THE 7TH INTERNATIONAL
CONGRESS ON ADHESIVE DENTISTRY

*"Art and Science in Adhesive Dentistry"*

7TH IAD2023
INTERNATIONAL CONGRESS
ON ADHESIVE DENTISTRY
KONYA

JUNE 01-03, 2023

Selcuk University
Sultan Alparslan Congress Center

# ABSTRACTS BOOK

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*"Words are pretext.
It is the inner bond that draws
one person to another,
not words"*
-Rumi-

organizasyon Nutuva

## INVITATION

Dear Friends and Colleagues,
We are very proud to invite you to the Joint Meeting of 7'th International Congress on Adhesive Dentistry (IAD), an official international meeting of the Japanese Society for Adhesive Dentistry (JADS) and Turkish Society of Restorative Dentistry (RDD), which will be held at Selçuk University in Konya, Türkiye between 1st to 3rd of June, 2023. The theme of the congress is "The art of knowing is knowing what to ignore," which is derived from Rumi, the greatest Sufi mystic and the 13th-century Persian poet who lived in Konya and made the city a top-rated cultural center in the world.

This event will bring together and promote the international exchange of the latest concepts, innovative techniques, and development ideas in the field of adhesive dentistry, offering a unique opportunity for participants to interact with distinguished speakers and researchers. The scientific program features 15 distinguished lecturers from Japan, USA, Belgium, Switzerland, and Türkiye, who are masters in Adhesive Dentistry. Furthermore, the latest fundamental research in adhesion will be presented and discussed by Japan's leading experts, and, for the first time, a 'Biomimetic Dentistry Session' will be held at the congress. Participants will also have the opportunity to present their research as poster or oral presentations and discuss their results with international peers and experts. There will also be company presentations and exhibitions. We believe all participants will significantly benefit from the excellent scientific program of the congress.

Apart from the scientific content, the congress will also offer you a satisfying social program you will never forget. Rumi museum, Sema Ceremony by whirling dervishes, Çatalhöyük, an extensive Neolithic and Chalcolithic proto-city settlement in Konya, which was inscribed as a UNESCO World Heritage Site, and traditional Konya kitchen are waiting for you.

The congress will also have a post-meeting half-day Satellite Symposium, "Being a researcher in a foreign country," on June 4 in Cappadoccia. Participants who wish to include the satellite symposium of the congress in their calendar will be transferred on June 3 afternoon, just after the closing ceremony of the congress, to Cappadoccia.

