ultimate; LU), hybrid dental ceramic (Vita Enamic; VE), zirconia reinforced lithium silicate ceramic (Vita Suprinity; VS), and lithium disilicate glass-ceramic (IPS e.max CAD HT; IPS).

Materials and Methods: CAD/CAM blocks were sectioned with a slow-speed diamond-saw sectioning machine with 2 mm thickness. Slabs were embedded in autopolymerizing acrylic resin ($n = 12$). Resin cements were applied on the surface of specimens. All specimens were stored in water for

24 hours and subjected to 5,000 cycles of thermocycling. Bond strength was measured by means of the shear bond strength (SBS) test. Data were statistically analyzed by two-way ANOVA and Tukey LSD post-hoc tests.

Results: The results of two-way ANOVA indicated that SBS values varied significantly depending on restorative materials, resin cements and the interaction of these factors ($p < 0.05$). LU-P group showed the highest bond strength for Panavia F 2.0 ($p < 0.05$). There were no significant differences between VS-P, VE-P and IPS-P ($p > 0.05$). IPS-M group showed the highest bond strength for Multilink N, it was followed by VS-M Group ($p < 0.05$). There were no significant differences between LU-M and VE-M ($p > 0.05$).

Conclusions: The choice should be done carefully because SBS values varied significantly depending on resin cement and restorative material.

Oral Presentation No. 10

Bond strenght of composite resins to CAD/CAM fiber-reinforced composite blocks

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Purpose: Nowadays, fibre reinforced composite (FRC) blocks for CAD/CAM restorations are introduced to dental market. The aim of this study was to evaluate the effect of different adhesive systems on the bond strength of composite resins to these materials.

Materials and Methods: 60 FRC blocks (Trinia, Bicon LLC) samples were prepared for the study with the $5 \times 5 \times 2$ mm dimensions, specimens were divided into six subgroups. Three of these groups were stored in a water bath for 24 hours for aging. Groups, which were aged (A) or non-aged (N), were treated with three different adhesive systems: One step-self etch (A1, N1) (Single Bond Universal, 3M Espe); Total etch (A2, N2) (Single Bond Universal); Two step-self etch (A3, N3) (Clearfil SE bond, Kuraray Dental). Then the surfaces were built up with composite resins (3 mm diameter and 3 mm length). The specimens were tested for shear bond strengths using universal testing machine. The fracture modes were evaluated and then results were statistically analyzed with one-way ANOVA and Tukey's HSD test.

Results: There were significant differences between groups N2 and N3, and between groups A3 and N3 ($p < 0.05$). There wasn't any difference between A1 and N1, A2 and N2 ($p > 0.05$). The fracture modes were dominantly adhesive in all groups.

Conclusions: The application of two step-self etch adhesive system may be beneficial for the bond strength of composite resins to FRC blocks comparing with the total etch system. Aging of FRC blocks have a negative effect on their bond strengths with composite resins when using the two step-self etch adhesive systems.

Oral Presentation No. 11

Effect of cement film thickness on the strength of all-ceramic crowns

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Purpose: The purpose of this study is to investigate the effect of the cement film thickness on strength in different all ceramic crowns fabricated with CAD/CAM system.

Materials and Methods: 9 groups, in which 12-units examples were produced from feldspathic glass ceramic (cerecblocs), lithium disilicate (e.max CAD) and nano-ceramic (Lava Ultimate) blocks, in the range of 100, 120 and 200 μ cement film thicknesses. Dental implant abutments with same diameter (4.5 mm) were used for supports of restorations. CAI/CAD/CAM system (Cerec AC) was

used to produce the restorations. For the measurement of resistance values was used a universal tester with 3 mm thick sphere.

Results: Average strength values of feldspathic glass ceramic crowns were at 100 micron cement film thickness (A1 group) 556.4 N, at 120 micron cement film thickness (A2 group) 569.5 N and at 200 micron cement film thickness (A3 group) 624.3 N. Average strength values of lithium disilicate glass-ceramic crowns were at 100 micron cement film thickness (B1 group) 1235.8 N, at 120 micron cement film thickness (B2 group) 1066.8 N and at 200 micron cement film thickness (B3 group) 1060.7 N. Average strength values of nano-ceramic crowns were at 100 micron cement film thickness (C1 group) 1156.1 N, at 120 micron cement film thickness (C2 group) 1130.8 N and at 200 micron cement film thickness (C3 group) 1053.2 N.

Conclusions: The cement film thickness increase was resulted with decrease in the strength values of lithium disilicate and nano-ceramic crowns and with increase in the strength values of feldspathic glass ceramic crown.

Oral Presentation No. 12

Effect of selective infiltration etching for resin cementation of zirconia

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Purpose: The purpose of this in vitro study was to evaluate efficiency of selective infiltration etching method on shear bond strength between zirconia and two resin cements; a conventional resin cement Variolink II and a MDP containing resin cement Panavia SA.

Materials and Methods: 40 zirconia specimens (13 mm × 7.5 mm × 2.5 mm) (ICE Zirkon, Zirkonzahn, Bruneck, Italy) were prepared and divided into two groups. Surface treatments were performed as following; group I: Sandblasting, group II: Selective infiltration etching. 40 composite cylinders (Tetric N-Ceram: Ivoclar Vivadent, Schaan, Liechtenstein) in 3 mm diameter and height were prepared. After application of surface treatments composite cylinders were cemented to zirconia surfaces using conventional resin cement Variolink II (Ivoclar, Vivadent AG, Schaan Liechtenstein) or MDP containing resin cement Panavia SA (Kuraray, Osaka, Japan). After cementation procedure specimens were stored in 37 °C distilled water for 24 hours. Following water storage shear bond strength test was performed at a crosshead speed of 1 mm/min in a universal test machine (Lloyd-LRX; Lloyd Instruments, Fareham, UK). Then statistical analyses were performed.

Results: Highest shear bond strength values were observed in Group II cemented using Panavia SA resin cement while lowest shear bond strength values were observed in group I cemented using Variolink II resin cement.

Conclusions: Use of selective infiltration etching method seems a promising surface treatment method for resin cementation of zirconia ceramics. MDP monomer containing resin cement improves resin bonding of zirconia ceramics.

Oral Presentation No. 13

Effect of femtosecond laser angles and shapes to zirconia-resin bond strength

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Purpose: Femtosecond (Fs) laser is an innovative laser technology for modifying ceramic surface. The purpose of this study was to evaluate the effect of angles and shapes formed by femtosecond laser on surface roughness (Ra) and shear bond strength (SBS) of zirconia ceramic.

Materials and Methods: Seventy specimens were prepared from monolithic zirconia (Prettau) and randomly divided to 7 subgroups ($n = 10$) according to different surface shapes (square, circular, spiral) and laser angles (30° and 90°). Ra values were measured using a profilometer and SEM images were taken at 500x magnification. Self-adhesive resin cement (Rely X U200) was bonded to specimens using a Teflon mould. Specimens were stored in distilled water at 37°C for 24 hours and then thermal cycled. SBS test was performed using a universal testing machine at a crosshead speed of 1 mm/min. Failure modes (adhesive, cohesive or mixed) evaluated for each specimen. Data were statistically evaluated using one-way ANOVA, Kruskal-Wallis, Tukey HSD and Mann-Whitney U ($p = 0.05$).

Results: Control group showed significantly lower Ra and SBS values compared with laser groups ($p < 0.05$). Circular shaped groups showed lower Ra and SBS values compared with spiral and square in each 30° and 90° groups ($p < 0.05$). 30° laser groups showed higher SBS values compared with 90° groups.

Conclusions: Based on the results it can be concluded that, femtosecond laser is effective on surface roughness and bond strength between zirconia and resin cement. Also angles and shapes formed by femtosecond laser are important factors on bond strength and surface roughness.

Oral Presentation No. 14

Contemporary view on dental materials and MRI

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Purpose: Magnetic resonance imaging (MRI) is of significant importance for diagnostics in many fields of medicine. Since its first application in clinical practice in 1980's, over 300 million MRI examinations have been performed. MRI has also certain shortcomings. One of them is the interference between magnetic resonance (MR) scanner magnetic field and metallic materials. As for dental objects, this interference mostly manifests as artefacts, which look like image distortion, addition or deletion of graphic information, sometimes as a noticeable rim around metallic object images. Artefacts obstruct MRI assessment, which may lead to patient's misdiagnosis. Various studies of dental alloys indicated that there is an enormous difference in their MR issues because materials composition differs significantly, which as well as internal structure, determine their magnetic properties. Secondly, artefact size directly depends on MR magnetic field. Furthermore, some sequences are more prone to metals, which lead to larger artefacts. Besides, metallic object shape and size as well as its orientation in magnetic field influence image distortion.

Materials and Methods: This presentation summarizes contemporary data on MRI image distortions due to dental metallic materials.

Results: Examination of all materials showed that all of them caused artefacts of different extend. The largest distortions were observed on MR images of cobalt-chromium and nickel-chromium alloys, stainless steel and aluminium bronzes.

Conclusions: Since MRI is a rapidly developing diagnostic modality with increasing magnetic field strength, artefacts remain a serious issue, which requires intent attention from researchers and clinicians. Newly developed materials should be tested for MRI interactions.