We hope to see you all in Konya on June 1-3, 2023.
Kindest Regards

**Prof. Dr. Sema BELLİ**
President, The 7th International Meeting on
Adhesive Dentistry

**Prof. Dr. Esra CAN**
President, Turkish Society
of Restorative Dentistry (RDD)

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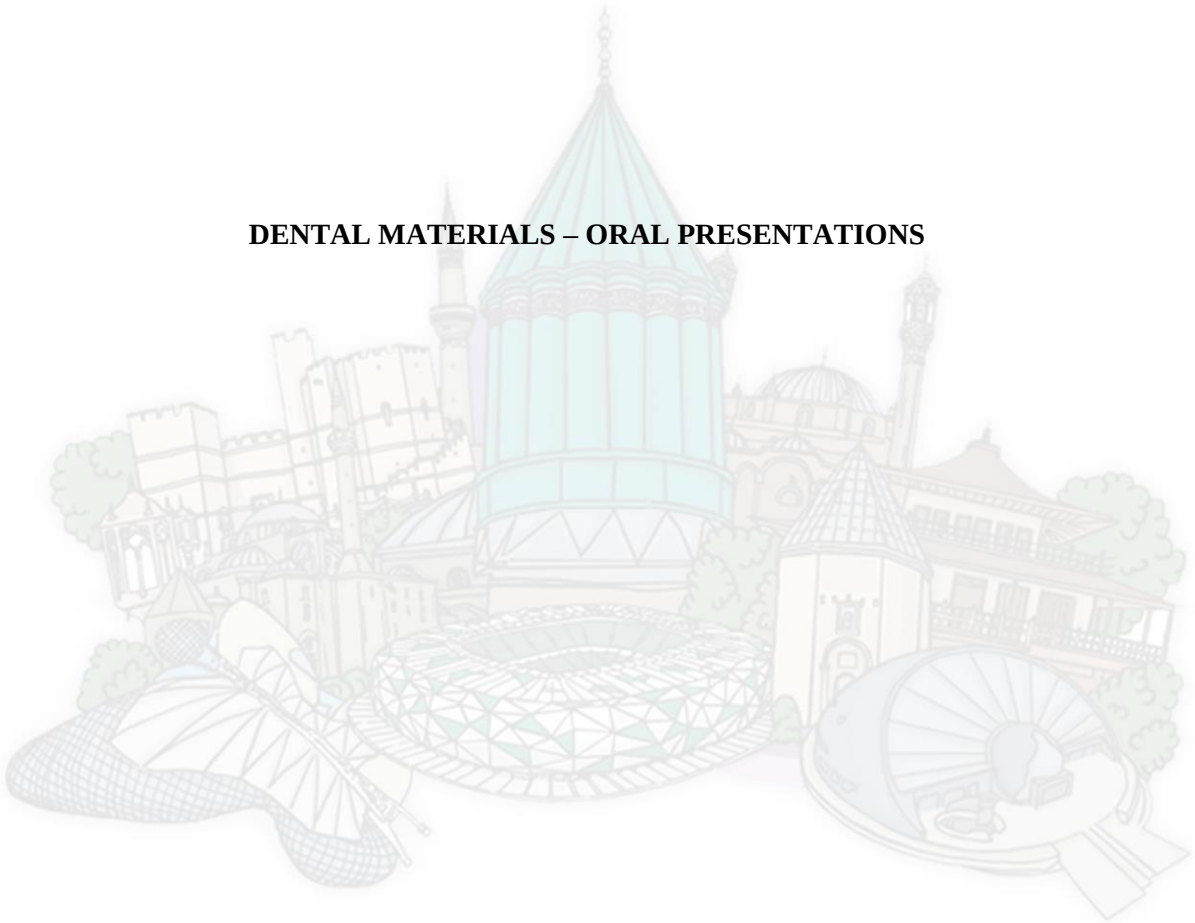
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**DENTAL MATERIALS – ORAL PRESENTATIONS**



**Polymerization Behavior of Various-Composites at Top/Bottom of Cavity using Different-Irradiance-Light**

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**Introduction:** We reported uniform polymerization of resin composite improved resin-cavity adaptation in Dent Mater 2001. Hardness ratio near 1 show degree of conversion at the bottom surface is near that of the top surface. The aim of this study was to evaluate microhardness and hardness ratio of various resin composites using different light irradiation related to cavity wall adaptation.

**Materials & Methods:** Light-curing unit was an LED light-curing unit (Demi Ultra; Kerr). The light-cured resin composites were hybrid type Clearfil AP-X (AP, shade A3, Kuraray Noritake Dental), structural color type Omnichroma (OC, Tokuyama Dental), universal chroma type Clearfil Majesty ES Flow (Super Low) (MU, shade U, Kuraray Noritake Dental) and bulk fill flowable type GRACEFIL BulkFlo (BF, shade U, GC). Composite specimens of 2 mm thickness were polymerized in Teflon molds using radiant exposure of 24,000 mJ/cm$^2$. Light irradiance were 1,200 mW/cm$^2$ 20s (light tip–resin distance: 0mm) and 600 mW/cm$^2$ 40s (light tip–resin distance: 6mm). Just after light curing, Knoop hardness (KHN) was measured at the top and bottom surfaces of each specimen using a load of 100g and a dwell time of 15s. The hardness ratio=KHN of bottom surface/KHN of top surface was calculated. All experiments were performed at room temperature of 23±2˚C with humidity of 50±10%. Data (n=6) were analyzed using Bonferroni/Dunn test.

**Results:** Immediately after light curing, KHN at the bottom surfaces of resin composites were significantly lower than that of at the top surfaces using 1,200 mW/cm$^2$ 20s for AP and BF ($p$<0.05). Hardness ratios of every resin composite using 1,200 mW/cm$^2$ 20s were < 1. 600 mW/cm$^2$ 40s showed significantly larger hardness ratio compared with that of 1,200 mW/cm$^2$ 20s for every resin composite ($p$<0.05).

**Conclusion:** When radiant exposure was the same, 600 mW/cm$^2$ irradiance light created more uniform polymerization for four types of composites.

***Keywords:*** *Resin composite, Irradiance, Radiant exposure, KHN, Hardness ratio*

*This study was supported by #16K11543 of JSPS, Kuraray Noritake Dental and Tokuyama Dental.*

**Effect of Press-on Force-Guided Brushing Machine on 3D-printed Restorative Materials**

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**Introduction:** To evaluate the surface properties and the abrasion resistance of three different three-dimensional (3D)-printed composite resin materials after brushing with soft-, and medium-bristle toothbrushes using an abrasive toothpaste with a novel mechanical tooth brushing simulator.
**Materials and Method:** 120 samples from 3D-printed restorative materials (Composite C&B Resin (CRS, Turkey); Temp Resin (PowerResins, Turkey); Crowntec (Saremco, Switzerland)) (n=40) were printed (8mm in diameter and 2mm in height). The samples were divided into 4 groups (n=10). Group 1 and Group 2 were polished with Sof-lex discs (3M); Group 3 and Group 4 were polished with Sof-lex Diamond spirals (3M). Group 1 and Group 3 were brushed with a soft-bristle toothbrush (R.O.C.S. Pro 5940); Group 2 and Group 4 were brushed with a medium-bristle toothbrush (Colgate neo 2548) using a "Press-on Force-Guided Brushing Machine" for 100.000 strokes (correspondence to 10 years) in a slurry containing toothpaste with 99 RDA (R.O.C.S. Coffee&Tobacco toothpaste) under 300g load (200 strokes/min). Surface roughness (SR), surface gloss (SG), and weight loss (WL) were assessed before and after the brushing simulation.
**Results:** At baseline the highest SR (0.43±0.11) and the lowest SG (12.95±0.2) values were obtained for PowerResins polished with spiral wheels, while the lowest SR (0.18±0.03) and the highest SG (55.2±4.1) for Saremco polished with spiral wheels. Soft- and medium-bristle toothbrushes provided similar SR and SG for all materials ($p>0.05$). After brushing, SR values significantly increased for PowerResins polished with spirals and decreased for the rest ($p<0.05$). SG values increased for all groups ($p<0.05$). All groups presented weight loss after brushing. Medium-bristle toothbrush caused more weight loss for all restorative materials. The highest WL was recorded in PowerResins polished with discs, and brushed with medium-bristle toothbrush ($p>0.05$).
**Conclusion:** Soft-bristle toothbrush resulted in less abrasive wear however, the stiffness of the toothbrush may not be an effective factor for the surface roughness and surface gloss of 3D-printed restorative materials.

***Keywords:*** *3D printing, composite resin, dental restoration wear, surface properties, toothbrushing*

**Effect of Remaining Walls and IDS on Fracture Strength of Endocrowns After Thermomechanical Aging**

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**Introduction:** This in-vitro study evaluated the effect of remaining walls and immediate dentin sealing (IDS) on fracture strength (FS; N) of endocrown restorations produced from hybrid CAD/CAM material (Cerasmart270, GC) in endodontically treated molars after thermomechanical aging.
**Material and methods:** 162 non-carious mandibular third molars were randomly divided into nine groups based on remaining walls and IDS (n=18). 144 teeth were endodontically treated, whereas 18 intact molars (G1) served as control. Following endodontic treatment, preparations were performed with 2mm deep central retention cavity, 2mm wall thickness and butt-joint occlusal finishing 2mm above the cemento-enamel junction (CEJ). Groups with different number of remaining walls were prepared in 3mm height above the CEJ. G1: intact teeth, G2: no wall, G3. one wall, G4: two walls, G5:three walls, G6: no wall with IDS, G7: one wall with IDS, G8: two walls with IDS, and G9: three walls with IDS that was performed with a universal adhesive (G-Premio bond; GC) and injectable composite (G-aenial Injectable; GC). Endocrown restorations were produced (CEREC) and luted with a dual-cure resin cement (G-CEM LinkForce, GC). Following thermocycling for 20000 cycles (SD Mechatronik Termocycler) and 480000 load cycles in a chewing simulator (CS-4.2, SD Mechatronik), FS was evaluated with a universal testing machine (Shimadzu AGS-H Instron). Data were analyzed with Shapiro–Wilk normality test, one-way ANOVA, Tukey multiple comparison tests, and independent t-tests ($p<0.05$).
**Results:** Remaining walls and IDS affected FS of endocrowns ($p=0.0001$). G1 resulted in the highest FS (2622.19±774.88) which was not significantly different from G2 (2089±574.17), G4 (2494.68±726.80) and G9 (2114.66±606.56) ($p>0.05$) while the lowest FS was achieved in G5 (1297.27±438.19) ($p<0.05$). There were no significant differences between G3 (1772.07±481.07) and G7 (1974.09±644.85) ($p=0.314$), G2 (2089±574.17) and G6 (2060.96±547.26) ($p=0.883$). G4 (2494.68±726.80) showed significantly higher FS than G8 (1727.67±320.81) ($p=0.0001$), while G9 (2114.66±606.56) yielded significantly higher FS than G5 (1297.27±438.19) ($p=0.0001$).
**Conclusion:** Number of remaining walls affected FS of endocrown restorations produced from hybrid CAD/CAM material in endodontically treated molars after thermo-mechanical aging. IDS increased FS in teeth with three remaining walls, whereas showed no difference in no wall and one wall remaining teeth.