Oral Presentation No. 15

Effectiveness of a universal adhesive on bond strength to dentin

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Purpose: To evaluate the micro-shear bond strength (MSBS) efficacy of a new universal adhesive to enamel and dentin surfaces with different dentin drying modes.

Materials and Methods: Fifty intact human third molars were divided into enamel (E) (n = 20) and dentin (D) (n = 30) groups. Each tooth was sectioned in four quadrants with a diamond saw to achieve 200 tooth surfaces and expose flat enamel and dentin surfaces. Then, E and D groups were divided into total-etch (T) and self-etch (S) subgroups with dentin group further divided into 2 drying modes: drying (DD) and over drying (DOD). Each subgroup (n = 10x1/4teeth) was surface-treated with 4 different universal adhesives: Tetric N-Bond Universal (IvoclarVivadent) (TRC), Adper Single Bond Plus (3M ESPE) (ADP), OptiBond Solo Plus (Kerr) (OPB) and Prime & Bond NT (Dentsply) (PB). A transparent custom mould (h: 3 mm, diameter: 8 mm with a central hollow of 1 mm) was used to pack a composite. Composite was light-polymerized and MSBS testing was made on a universal testing machine (cross-head speed: 1 mm/s) followed by fractographic analysis. The data were statistically analyzed (two-way ANOVA, Tukey's, p = 0.05).

Results: In DOD group, TRC exhibited the highest MSBS values, while OPB showed the lowest (p < 0.05). In DD group TRC and ADP provided higher bond strength values when compared with OPB and PB subgroups (p < 0.05). When gently-dried and over-dried dentin groups were compared, only TRC showed no significant differences (p > 0.05).

Conclusions: In over dried dentin group, TRC exhibited the highest bond strength. Drying both enamel and dentin substrates at once would not compromise the bond strength values with the use of the new tested universal adhesive.

Oral Presentation No. 16

Fracture surface analysis of PM CP titanium after ceramic debonding

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Purpose: Bonding of dental ceramics to commercially pure titanium (CP Ti) has always been a challenge. Thick oxide layer formation on the surface of titanium weakens the bond and leads to predominantly adhesive fractures between CP Ti and veneering ceramics. CP Ti manufactured by powder metallurgy (PM) processes has not yet been used in prosthodontics as a method for metal substructure manufacturing. The aim of this study is to evaluate the fracture mode between CP Ti manufactured by PM and veneering ceramics.

Materials and Methods: 120 samples of CP Ti manufactured by PM were divided into 5 groups according to surface modifications: 1. untreated; 2. sandblasted (Al_2O_3); 3. with applied bonding agent; 4. sandblasted (Al_2O_3) and with applied bonding agent; 5. etched with hydrochloric acid. All samples were veneered using low fusing dental ceramics. Each group was divided into 3 subgroups of 8 samples according to veneering ceramics. Surface of the samples was evaluated for fracture mode by XRD analysis before veneering and after debonding.

Results: XRD analysis of samples analysed before veneering showed pure α -Ti. After debonding only two of the fifteen groups showed traces of ceramics on the surface (cohesive fracture) and the rest showed only presence of α -Ti, β -Ti and different types of titanium oxides (adhesive fracture).

Conclusions: Fracture mode analysis of veneered CP Ti manufactured by PM shows similar results as conventionally manufactured CP Ti, suggesting the PM Ti material can potentially be used in crown manufacturing. However, further studies involving other methods of fracture mode analysis are necessary to draw definite conclusions.

Oral Presentation No. 17

Adhesion between composite and titanium with different metal primers

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Presentation was cancelled.

Oral Presentation No. 18

Corrosion behaviour of dental ceramics

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Purpose: Although dental ceramic materials are considered bioinert, none of these materials is non-corroding. First aim of this study was to determine the level of corrosion of selected ceramic materials. Second aim of the study was to determine the level of corrosion of ceramic material (most corrosive in the part one) In-Ceram® Spinell in commonly used beverages.

Materials and Methods: 11 types of ceramic materials from all groups of dental ceramic materials have been chosen. The composition of ceramic materials was qualitatively evaluated by X-ray spectrometry using the wave disperse XRF spectrometer Spectroscan MAKV-GV (Spectron NPO, Russia). For evaluation of a corrosive behaviour, leaching under extreme conditions was carried out. Hydrochloric acid was used (3 ml 0.1 mol.l⁻¹ HCl, 120 hours, 37 ± 1 °C), then extracts were filled up to 10 ml and analysed by mean of inductively coupled plasma optical emission spectrometry (ICP-OES, Integra XL2, Australia). Then In-Ceram® Spinell was immersed using following leaching agents: Ice Tea Peach (Lidl Stiftung & Co. KG, DEU; pH 2.99), Freeway Cola (Lidl Stiftung & Co. KG, DEU; pH 2.42), red wine Cabernet Sauvignon (Wine Cellars Peter Metres KG; pH 3.59), white wine Cabernet Sauvignon (Israel; pH 3.23), juice 100% orange (Relax Ltd., NZL; pH 3.76), mouth wash Colgate Plax Whitening (Colgate-Palmolive, SUI; pH 8.04), 0.9% NaCl (pH 5.35), 0.5% acetic acid (pH 2.56), 2% citric acid (pH 1.98), 0.1M HCl (pH 1.54), redistilled water (pH 5.70). Samples of the mentioned material were immersed at 37 °C during seven days. The change of sample masses, a surface structure and a colour were studied. Released elements were determined using again ICP-OES.

Results: In extracts, measurable amounts of elements were found: sodium (0.065 – 1.1), magnesium (0.012 – 0.15), iron (0.32 – 1.2), manganese (0.0042 – 0.096), zinc (0.014 – 2.7), silicon (up to 0.63), aluminium (up to 0.97), yttrium (up to 0.21) and titanium (up to 2.6, all in mg.l⁻¹). Zirconium and gold were found in leachates. The loss up to 2% of the origin mass was found for tests of In-Ceram® Spinell with citric, hydrochloric and acetic acids, Ice Tea Peach, juice and white wine. Samples treated in Freeway Cola and red wine came under colour changes irremovable by water rinsing. ICP-OES analysis of In-Ceram® Spinell demonstrated the increase in concentration of calcium, magnesium, aluminium, yttrium, silica and other elements.

Conclusions: The presence of released ions in the extracts was also documented in ceramic materials. The corrosive behaviour of In-Ceram® Spinell was monitored in the presence of currently used beverages. The colour change and the loss of the mass can have important clinical impact. None of the known dental materials can preserve absolute resistance against all corrosion forms. Supported by the programme PRVOUK P28.

Oral Presentation No. 19

The era of monolithic translucent zirconia: Two case reports

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Purpose: Yttria-stabilised zirconia polycrystalline (Y-TZP) ceramics were introduced as a biomaterial in restorative dentistry to eliminate the incidence of bulk fracture in all ceramic restorations. Although, Y-TZP ceramics exhibit high flexural strength and fracture toughness, chipping of the veneering material, reduced translucency of the core and heavy tooth reduction limit their use. Recently, monolithic translucent zirconia restorations were introduced in an effort to eliminate chipping of the veneering material and minimise occlusal and axial tooth reduction. Less wear to the antagonist tooth and improved aesthetic outcomes compared to traditional zirconia cores were demonstrated in in-vitro studies. Furthermore, these are cost-effective restorations since ceramic veneering is not required. The aim of this study was to present two case reports demonstrating rehabilitation with monolithic translucent zirconia restorations and discuss the clinical challenges of this treatment modality.

Materials and Methods: Case 1: A 25-year-old female patient with history of trauma to her maxillary anterior teeth received implant supported crowns in the lateral incisors and monolithic translucent zirconia crowns in the central incisors allowing minimal tooth reduction. Case 2: A 25-year-old female patient with amelogenesis imperfecta received monolithic translucent zirconia onlays in the maxillary and mandibular posterior teeth to increase the occlusal vertical dimension and facilitate full mouth reconstruction.

Results: Patients were satisfied with the functional and aesthetic outcome at the end of the treatment and no complications were noticed at the 3 month review appointment.

Conclusions: Although, the use of these materials is increasing, further clinical trials are necessary to confirm its clinical application.

Oral Presentation No. 20

Effect of surface treatments on bond strength of CAD-on technique

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Purpose: The aim of this study was to investigate the effect of different surface treatments (sand-blasting, Er:YAG and Femtosec lasers) on shear bond strength (SBS) of CAD-on technique.

Materials and Methods: Forty Y-TZP zirconia plates (IPS e.max ZirCAD, Ivoclar Vivadent) were cut, sintered ($12.4 \times 11.4 \times 3$ mm) and divided into four groups according to the surface treatments: $50 \mu\text{m Al}_2\text{O}_3$ sandblasting (group S), Er:YAG laser irradiated (group E), Femtosec laser irradiated (group F) and no surface treatment as a control (group C). Also forty cylindrical (5 mm – diameter, 2 mm – height) lithium disilicate (IPS e.max CAD) veneer ceramics were cut and fused to all zirconia cores by a glass-fusion ceramic and crystallized according to CAD-on technique. Specimens were subjected to shear force using a universal testing machine. Load was applied at a crosshead speed of 0.5 mm/min until failure. Mean SBS (MPa) were analyzed with one-way ANOVA ($p < 0.05$). The failed specimens were examined under a stereomicroscope at x20 to classify the mode of failure.