***Keywords:*** *Endocrown, hybrid CAD/CAM material, Immediate dentin sealing, thermomechanical aging, fracture strength*

*This study is supported by TUBITAK 1002.*

**The Use of Femtosecond Laser, Silica Coating or Combined, which is Better for Monolithic Zirconia?**

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**Introduction:** This study aimed to investigate the effects of femtosecond laser (Fs) and/or tribochemical silica coating protocols on bond strength to monolithic zirconia.
**Materials and methods:** One hundred forty four zirconia were randomly divided into nine subgroups according to surface treatment protocols: Control (C), tribochemical silica coating before sintering (TBS), Fs laser before sintering (FBS), tribochemical silica coating before and after sintering (TBS+TAS), Fs laser before sintering + tribochemical silica coating after sintering (FBS+TAS), tribochemical silica coating after sintering (TAS), Fs laser after sintering (FAS), Fs laser and tribochemical silica coating after sintering (FAS+TAS), tribochemical silica coating and Fs laser after sintering (TAS+FAS). Panavia V5 dual cure self adhesive resin cement was bonded to zirconia samples.
Surface morphological properties were evaluated with scanning electron microscopy (SEM) and shear bond strength (SBS) tests were performed.
The data were analyzed with one-way ANOVA, and Tukey HSD tests at 0.05. significance level.
**Results:** While the groups FAS, TBS+TAS, FAS+TAS, TAS+FAS, FBS+TAS had showed the highest SBS ($P<0,05$), control and TBS groups demonstrated the lowest SBS ($p<0,05$).
**Conslusions:** Combined laser and tribochemical silica coating application before and after sintering can be recommended for clinical applications.

***Keywords:*** *Femtoecond laser, silica coating, monolithic zirconia, MDP*

## Effect of Re-Polishing on the Physical Properties of Artificially Aged Composites

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**Introduction:** To compare the effect of re-polishing on the surface roughness, color stability and water absorption values of artificially aged composites.
**Materials and Methods:** A total of 74 discs (4mm*8mm) from a nanohybrid (G-aenial Achord), a microhybrid (Filtek Z250) and a bulkfill (Tetric N-Ceram Bulk) composites were obtained. The samples were kept in distilled water at 37±1°C for 24 hours for post-polymerization and polished. Then samples were divided into 3 subgroups such as artificial saliva, thermal cycle, ethanol (n=9). Afterward, all samples were immersed into non-sweetened black coffee (Nescafe, Nestle) solution three times a day and 15 minutes each. Between the immersion periods, they were kept in artificial saliva at 37±1°C. After immersion cycle, the samples were subjected to the mechanical brushing in a testing machine. (Mod Dental, Türkiye). The upper surface of each samples was re-polished under water by alumium oxide disc (Soft-Lex). After re-polishing procedures, they were kept in distilled water at 37±1°C. Surface roughness, color and water sorption measurements of baseline and final values were obtained and then, they were evaluated at $p<0.05$ significance with Kruskal Wallis and Friedmann tests.
**Results:** According to the data obtained, water absorption and color stability values were significantly different after re-polishing ($p<0.05$) however, surface roughness values of tested composite materials were not significantly different from each other ($p>0.05$). After re-polishing procedures, the highest color change was found in the ethanol subgroup of the bulkfill composite (Tetric N-Ceram Bulk) while minimum color change is observed in the control subgroup of the microhybrid composite (Filtek Z250).
**Conclusion**: Re-polishing procedures following immersion period and brushing cycle had a significant effect on the surface roughness and color stability of the tested composite materials. Since the evaluation time was limited and the samples were already aged, long-term researches are necessary in order to reveal the influence of water sorption characteristics of the tested composites.

***Keywords:*** *composite resin, aging protocols, polishing, surface roughness, water absorption*

**Fracture Resistance of 3D Additive Manufacturing-Based Endocrowns Luted with Various Resin Cements**

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**Introduction:** This study aimed to evaluate the fracture resistance and failure type of endocrowns produced with 3D additive manufacturing and indirect resin composite method luted with various resin cements.
**Material and Method:** Forty extracted human mandibular premolars free of caries and crack with similar bucco-lingual and mesio-distal dimensions were used in this study. The root canal access cavities were prepared by a single operator. The root canals were shaped using R25 (Reciproc; VDW, Munich, Germany) reciprocal file and sodium hypochlorite irrigation and filled with the lateral condensation technique. The teeth were prepared at a height of 2 mm from the cemento-enamel junction. The diameter and depth of the pulp chamber were adjusted to be 2 mm standard. The dimensions of the cavities of the teeth were obtained using a digital scanner. Endocrowns were created using computer aided 3D additive manufacturing and indirect resin composite methods. Teeth were divided into 4 groups (n=10). In the groups 1 (3Dsa) and 2 (3Dse), 3D printed endocrowns were luted with a self-adhesive and self-etch resin cement, respectively. In the groups 3 (IDsa) and 4 (IDse) endocrowns produced by indirect resin cement were luted with a self-adhesive and self-etch resin cement, respectively. After the cementation was completed, the teeth were kept in distilled water at 37°C for 24 hours. The fracture strength of teeth was obtained using a universal testing machine (Testometric M500, 25 kN; Rochdale, UK). Fracture types were examined under a stereomicroscope. Statistical differences were evaluated with one-way ANOVA, and the Tukey tests (p=0.05).
**Results:** Different resin cements had no effect on fracture resistance in endocrowns produced by both 3D printed and indirect resin composite methods (p>0.05). The highest fracture strength was obtained in the IDsa group, and the difference was statistically significant compared to the 3Dsa and 3Dse groups (p=0.001 and p=0.029, respectively). The cohesive fracture type was most commonly observed in the IDse group.
**Conclusion:** Cementation of endocrowns fabricated with indirect composite with a self-adhesive resin cement showed higher fracture resistance than endocrowns fabricated with 3D additives.

***Keywords:*** *additive manufacturing, endocrown, 3D printing, resin cement*

**Effect of Sintering and Surface Treatment on Resin Bond Strength to Monolithic Zirconia**

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**Introduction:** The aim of this in-vitro study was to evaluate the effect of different sintering modes and various surface treatment protocols on the shear bond strength (SBS) between monolithic zirconia and adhesive resin cement.
**Materials and Methods:** One hundred and fifty monolithic zirconia specimens were fabricated and divided into 3 groups according to the sintering mode to be applied: classic (at 1510°C for 8 hours), speed (at 1540°C for 2 hours), and super-speed (at 1580°C for 10 minutes). After sintering, the specimens were further divided into 5 subgroups based on the surface treatment (n=10): control (specimens left as-sintered; C), 50-mm alumina particle abrasion with 0.2-MPa air-pressure (A), 50-mm alumina particle abrasion with 0.2-MPa air-pressure and zirconia primer application (AP), 50-mm glass beads particle abrasion with 0.2-MPa air-pressure (G), and 50-mm glass beads particle abrasion with 0.2-MPa air-pressure and zirconia primer application (GP). A dual-cure resin cement was applied to specimens and the SBS test was conducted after thermocycling between 5°C and 55°C for 5000 cycles. A two-way ANOVA, Tukey HSD, and Bonferroni tests were used to analyze the data ($\alpha$=0.05).
**Results:** The main effects of sintering, surface treatment, and their interaction were statistically significant ($P<0.001$). Regardless of the surface treatment, the classic sintering led to the highest SBS, while the super-speed had the lowest SBS ($P<0.001$). Regardless of sintering, surface treatments were ranked as follows: AP>A>GP>G>C. The effect of the surface treatment on the SBS was larger ($\eta_p^2=0.764$) than the effect of sintering ($\eta_p^2=0.177$). Primer application increased the SBS values, however, the difference was not statistically significant between A and AP, and G and GP within the sintering subgroups. The G and GP subgroups in classic sintering had similar SBS values compared with the A and AP; however, they had significantly lower SBS than that of the alumina groups in speed and super-speed sintered groups.
**Conclusion:** Glass beads and alumina application significantly enhanced the bonding strength of the resin cement to monolithic zirconia. Glass beads yielded comparable bond strength with alumina application in classic sintering. In contrast, the alumina application could be preferred if the speed and super-speed sintering modes were to be used.