Results: The highest SBS was observed in group FS (36 ± 3.31 Mpa), followed by group SB (33.03 ± 5.05 MPa) and group C (32.52 ± 10.15 MPa). The lowest SBS was observed in group ER (31.02 ± 4.96 Mpa). But no significant differences were found between the control and surface treated groups ($P = 0.377$). All the specimens showed mixed type (adhesive and cohesive) of failure.

Conclusions: Femtosec laser application has increased the bond strength between zirconia-veneer specimens. However, novel CAD-on technique with no surface treatment also showed high bond strength. Thus, this technique could increase ceramic bonding to zirconia without additional surface treatments.

Oral Presentation No. 21

Shading impact on the bond of Y-TZP to resin cement

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Purpose: Shading Y-TZP ceramics affects the mechanical properties, however effect of shading on the bond strength of zirconia to resin cement is lacking in the literature. This investigation evaluated the effect of dipping a zirconia ceramic in different colour liquids on the micro-tensile bond strength of zirconia ceramic to a resin cement.

Materials and Methods: This in vitro study was conducted on 100 microbar specimens divided into 5 groups of B2, C1, D4, A3 and Uncolored (control). To prepare the microbars, 20 white zirconia ceramic blocks, measuring 5 × 11 × 11 mm, were dipped in each of shades A3, B2, C1, or D4 colour liquids for 10 seconds (5 blocks each colour liquids) and 5 blocks remained uncoloured for the control. Composite blocks of similar dimensions were fabricated and bonded to zirconia ceramic blocks using Panavia F 2.0 resin cement. Zirconia-cement-composite blocks were sectioned into microbars measuring 1 × 1 × 10 mm. The micro-tensile bond strength of microbars was measured by testing machine. Data were analyzed using one-way ANOVA and Tukey's test. All tests were carried out at the value of significance 0.05.

Results: Statistically significant differences were found among the groups in micro-tensile bond strength values ($p < 0.001$). The group D4 was the highest with 39.16 ± 6.52 MPa.

Conclusions: Shading affected the micro-tensile bond strength of zirconia ceramic to Panavia F 2.0 resin cement; however, a similar pattern of change was not shown among the different colour liquids.

Oral Presentation No. 22

Topographical properties of zirconium-dioxide: Effect of polishers with different surface-coatings

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Purpose: Improper surface finishing of fixed dental prosthesis made of monolithic zirconia (MZ) may cause opposing enamel wear. This study investigates the surface topography parameters and wettability of MZ using polishers with different coatings.

Materials and Methods: MZ specimens ($N = 50$, $n = 10$ per group) (Katana Zirconia HT) ($12 \times 12 \times 1.8$ mm³) were polished and randomly allocated to 5 groups, namely BG: Silicon carbide polishers (Brownie, Greenie, Super Greenie); CG: Diamond impregnated (Ceragloss); EV: Synthetically bonded grinder interspersed with diamond (EVE-Kit); SL: Urethane coated paper with aluminium oxide grits (Soflex-Kit) and DB: Diamond bur (8 µm, FG9205/6). After roughening (Grinding Bur-GB) (220 µm grit, 10 s, 160,000 rpm) and baseline measuring, each polishing step was performed for 10 s (750 g, 5,000–30,000 rpm) according to manufacturer's instructions. Changes were evaluated considering: a) Weight (digital scale); b) Volume loss (digital microscope); c) Vertical height loss (digital microscope); d) Surface roughness (profilometer); and e) Surface wettability (goniometer, water). Data for each parameter were statistically analyzed (one-way ANOVA, Scheffé, Wilcoxon) ($\alpha = 0.05$).

Results: The material loss after polishing compared to baseline ranged between $-3 \pm 0.1 \times 10^{-4}$ – $-296 \pm 8 \times 10^{-4}$ g in ascending order as follows: SLa < CGa < BGa < DBb < EVc, volume loss between $-0.158 \pm 0.03 \times 10^{-6}$ – $0.245 \pm 0.07 \times 10^{-6}$ mm³ (SLa < BGa < CGa,b < DBb < EVc), vertical height loss between -18.91 ± 3.52 – 55.19 ± 6.26 µm (SLa < BGa < CGa,b < DBb < EVc), surface

roughness between $-0.143 \pm 0.015 - 0.855 \pm 0.419 \mu\text{m}$ (DBa < BGa < Sla < CGa < EVb) and contact angle between $-3.93^\circ \pm 0.79^\circ - 2.79^\circ \pm 3.14^\circ$ (BGa < DBa < Sla < CGa < EVa).

Conclusions: All the polishers performed similar when Ra values are considered. After 40 s of polishing, SL, BG and CG performed similar, producing the least material loss of MZ, while EV could not be suggested for polishing.

Oral Presentation No. 23

Professional smile designing: Going digital

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Purpose: 1. To emphasize the importance of smile designing in everyday clinical practice. 2. To show the history of smile designing in dental practice starting from manual and ending to virtual digital ways. 3. To be able to identify the basic requirements needed to start smile designing for a case. 4. To be able to compare and choose between different smile designing systems available in the market based on scientific selection. 5. To show the method of presenting a case for patients after performing smile designing digitally.

Materials and Methods: Many digital programs and protocols have been introduced to the dental market the last few years. Some of them focused on the style of imaging and producing a virtual simulation to the patient, helping him in imagining how his smile going to look like after the planned esthetic dental work. 8 programs were collected, and used to design patients smiles, then they were analyzed according to preclassified criteria and given scores.

Results: No ideal software for smile designing is yet available in the market, however, dentist can identify the closest software that covers the needs of his practice and choose the highest score.

Conclusions: Many digital programs and protocols have been introduced to the dental market the last few years. Some of them focused on the style of imaging and producing a virtual simulation to the patient, helping him in imagining how his smile going to look like after the planned esthetic dental work. Some soft wares need minor improvements to get closer to the ideal characteristics required from a designing software, others need dramatic changes to be able to meet the minimum needs of a dentist.

Oral Presentation No. 24

Factors influencing the dimensional accuracy of 3D-printed full coverage dental restorations using stereolithography technology

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Purpose: With the advancement in CAD/CAM technology, additive manufacturing (AM) or 3D-printing is emerging in the dental field and is promising in manufacturing of dental restorations. The aim of this study was to evaluate the effect of the build orientation (the angle of the support) and dimensions of the support (thick vs. thin support) on the dimensional accuracy of 3D-printed full coverage dental restorations.

Materials and Methods: A full dental crown was digitally designed and 3D-printed using stereolithography (SLA-AM) technology. Nine angles were used for the building orientation as follows: 90° , 120° , 135° , 150° , 180° , 210° , 225° , 240° and 270° . In each build orientation, the crown was printed using a narrow and a wide type of support. The specimens were digitally scanned using a high-resolution optical surface scanner. The dimensional accuracy was evaluated using digital sub-

traction technique. The 3D-digital files, exported in standard triangulation language (STL) format, of the scanned printed crowns (test model) were superimposed with the STL files of the designed crown (reference model) using Geomagic® studio; 2014. The average deviation between the two models and the root mean square estimate values (RMSE) were then evaluated. Additionally, the deviation pattern on colour map was further assessed.

Results: The build angle and different dimensions of the support structure are suggested to influence the dimensional accuracy of 3D-printed restorations. The lowest average deviation was found with the build angle of 120° for both thin and thick type of support (0.019 and 0.021 mm respectively). Further, the RMSE value recorded for thin type of support (0.029 mm) was lower compared to the thick type (0.031 mm), indicating a more accurate fit between the test and reference models.

Conclusions: Within the limitations of this study, the preferred build orientation using SLA printing technology is 120° combined with the thin type of support. The selected build angle offers the highest accuracy of the printed restorations. It also offers the least needed surface support area which decreases the time needed for finishing and polishing

Oral Presentation No. 25

Some anatomical considerations for implant-supported restorations in edentulous patients

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Purpose: After the loss of natural teeth, the alveolar process and part of the basal bone remodels, resulting in edentulous residual jaws. The resulting residual arches provide the vital foundation on which should be placed the denture bases and the artificial teeth into their selected positions. The residual arches also furnish the foundation of osseointegrated implants for the planned restorations. The purpose of this study was to learn some characteristics of the edentulous arches, the relations between occluding jaws and their clinical importance.

Materials and Methods: One hundred and six edentulous subjects which rendered 212 casts, mounted in centric relation, were examined and measured. There is a large disparity in sizes and shapes of the edentulous arches and varied spatial interarch characteristics.

Results: The space conformed between the recommended teeth-gingivae wax-up scaffold and the residual tissues surfaces, provides a prosthetic space to be properly occupied by the bone augmentation material, implant abutments, crowns, fixed bridges and/or denture bases according to the individual requirements and possibilities.

Conclusions: The precept of beneficial effect of axial close forces to the supporting bone is widely accepted in orthopaedic implant surgery and in dental implantology. However nowadays, in implant dentistry, there is a disagreement on this axiom and successful oblique and distant osseointegrated implants are reported in the current literature. Regardless of these different considerations, it is important to know, before the insertion of osseointegrated implants, the individual anatomy and the spatial relations of the residual ridges between occluding edentulous jaws in each patient. This will contribute for a more cosmetic and functional rehabilitation.

Oral Presentation No. 26

Multidisciplinary intervention for prosthetic rehabilitation

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Presentation was cancelled.

Oral Presentation No. 27

Alternative attachment incorporation methods in implant-supported overdentures with non-splinted abutments

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Purpose: The rehabilitation of completely edentulous mandibles with implant-supported overdentures (ISOs) is now a popular treatment modality with world-wide acceptance. Two types of overdenture attachments are essentially used for the retention of ISOs: splinted and unsplinted attachments. Splinted attachments may be either rigid (U-type tissue bar) or non-rigid (Dolder bar or Hader bar). Non-splinted attachments may also be either rigid (locators or telescopic retainers) or non-rigid (ball/stud attachments). The connection between the matrix and the denture can be achieved by indirect or direct method. The direct method for integrating a non-splinted attachment (ball or locator) intraorally is relatively simple, economic, requires minimal chair time, does not necessitate additional laboratory procedures or component parts, and can be achieved at prosthesis insertion appointment. The most frequently seen complications in the direct incorporation method are metal housing debonding, incorrect orientation of attachment components and entrapment of autopolymerizing acrylic resin within the retainer(s).

Materials and Methods: Presentation of alternative direct attachment incorporation methods in order to prevent or minimize metal housing debonding, attachment malpositioning and acrylic resin entrapment within attachment undercuts.

Results: Accurate incorporation of the attachment into the overdenture is crucial for effective function, patient comfort and tissue preservation.

Conclusions: Currently, not any evidence based data exist in the literature about the clinical superiority of using splinted versus unsplinted attachments in ISOs. However, the high treatment costs, technique sensitivity and prosthetic space requirements for splinted attachments make the unsplinted attachments more popular choices for both patients and clinicians.

Oral Presentation No. 28

Evaluation of immediate loaded implants in single tooth missing zone

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Purpose: The aim of this study was evaluation of the immediate loading of platform switching implants at single tooth missing in the aesthetic zone of maxilla clinically and radiographically.

Materials and Methods: Thirty three (23 female, 10 male) patients with a single missing tooth on the maxillary anterior region participated in this study. Immediate loading protocol with temporary abutments was applied to 18 of these patients without function. Two of these implants were lost because of early dental implant failure. Late loading protocol was applied to the other 15 patients. Pocket depth, bleeding index, gingival index, plaque index and keratinized gingival width were measured during the final loading session and after 1 month, 3 months, 6 months and 12 months of loading. The periapical radiographs of the patients were taken in the session of loading, after 1 month, 3 months, 6 months and 12 months of loading. Marginal bone losses were measured on the radiographs.

Results: As a result of one-year follow-up, success rates were 88.88% for immediate loading group and 100% for delayed loading group. There was not any statistically significant difference of marginal bone resorption between groups. The probing depth showed statistical difference between the groups at first month and bleeding index had significant difference between the groups at third and sixth month's sessions. There was not any significant difference between the groups for other clinical parameters.

Conclusions: According to the results of this study, with the help of appropriate patient selection and good practices, there would be no significant clinical and radiographic difference between immediate loading and delayed loading protocols.

Oral Presentation No. 29

Fracture resistance of oval and circular dowels used in oval root canals

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Purpose: To evaluate different dowel morphologies and different dowel placement lengths on the fracture resistance of teeth with oval canal morphology treated endodontically and restored with crowns.

Materials and Methods: Extracted mandibular premolars with similar dimensions were decoronated. After the root canal treatment, the teeth were mounted on acrylic blocks. Samples were randomly divided into four groups of 10 samples each. In groups C-10 and C-5, 10 mm and 5 mm long circular dowel space was achieved with #0.5 and #2 coded manufacturer's drills, respectively. In groups O-10 and O-5, respectively, 10 mm and 5 mm long oval dowel space was achieved ultrasonically with the manufacturer's medium gritted tips. Dowels were cemented using resin cement and the self-adhesive technique. All specimens were restored with composite cores and prepared at a height of 6 mm (including 1 mm ferrule) and a convergence angle of approximately 5° in total. Then, all teeth were restored with metallic crowns. After thermocycling, all specimens underwent fracture resistance testing. Data were analyzed using the two-way ANOVA test ($\alpha = 0.05$).

Results: Oval dowels and placement of dowels at 10 mm depth showed higher fracture resistance than circular dowels and placement of dowels at 5 mm depth ($p < .001$).

Conclusions: Increased dowel length and use of oval dowels enhanced the fracture strength of teeth with oval canal morphology.

Oral Presentation No. 30

Stress distribution in cantilevered fixed partial denture with different C/I ratio

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Purpose: The prosthetic treatment procedure with dental implants of posterior edentulous maxilla is difficult because of maxillary sinus and bone density. Cantilever fixed partial denture can be the treatment option which doesn't take long time and need extra treatment cost. In addition it is very important to evaluate the effect of crown/implant ratio in resorbed maxilla for getting successful treatment result. The aim of this study was to evaluate the stress distribution in cantilevered fixed partial denture with different crown/implant ratio.

Materials and Methods: A maxillary jaw modelled in D3 bone density with 3D finite element method. A 4.1 mm in diameter and 10 mm in height ITI implant was modelled with two unit distal cantilevered fixed partial dentures. Cr-Co metal substructure and feldspathic porcelain were used for the restoration. The mesiodistal dimension of cantilever was 7 mm. 3 different crown/implant ratios (1/1; 1.5/1; 2/1) were used. 300 N oblique loads were applied for each crown. Data were evaluated in cortical bone, implant and metal substructure.

Results: Minimum principle stresses were localized buccal, distal and palatal side of the implant neck in cortical bone. The min. principle stress was -106.8 MPa for the 1/1 crown/implant ratio.

When the crown/implant ratio increased, the min. principle stress increased % 17.5 and % 32.3 respectively. While increased stress was seen in implant too, metal substructure didn't show this kind of characteristic property.

Conclusions: The effect of increased crown/implant ratio is important for both the cortical bone and implant.

Oral Presentation No. 31

Prevalence and risk variables analysis for peri-implant disease

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Purpose: The aim of this study was to assess the prevalence of peri-implant mucositis and peri-implantitis and establish the association of different variables associated with it, also to find out the awareness level, practice of oral hygiene and maintenance among implant patients.

Materials and Methods: Patients visiting the Dental Outpatient Department of Zhengzhou University, China were selected for the study. The examination was conducted using basic diagnostic tools (Mouth mirror, HU-FRIEDY periodontal probe). They were categorized into those with healthy implants and those who had developed peri-implant mucositis or peri-implantitis using the formulated indicators. The statistical association of different variables with peri-implant disease was calculated using Chi-square test and Fisher's test using SPSS version 16.

Results: Out of 63 dental implant patients examined, 41 had healthy implant, 20 patients suffered from peri-implant mucositis and only 2 of them had incidence of peri-implantitis. The statistical analysis showed bleeding on probing, clinical attachment level, plaque index and gingival index are statistically associated with peri-implant disease. The other variables like age, gender, time of follow-up, brushing technique, smoking habit etc. did not show statistical association with peri-implant disease.

Conclusions: The overall oral hygiene, maintenance and care practiced by implant patients were good and their awareness level regarding oral hygiene was also high. This is largely due to follow up instructions given to the patients to improve the awareness level.

Oral Presentation No. 32

Replacing first premolar and first molar with cantilever bridge: A clinical study

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Purpose: Evaluation of cantilever bridge for replacing lower first premolar and first molar using second premolar and second molar as abutment teeth.

Materials and Methods: In this experimental study we selected 23 patients with missing lower first premolar and first molar on the basis of a specific protocol. All of them understood this treatment and other alternative methods and signed the informed consent. We provided 4 units cantilever porcelain fused to metal bridge with base metal alloys using second premolar and second molar then missing teeth were replaced. All patients were controlled with clinical examinations and radiography during 5 years with no data loss. Statistical analyses of Chi-square showed: $p = 1$ and regarding the $p > 0.05$, it means the test is not significant or there were not any destructive symptoms ($\alpha = 0.05$).

Results: This research stated 100% of volunteers asymptomatic. Regarding Chi-square analysis test during 5 years follow up $p = 1$ ($\alpha = 0.05$) although it is not significant but it states all of 23

treated persons had no failures.

Conclusions: In the present research we found the treatment in all patients have been successful during the period. These findings can be related to the specific protocol for selecting cases and/or the period is not so long term. It seems our method can be a reliable treatment and the excellent findings may be related to our specific case selection but we suggest more long-term studies.

Oral Presentation No. 33

Influence of different protocols for cement removal during cementation on implants

Larisa Jercan

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Purpose: Purpose of this study was to evaluate the influence of different protocols for resin cement removal during cementation in various depth gingival sulci on an experimental model.

Materials and Methods: Various depths of gingival sulcus were built around implant-supported porcelain fused to metal crown. The subgingival location of the margin of each implant was measured with a periodontal probe. The crown was repeatedly luted on the abutment, and the artificial gingiva was removed after thoroughly cleaning the excess cement in order to observe if debris remains in the sulcus or on the implant abutment. The four methods used were with rubber dam, with PTFE tape and silicon index, with dental floss and by measuring the volume of cement to be used.

Results: Cementing on implant abutments proved to be a technique sensitive procedure.

Conclusions: In greater depth sulcus the unremoved cement can and will lead to complications such as periimplantitis therefore this topic is of high interest for any practitioner.

Oral Presentation No. 34

Pain and dysfunction after changing the VDO – digital analysis and occlusal hygiene

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Purpose: The aim of this presentation is to demonstrate the use of digital analysis of the occlusion in a patient with heavy pain and dysfunction complaints after changing the VDO.

Materials and Methods: Clinical case: A 39-year-old woman was referred to us after treating generalized tooth surface loss three month before. She lost weight due to heavy toothache and muscle pain. One molar was treated endodontically without relieve of the pain. Intra-orally there seems to be no proper ICP and no contact of the canines. Increase of the VDO is estimated to be 3 mm. Palpation of the muscles is painful especially on the left side in the temporal region.

Results: With a t-scan (Tekscan) the contacts between upper and lower teeth were digitally analysed. The scans were necessary because the patient was avoiding contact due to pain and therefore not able to reproduce the bite. There was no contact on the right side at all. 60% of the total bite force was concentrated on the second left molar. The occlusion was equilibrated with smooth diamond burs and polishing cups guided by new scans after each correction. Finally the two canines were built up to achieve canine protection and disclusion of the posterior teeth in protrusive and lateral movements. Recall after one week showed almost total relieve of the pain and balanced occlusion with canine protection.

Conclusions: Digital analysis of the occlusion proves to be a helpful instrument to judge the force distribution in occlusion.

Oral Presentation No. 35

Interdisciplinary creation of bone and teeth after severe trauma

Rob Groot, Hans van Pelt, Manfred Leunisse, Dick Barendregt, Marcel Linssen, Michiel van Lieshout

PRO Rotterdam, The Netherlands

Purpose: The aim of this presentation is to show a solution for non-surgical bone augmentation in young patients with missing teeth after severe dental trauma, combined with autotransplantation, implantology and prosthodontics.

Materials and Methods: This case study shows us that it is possible to acquire dense alveolar bone by moving teeth through the (remaining of) the processus alveolaris. It also shows us the possibility of autotransplantation of endodontic treated elements.

Results: The transplanted elements grow along with the developing of the face and skull. Autotransplantation appears to be a good expansion of our treatment possibilities for young adults who otherwise would have to wait for fixed prosthodontics on implants until they have stopped growing.

Conclusions: It appears that the PDL is capable of creating a beautiful, thick process by the orthodontical moving of teeth. We "just" have to understand the biology of the PDL. Autotransplantation of a vital or endodontically treated tooth is a very valuable alternative for implants and usable for young patients who do not have stopped growing yet. It is a requisite to act as an interdisciplinary team of orthodontist, endodontist, periodontist and prosthodontist to develop a procedure of getting predictable results in case we create new alveolar bone and gingiva by means of selective orthodontic movement of teeth and perform autotransplantations.

Oral Presentation No. 36

Laser application in modern dental medicine

Doriana Agop-Forna

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Purpose: Laser technique facilitates the practical execution of interventions on both hard tissues (regularization, slicing, and apicoectomy) and on soft tissue (frenectomy, gingivectomy, incision, curettage, ablation of cysts, granulomas).

Materials and Methods: For a number of 60 cases we used both the Biolase laser system, and KaVo Key 3 laser, noting differences compared to the classical surgical technique, on the basis of duration, pain, bleeding, sterilization, and by comparing two laser systems.

Results: For the Biolase system we obtained decreased time of execution, higher accuracy, and higher sterilization than for KaVo system.

Conclusions: Rigor and difficulty to finish the maneuvers were by 2% higher for KaVo than for Biolase system.

Acknowledgement POSDRU/160/2.1/S/139881

Oral Presentation No. 37

Implant treatment in a patient who is under methotrexate medication: A case report

Polykarpos Papanagiotou, Stavros Pelekanos

University of Athens, Greece

Purpose: Presentation of case report: a 58-year-old male patient presented the request to remove his full arch maxillary prosthesis and restore it with implants.

Materials and Methods: The patient takes methotrexate every week to treat psoriasis. Psoriasis is evident on his hands and legs. Besides psoriasis the patient has no other medical condition that can be contradictory to implants. This case report will discuss the treatment modality that was followed; the surgical difficulties that appeared during implant placement and the adverse effects caused by methotrexate intake. The adverse effect was painful, had a negative impact on the healing progress and thus the patient's trust was unsettled.

Results: The case report presented the conclusions made after the treatment and made suggestions for a therapeutical scheme that can minimize these adverse effects on patients who wish to have implants and take methotrexate.

Conclusions: Up to date, there are no sufficient data to correlate implant placement with patients under methotrexate medication.

Oral Presentation No. 38

Bruxism and tinnitus

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Purpose: Bruxism is recognized as an activity by which stress is reduced. When bruxism coincides with a disharmony between the arrangement of the teeth and with an inclination of both the occlusal plane and the condylar path, the result is not only the destruction of dental tissue but also the change of the position of the condyle in the glenoid fossa. When the adaptation of the patient is exhausted, then tinnitus – a personal perception of a sound within the ear when no external sound is present – may be the result due to the anatomical proximity of the medial pterygoid muscle, which is always active during bruxing, to the synergic muscles *tensor tympani* and *veli palatini*.

Materials and Methods: The author reports the case of a 61-year-old bruxing patient with tinnitus, who is gradually losing hard dental tissue. The patient underwent a systematic clinical and instrumental analysis according to the Viennese school. On this basis the patient received a mandibular splint as a long-term provisional.

Results: After 3 months of the wearing of the splint, tinnitus disappeared. The positive result was then fixed in provisorias made out of PMM according to the wax-up technique with the concept of sequential guidance. The metric data gained by axiography were applied in the individually adjusted articulator and the casts were mounted on the individual hinge axis.

Conclusions: Due to the stabilisation of occlusion, tinnitus faded away. Although the bruxism has not ceased, further destruction of dental tissue could be averted.

Oral Presentation No. 39

Cleft patients – solutions of dental defects

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Purpose: The aim of the study was to estimate the best solution for missing teeth in upper frontal region in patients with orofacial cleft. Cleft lip and palate is associated with both quantitative and qualitative deficiency of the osseous and soft tissues. In more than half of cleft patients numerical defect of the dentition is present, predominantly missing tooth is a lateral incisor on the cleft side.

Materials and Methods: The group of young adults with cleft lip and palate treated at the Centre for treatment of congenital anomalies of the face and neck at FNKV was investigated and different

treatment options were detected.

Results: The decision regarding prosthetic solution in patients with cleft lip and palate has to be based on interdisciplinary cooperation between prosthodontist, orthodontist, implantologist and plastic surgeon. The biological factor of the teeth, extent of the defect and condition of the soft tissues, quantity and quality of the bone in the cleft alveolar ridge, the shape and relationship of dental arches and finally the patient's cooperation have to be considered. There are several possible prosthetic solutions in the atypical situations of the cleft jaws: dental implant, specially adjusted fixed prosthetic bridge or removable denture serving also as the obturator.

Conclusions: Prosthetic reconstruction of dental defects in cleft patients has its own specifics because of atypical anatomical situation and the low age of the patients. Individualized treatment plan and a detailed planning of the form and range of the prosthetics are necessary.

Oral Presentation No. 40

No time limit for using autotransplants

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Purpose: Autotransplants are a widely used treatment option in the Scandinavian countries. The primary indication is in young adults teeth where open apices are used with good success rates (on average 90 to 95% after 10 years). In our referral practice in Rotterdam the purpose was to investigate if a comparable success rate could be accomplished with fully developed teeth.

Material and Methods: Up to April 1, 2015, 125 fully developed teeth were transplanted to various receptor sites. The treatment modality prescribed that if possible the endodontic treatment was done 4–6 weeks before transplantation. No prophylactic antibiotics were used with the transplantation procedure.

Results: Results show that in a follow-up period of 12 to 126 months the success rate added up to 95% and the survival rate 98%. In 2% the external root resorption was observed and in total in 23% of the cases antibiotics were prescribed after the transplantation procedure.

Conclusions: In conclusion transplantation of fully developed teeth is as successful as for teeth with open apices. Therefore this treatment modality is a viable option in daily practice and preferable over dental implants. With use of fully developed teeth age is no restriction.

Oral Presentation No. 41

**Autotransplantation in young patients after dental trauma in anterior teeth in the upper jaw:
Review of a guideline**

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Purpose: The aim of this research was to determine if actual treatment planning of autotransplantation in a multidisciplinary dental practice (Proclin, Rotterdam) is corresponding to the existing guideline for autotransplantation.

Materials and Methods: Through a literature review, the existing guideline for autotransplantation is examined on its evidence. Subsequently a checklist is developed to analyze whether the guideline is applied consistently.

Results: Many articles were found describing the treatment planning of autotransplantation and substantiate the guideline. However, lack of consensus concerning several details exists. For the clinical research 28 autotransplantations within 24 patients were included. At the time of the surgical procedure the mean age was 12.2 year ($r = 10.25\text{--}16.83$ year) and the follow-up period was

34 months ($r = 11-94$ months). A survival rate of 96.4% was found, due to loss of 1 transplanted element. Complications occurred in 5 cases, resulting in a success rate of 82.1%. When actual treatment planning did differ from the guideline, a legitimate explanation was given or supporting literature was available. In some cases, patient factors have been the reason to deviate from the guideline.

Conclusions: It could be stated that the examined guideline for autotransplantation describes a convenient procedure for autotransplantation in young patients after dental trauma in anterior teeth in the upper jaw.

Oral Presentation No. 42

The gradation of the color in natural teeth

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Purpose: The knowledge of the gradation of the colour in natural teeth is essentially for shade matching in the clinic, during technician work of fixed prosthetic appliances and also for fabricating the resin artificial teeth. The purpose of this study was to analyze the distribution of colour parameters: brightness (B^*), chroma (C), hue (H), axes a^* (red-green) and b^* (blue-yellow), in intercanine sector in maxilla, measured by an intraoral spectrophotometer.

Material and Methods: Patients tooth color measurements were performed using an intraoral spectrophotometer Vita Easyshade® (Vita Zahnfabrik, H Rauter GmbH & Co. KG, Bad Sackingen, Germany). The measurements were made in 255 patients in maxillary left central incisors, lateral incisors and canines CI/LI/C/. The data B^* a^* b^* , C and H values were collected. The mean B^* , a^* , b^* , C and H were calculated for central, lateral incisors and canines. The differences of analysed parameters in CI/LI/C/ segments were tested with descriptive statistics.

Results: The mean values for the group of 255 subjects were as follows: B^* , a^* , b^* , C and H (81.6; 0.67; 21.6, 21.7 and 92.7).

Conclusions: Based on results, the lightness was higher in the cervical and middle segments of the analysed teeth. The mean value of chrome in the cervical segment was much higher than in the middle segment, respectively incisal segment of analysed central incisors, which shows that the colour in the cervical part is more saturated.

Oral Presentation No. 43

Restorative aspects after autotransplantation in young patients with traumatized dentitions

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Purpose: The aim of this presentation is to present a biological solution for clinical dilemmas in young patients with missing teeth or teeth at risk after dental trauma.

Materials and Methods: Over the past ten years we have developed an interdisciplinary treatment approach combining, surgery, orthodontics and prosthodontics which give excellent and predictable results, fitting in a lifetime treatment plan.

Results: Autotransplantation of teeth with an open apex has a long and well documented history. The use of fully developed and endodontically treated teeth for autotransplantation is, in general, not considered to be an option. In our clinic however we have the same success rates for both options. In young patients there is a need for tooth replacement options not interfering with growth of the dento-alveolar complex. Ankylosis after trauma shows what kind of problems may occur if we

do not take facial growth into account. Growth of the facial height continues over a much longer period than generally is considered in the decision making of implant placement.

Conclusions: Autotransplantation, if carried out carefully, on time, and by a team of well trained specialists, is a more than promising solution in young patients with missing teeth or teeth at risk. This treatment option should be taken in consideration more often as an alternative for bonded retainers or implants. Understanding the biology of the periodontal ligament, the effect of orthodontic forces on this ligament as well as restoring the dental anatomy with composites is the key to success.

Oral Presentation No. 44

Is there consensus among specialized dentists and oral surgeons for autotransplantation after loss of anterior teeth in the upper jaw in young patients?

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Purpose: The aim of this research was to investigate the commonalities and differences regarding the treatment with autotransplantation in training hospitals in the Netherlands. Additionally the indication for autotransplantation is being examined in young patients (7–16 years) after loss of one or more anterior teeth in the upper jaw by trauma.

Materials and Methods: Specialized dentist and oral surgeons in dental training hospitals have given their treatment vision by answering a questionnaire on several cases and the treatment procedure of autotransplantation. The reported case reports were selected from the patient records of Proclin Rotterdam. Four groups of patients could be distinguished based on the lost element(s): loss of one central incisor, loss of both central incisors, loss of a lateral incisor and loss of both central and lateral incisors. From each group a case report was selected. The questionnaire was based on the available literature and the guideline autotransplantation from the Clinic for Periodontology Rotterdam.

Results: There is no widespread support for the treatment with autotransplantation of the patients in the case reports. The results show that the key factors for choosing autotransplantation are the presence of a suitable donor element and the need for orthodontic treatment. With regard to the treatment procedure, there was division among the respondents. This was in line with the literature. Conclusions: In the Netherlands there is no consensus to treat loss of anterior teeth by trauma with autotransplantation. It is despite the high success – and survival rates reported in the literature.

Oral Presentation No. 45

Prosthetic rehabilitation of growing patients with ectodermic dysplasia

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Purpose: Ectodermic dysplasia (ED) is a hereditary condition diagnosed in childhood that is characterized by developmental and morphological abnormalities of anatomic structures derived from the ectoderm. Multidisciplinary management and team approach are essential for providing optimal diagnostic and follow-up care for the patients and their families. Several conventional prosthetic treatment methods are available for the oral rehabilitation of ED patients, but definitive implants still remain a challenge for the growing population. To overcome problems associated with definitive implant treatment, provisional implants became an option for the rehabilitation of the growing ED patient.

Materials and Methods: Clinical cases illustrating the prosthetic rehabilitation of young patients with ED will be presented. Treatment regimens include conservative restorative modalities and conventional prostheses, such as complete dentures, overdentures, and removable partial dentures, as well as the fabrication of provisional implant supported prostheses. Advantages, disadvantages, and indications of the discussed treatment options will be presented.

Results: The discussed treatment modalities appeared to be effective in the management of young patients with ED.

Conclusions: Effective management of growing patients with ectodermic dysplasia consists of a true multidisciplinary approach involving a paediatric dentist, an oral and maxillofacial surgeon, an orthodontist, and a prosthodontist. The prosthodontist is an integral member of the therapeutic team, since oral rehabilitation is of utmost importance in the management of ED, because it assists patients develop a normal appearance and a positive self-image, restoring their quality of life.

Oral Presentation No. 46

The effect of a key-way preparation on fracture resistance of teeth restored with different post systems

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Purpose: The aim of this in vitro study is to evaluate the effect of key-way cavity on the fracture resistance of different post-core systems.

Materials and Methods: Seventy single-rooted extracted mandibular second premolars were endodontically treated and divided into 4 groups. The control group consisted of teeth restored without post-core. Group 1 was restored with cast post-cores, group 2 with fibre posts and composite cores, and group 3 with zirconia post-cores. Key-way cavities were performed to the half of the specimens in group 1, 2, and 3. The posts were cemented using adhesive resin cement. All teeth were prepared with a circumferential shoulder including a 2 mm ferrule, restored with Ni-Cr crowns and thermocycled. The compressive test was performed in a universal testing machine with a crosshead speed of 1 mm/min until failure revealed. The fracture load (N) was recorded and the data were analyzed with one-way ANOVA and Tukey's Honestly Significant Difference test.

Results: Statistical analysis revealed that control group had significantly higher failure thresholds than other groups. The lowest fracture strength mean was recorded in fibre group. The key-way increased the mean fracture strength value in zirconia and fibre groups. However it caused the decreasing fracture strength in cast post-core group. This increase and decrease in the fracture strength values were not found statistically significant ($p < 0.05$).

Conclusions: Within the limitations of this study, the results suggest that key-way cavities can be recommended when cast post-cores, fibre post and composite cores and zirconium post-cores used.

Oral Presentation No. 47

Immediate loading screwed crowns on 3.0 implants: A 3-year follow-up

Rafael Martinez-de Fuentes, Pedro Infante-Cossio, Diego Cañadas-Rodriguez, Ana Orozco Varo, Bruno Pereira, Emilio Jimenez-Castellanos

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Purpose: Immediate loading implant therapies in the anterior aesthetic area in small mesiodistal spaces, narrow bone ridges or limited interradicular spaces are a challenge for dentists. The introduction of 3.0 mm implants have solved the said complications but only for cemented restorations

as there are no abutments in most of implant systems for screwed prosthesis. The NobelActive Implant 3.0 presents a great variety of abutments for all restorations including screwed solutions. The purpose of this work is to assess the advantages or disadvantages of immediate loading screwed crowns on NobelActive 3.0 implants during a 3-year period.

Materials and Methods: We present several clinical cases in which we show the clinical and laboratory procedure of making screwed crowns on NobelActive implants placed within the first 24 hours.

Results: Preliminary results of the clinical trial show, that success rate of implant after 3 years were 93.33%. In literature we have not found any published papers regarding the use of 3 mm implants for immediate loading using screwed crowns.

Conclusions: The screwed crown on NobelActive 3.0 implants is a valid alternative for immediate loading.

Oral Presentation No. 48

Veneer firing effects on zirconia

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Purpose: To observe dimensional changes during veneer firing on zirconia frameworks sintered with three different programs.

Materials and Methods: 72 zirconia single crown frameworks were randomly assigned to three groups and sintered with three different programs with durations of 8 hours (A), 2 hours (B) and 10 minutes (C). A Toolmaker's microscope was used to take marginal gap measurements from 36 equidistant points; also measurements to calculate the projection area and perimeter between four marked points on each occlusal and buccal surface were taken. All frameworks were subjected to 5 veneer firings without applying porcelain to observe the insulate effect of heat treatment. All dimensional and marginal gap measurements were repeated after veneer firings.

Results: Marginal gap values before and after veneer firings were 37.61 μm – 35.98 μm for group A; 36.68 μm – 33.06 μm for group B; 33.28 μm – 30.48 μm for group C. The change in marginal gap was insignificant for group A, significant for groups B and C ($p < 0.05$). The occlusal surface dimensional changes of groups A, B and C were -0.163%, -0.181%, -0.086% for perimeter and -0.321%, -0.300%, -0.197% for area respectively. Buccal surface dimensional changes of groups A, B and C were 0.178%, 0.144%, 0.257% for perimeter and 0.340%, 0.313%, 0.556% for area respectively. There is no significant difference between these three groups regarding surface dimensions ($p > 0.05$).

Conclusions: Veneer firing caused shrinkage in occlusal surfaces and enlargement in buccal surfaces. Marginal gap values decreased after veneer firing in all groups.

*This presentation is drawn from data gathered for the doctoral dissertation of Hasan Murat Aydođdu at the Yuzuncu Yil University in 2015.

Oral Presentation No. 49

Accuracy of vinyl-polysiloxane and polyeter one-step impressions in-vivo

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Purpose: To evaluate the accuracy of vinyl-polysiloxane and polyether impressions made in daily practice using the one-step technique.

Materials and Methods: The impressions ($n = 140$) for fixed-dental-prostheses made in daily prac-

tice by 3 prosthodontists were visually inspected and rated by an experienced another prosthodontist. The respective casts of the impressions were also subjected to visual evaluation by an experienced dental technician and rated. A structured scale was used for the ratings of the impressions and casts with Alpha (excellent; no defects), Bravo (acceptable; small defects), Charlie (inadequate; defects that require remaking of impression) and Delta (unacceptable; substantial defects like at preparation finish lines) rates. Results were statistically compared.

Results: Scale rate results were calculated as 76 (54%) for Alpha, 53 (38%) for Bravo, 4 (3%) for Charlie, 7 (5%) for Delta and 63 (45%) for Alpha, 70 (50%) for Bravo, 2 (1%) for Charlie, 5 (4%) for Delta regarding all the impressions and casts, respectively. Of Alpha rates 45% were polyether and 55% were vinyl-polysiloxane; of Bravo rates 57% were polyether and 43% vinyl-polysiloxane, of Charlie 50% were polyether and 50% vinyl-polysiloxane, and of Delta 57% were polyether and 43% vinyl-polysiloxane for the impressions. The results were statistically influenced by the inter-operator variability. The number of abutments, location of the preparations, and bleeding at the preparation side had no effect on the impression accuracy. No statistical difference was found between the materials regarding quality of the impression.

Conclusions: Considering the limitations of the study, the impressions made of vinyl-polysiloxane and polyether for fixed dental prostheses using the one-step technique are both highly accurate.

Oral Presentation No. 50

Color measurement of composites: Is the VITA Shade Guide the reference?

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Purpose: The objective of this in vitro study was to measure the difference in color between similar shades of two different Vita-based resin composites. In addition, an experimental composite (non-Vita based), of which the shades are based on the natural aging process of teeth, was tested.

Materials and Methods: Two Vita-based resin composites; Filtek Supreme XTE (3M ESPE) and Clearfil Majesty ES-2 (Kuraray); and an experimental (non-Vita based) composite; Essentia (GC); were tested. The shades tested for the Vita-based resin composites were: A1, A2, A2 (enamel, dentin and body shades). For Essentia: 3 dentin shades and 2 enamel shades were tested. Composite samples were made in standardised thicknesses: enamel (0.5 mm), dentin (1.5 mm), body (2 mm). The CIE-Lab values of these specimens (enamel, dentin, enamel+dentin, body), and the VITA tabs A1, A2 and A3, were measured with a spectrophotometer (SpectroShade MHT) on a white and black background. Differences in Lab values (Δa^* , Δb^* , ΔL^*), differences in color (ΔE) and the translucency parameter (TP) were calculated.

Results: Perceptible color differences ($\Delta E > 3.7$) were measured between similar composite samples (enamel, dentin, enamel+dentin, body, Vita tabs). The range of rE between the same shade-designated samples is 0.7 – 18.0. That of ΔTP is 2.9 – 15.0. The largest variation was noticed for the L^* values: 0.3 – 15.1 and a^* values: 0.7 – 5.6. For Essentia, a trend of increasing TP, a^* and b^* values has been recorded for the enamel and dentin shades becoming darker.

Conclusions: Perceptible color differences were present between the three composite brands. The experimental composite showed a more gradual change in Lab-values between the different dentin and enamel shades (from light to dark), imitating the natural aging process of teeth.

Oral Presentation No. 51

Survival rate of indirect lithium disilicate restorations after 5, 10 and 17 years

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Purpose: The aim of this research was to investigate the long term survival of indirect lithium disilicate (LDS) restorations that were placed between 1997 and 2008.

Materials and Methods: 55 indirect LDS restorations (e.max Press and Empress2) that were placed in the period 1997–2008 in 9 patients have been evaluated. It concerned 47 conventional LDS restorations (partial and full coverage) and 8 “endocrowns” for the endodontically treated teeth (pre-molars and molars). Intra-oral inspection of the LDS restorations was carried out by using a format, based on a list of criteria provided by Hickel. Each criterion could be given a score 1–5. Scores 1–4 were classified as “good” or “repairable”. Score 5 was classified as failure.

Results: The percentage of survival after 17 years was 90.9%. The cumulative survival proportion was 98% after 7.9 years, 93% after 8.9 and 78% after 17.3 years (Kaplan-Meier analysis). The mean survival time was 16.7 years. 5 out of 55 LDS restorations were classified as failure. For 4 restorations, the cause of failure was secondary caries. In 1 case the crown had debonded. None of the failures were “endocrowns”.

Conclusions: Based on this research, LDS can be regarded as a strong and fracture-load resistant material. Secondary caries was the main reason for failure of LDS restorations. Low sugar intake and good oral hygiene are beneficial for the longevity of restorations. “Endocrowns” are a good restorative option for molars and possibly premolars. Regarding the assessment of restorations, a high level of subjectivity exists despite the use of a format.

Oral Presentation No. 52

Current trends in teaching tooth colour selection and communication in prosthodontics

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Purpose: Successful colour matching of prosthetic restorations is a significant factor of patient satisfaction and acceptance. The purpose of this presentation is to outline the current status and the methods taught to dental students concerning colour selection and communication in prosthodontics.

Materials and Methods: Visual determination systems (shade guides) and digital colour selection systems taught at predoctoral and postdoctoral level at the University of Athens, Dental School, were assessed. The techniques employed by dental students for colour communication with the dental lab (verbal instructions, written instructions, digital photography) were also outlined.

Results: The most frequently used shade guides at predoctoral level were Vitapan Classical and Vitapan 3D Masterguide. Predoctoral students had received education on digital colour selection systems through courses, but they had not been using them for colour selection, while written instructions to the dental lab were routinely used for colour communication. The Vitapan 3D Masterguide was a common shade guide among postdoctoral students. The clinical use of digital colour selection systems at postdoctoral level was common. Communication of tooth colour at postdoctoral level was routinely achieved through written instructions, verbal communication and digital photography.

Conclusions: Future general dentistry practitioners may largely benefit from familiarization with digital photography and digital instruments used in tooth colour selection and communication. The incorporation and routine use of these techniques in the predoctoral dental curricula may result in higher restoration success and patient acceptance.

Oral Presentation No. 53

Effect of method, expertise and inter-examiner variability in evaluating crown preparations

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Purpose: The purpose of this study was to compare the subjective (glance and grade) with the Objective (criteria based) grading, investigate inter and intra examiner difference in the grades and determine difference in the grades of anterior and posterior.

Materials and Methods: Two faculty staff members with ten years of clinical and teaching experience and two demonstrators with no teaching experience, evaluated tooth preparations performed on two ivory teeth (#21 and #46) in 140 minutes by 74 third year dental students. The preparations were graded subjectively (out of 10) and objectively by each of the evaluators. The values were analyzed by using parametric tests in SPSS setting value of significance at 5 percent.

Results: The study revealed that the examiners awarded high scores by objective than the subjective method of grading. Inter-examiner comparison showed a statistically significant difference ($p < .05$) between the Demonstrator-2 and the rest of the examiners for the subjective method of grading and between Faculty-1 and all the rest of the examiners by objective method. Intra examiner comparison of subjective and objective methods of grading showed a statistically significant difference ($p < .05$) for two of the examiners. Comparing the grades for anterior and posterior teeth by objective method showed a statistically significant value ($p < .05$).

Conclusions: There was no consistently preferred grading method and there were variations in the grades by the evaluators. Higher grades were scored by objective method of grading and junior faculty awarded higher grades. Non-significant difference between grades of anterior and posterior teeth was found.

Oral Presentation No. 54

Histo-morphological study of functional overload (clinical-experimental study)

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Purpose: Traumatic occlusion is a continuous overload of dental system in chewing function which causes various damages in periodontium. This overload is visible not only in the full dental system but also in the lack of teeth. Histo-morphological changes are noticed not only in the soft tissues but also in the periodontium and alveolar process with their own atrophy. The aim of our study is to investigate the histo-morphological changes in the periodontium of experimental animals (guinea-pigs) comparing them to the morphological changes of the patients.

Materials and Methods: In this study, we have investigated and treated 108 of patients, at the age of 20–70 for a period of more than 10 years. In our study, we have taken into consideration overload in the oral cavity. We have also studied the histo-morphological changes of functional overload in the experimental animals.

Results: The main cause of functional overload of teeth is the absence of substitution for a long period of time and the prosthesis which are badly put. We noticed macroscopic and microscopic changes in the periodontium of patients and animals, too. In the patients, the macroscopic changes were gingival hypertrophy, the damage of contact point, the teeth movability and their displacement. Radiology showed us vertical and horizontal atrophy. In the experimental animals, histo-morphological changes were shown in the damage of periodontal ligaments, hematopoietic disorders of pulp and necrotic lesions.

Conclusions: The results of clinic treatment of patients were based on the subjective and radiological data before and after treatment where functional overload interruption was observed.

Oral Presentation No. 55

Impact of removable partial dentures on masticatory efficiency and comparison with natural dentition

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Purpose: Mastication is one of the most important functions of the stomatognathic system. It is a process of cutting and chewing food into small particles the first step of digestion achieved by teeth. The aim of this study was to evaluate the impact of removable partial dentures (RPDs) on masticatory efficiency and comparison with natural dentition.

Materials and Methods: A total of 107 patients with (RPD) and of 101 students with natural dentition as a control group participated in this study, in University Dentistry Clinical Centre, Prishtina, Kosovo. For the masticatory efficiency test, 5.0 g of peanuts were put into patients mouths for them to chew for 30 s and recorded the number of strokes. The suspension was measured by 722–2000 Spectrophotometer in absorption of 590 μm . Masticatory efficiency measured before, after insertion the RPD, then one and three months after insertion the RPD. Level of significance was set at $p < 0.001$.

Results: A statistically significant difference was found for masticatory efficiency between students and patients before, after insertion the RPD, then one and three months after insertion the RPD ($p < 0.001$) with Dunn's Multiple Comparison test. With Kruskal-Wallis test was found statistically significant differences on masticatory efficiency by groups (KW = 472.3, $p < 0.001$).

Conclusions: Rehabilitation of dentitions with RPD improved patients' masticatory efficiency. Increase of masticatory efficiency of RPD wearers was also associated with an increased number of masticatory strokes. Masticatory efficiency of students with natural dentition as a control group was much better compared to masticatory efficiency of patients with RPDs wearers.

Oral Presentation No. 56

The reasons for acceptance or refusing the recommended prosthetic treatments

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Purpose: Our aim in this study is: 1. To analyze the frequency of recommended prosthetic treatments; 2. To show the frequency of accepted prosthetic treatments; 3. To show the frequency of refused prosthetic treatments; 4. To determine the correlation between them.

Materials and Methods: Between years 2009 and 2014, were examined 1785 of patients which in clinic for prosthetic dentistry "Protetika Ag" in Tetova have asked for prosthetic treatment. From this total, 52.83% were males and 47.17% females. Their age ranged from 13 to 82 years, with average age 48.2 years. The gained data were evidenced in the work sheet for each patient separately according WHO, adapted and modified by the nature of our study. The statistically significance of results from our study is showed with: T-student fisher test; Coefficient of probability (p); Coefficient of correlation (R_{xy}).

Results: The gained results showed that: 1. Dentures were recommended in a high per cent of 24.48. 2. In 46.19%, the costs were the crucial reason for acceptance of recommended treatment. 3. The crucial reason for refusing the recommended treatment was also its cost.

Conclusions: 1. In our treated patients the stomatognathic system is disordered with wide toothless areas and disfavoured distribution of remained teeth. 2. Covering of cost for prosthetic treatment from the side of Health Insurance Fund influences the choice of patients in prosthetic appliances. 3. The lack of awareness among patients about the importance of oral health in one side, and negligence for need of preventive measures on the other side, influence on refusing of recommended treatment.

Oral Presentation No. 57

Patient's satisfaction with removable partial dentures

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Purpose: Removable partial denture (RPDs) therapy is an acceptable form of treatment that provides an increased spectrum of restorative options: improving aesthetics, masticatory function and stabilizing dental relationships for patients. The aim of this study was to evaluate patient's satisfaction with RPDs retention, chewing ability, aesthetics, while wearing RPD in a five-year worn period. **Materials and Methods:** A total of 63 patients with RPDs, participated in this study. It was examined ninety-one RPDs, 75 with clasp-retained and 16 were RPDs with attachments. There were 28 females and 35 males, aged between 34–79 years. The data's were collected from survey questionnaire, in University Dentistry Clinical Centre, Prishtina, Kosovo. Patients graded their satisfaction with their RPDs in total and then graded retention, chewing ability, aesthetics, while wearing dentures by using a scale 1 to 4. The level of RPDs acceptance was classified as "excellent", "good", "medium" and "bad". RPDs success was graded in three categories based on function and condition: complete success, partial success and failure.

Results: According to denture design of RPD's with Fisher exact test we confirmed statistically significant difference ($p = 0.008$) of patient's success of RPD's with or without attachment. Retention, chewing ability, aesthetics proved no statistically significant difference with X² test of patients' satisfaction of RPD's with or without attachment.

Conclusions: Oral rehabilitation with RPDs was considered satisfactory after five years of use by most of patients (Cosme DC et al, 2006). Patients are generally satisfied more with RPDs with attachment based on level of retention, chewing ability, aesthetics.

Oral Presentation No. 58

Effect of denture cleansers on matrice retention of precision attachments

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Purpose: The purpose of this study was to evaluate the changes in retention of plastic precision attachment matrices after exposure to various denture cleansers.

Materials and Methods: One control and four test groups (10 pairs each) of matrices (Bredent VKS-SG) were soaked for the equivalent of 6 months of clinical use in the following solutions: Water (control), Corega, Protefix, 5% Sodium hypochlorite (NaOCl, 1 : 10 diluted) and Listerine mouthwash. A universal testing machine set at a crosshead speed of 0.5 cm/min was used to perform one pull. The peak load-to-dislodgement was recorded to reflect changes in the retention of the matrices after soaking. Data were analyzed by one-way ANOVA followed by Tukey's Honestly Significant Difference test. A $p < 0.05$ was considered significant.

Results: Denture cleansing solutions significantly affected the retentive values of matrices ($p < 0.01$). NaOCl increased the retentive values of the matrices (19.02 ± 2.26 N) when compared to the control group (15.67 ± 2.75 N). There was no significant difference in the retentive values of attachments soaked in Corega, Protefix or Listerine when compared to the control group.

Conclusions: The use of NaOCl may be recommended for cleaning of the removable partial dentures with precision attachments because of its increasing effect on the retentive values of the matrices within the limitations of the test conditions.

Oral Presentation No. 59

Comparison of two techniques to achieve postdam for maxillary dentures

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Presentation was cancelled.

Oral Presentation No. 60

The effect of removable partial dentures on the periodontal health of abutment and non-abutment teeth

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Purpose: Removable partial denture therapy (RPD) is an adequate form of treatment for patients with missing teeth. The aim of this study was to evaluate the effect of (RPD) on the periodontal health of abutment and non-abutment teeth.

Materials and Methods: A total of 107 patients with (RPD) participated in this study. It was examined 138 (RPD), they were 87 with clasp-retained and 51 were RPD with attachments. The following periodontal parameters were evaluated for abutment and non-abutment teeth: plaque index, calculus index, bleeding on probing, probing depth (mm) and tooth mobility index. These clinical measurements were taken immediately before insertion the RPD, and subsequently one and three months after insertion. Level of significance was set at $p < 0.05$.

Results: The mean scores for PLI, CI, BOP, PD, and TM index of the abutment teeth and non-abutment teeth were no statistically significant at the time of insertion of RPD. After one month PLI was statistically significant (0.57 ± 0.55 for abutment and 0.30 ± 0.46 for non-abutment teeth). After three months there were significant differences between abutment and non-abutment teeth with regard to the BOP (1.53 ± 0.50 and 1.76 ± 0.43 respectively), PD (0.28 ± 0.45 and 0.12 ± 0.33 respectively) and PLI (1.20 ± 0.46 and 0.75 ± 0.64 respectively). No significant mean difference in TM and CI was found between the abutment and non-abutment teeth ($p > 0.05$).

Conclusions: With carefully planned prosthetic treatment and adequate maintenance of the oral and denture hygiene we can prevent the periodontal diseases.