***Keywords:*** *Alumina, Bond strength, Glass beads, Primer, Zirconia*

**Antibacterial Effect and Bond Strength of the Experimental Adhesive Resin Added Nisin**

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**Introduction:** This study aimed to evaluate the antibacterial effect and bond strength of the experimental adhesive resin added nisin antimicrobial peptide.
**Materials and Methods:** Synthetic AMP was produced by analyzing the minimum inhibitory concentration against Streptococcus mutans and Lactobacillus microorganisms and included 1/40 of the universal adhesive (Scotchbond TM Universal Adhesive 3 M ESPE, St Paul, MN, USA). Its antibacterial activity was evaluated using the agar diffusion test. A total of 80 caries-free extracted molar teeth were used, the enamel of the teeth was removed and the teeth were divided into 2 groups. They were further divided into two subgroups according to the application mode: etch-and-rinse or self-etch (n = 20). Composite resin cylinders were bonded to dentin surfaces, then dentin shear bond strength test (SBS) were applied. The data were analyzed using the Shapiro-Wilk and Wilcoxon tests.
**Results:** When the SBS values were examined, the highest value was observed when the experimental adhesive resin was applied in the etch and rinse mode, but no statistically significant difference was found between the groups ($p < 0.05$).
**Conclusion:** Nisin added experimental adhesive resin synthesized from Lactococcus Lactis bacteria showed antimicrobial activity against the cariogenic microorganisms (S. Mutans and Lactobacillus strains) and resin-dentin bond strength was not adversely affected.

***Keywords:*** *antimicrobial peptide, nisin, universal resin, bond strength*

*Bu bildiri Nevşehir Hacı Bektaş Veli Üniversitesi BAP Birimi tarafından desteklenmektedir.*

# The Effect of Different Restorative Materials Application on Stress Distribution in Different PPIR Bridge Designs: A Finite Element Method Study

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**Introduction:** In multi-unit bridge restorations, alternative designs such as posterior partial indirect restorations (PPIR) can be preferred as an alternative to traditional full crown bridge designs in abutment preparation. The aim of this study is to investigate the effects of different types of abutment preparations and the use of different materials on the resulting stress distribution in the restoration of mandibular first molar tooth loss with a multi-unit bridge.

**Materials and Methods:** In the student phantom study model, tooth number #46 was extracted, and the relevant area was prepared to resemble the extracted tooth area. Inlay, onlay, and overlay preparations were made in teeth number #45 andnumber #47. Models were scanned using a desktop scanner at each stage and transferred to EXOCAD and all three-unit bridge models were designed. Adjustments were made on the models using Geomagic software. Models were overlapped using Solidworks. All these 3D models were transferred to ABAQUS software. Sample size was increased by using different material properties. A 600N vertical stress was applied to the models and resulting stress distributions were analyzed.

**Results:** In light of the obtained results, it was observed that any stresss exerted on any tissue or restoration were within the limits of the strength. It was observed that a more flexible material type, polymer infiltrated ceramic network, distributed more load to dental tissues. On the other hand, it was seen that more stresss were distributed to the restorations due to the rigid structure of lithium disilicate material, and less stress was distributed to the teeth. When PPIR groups were compared in terms of the stress distributed to the restoration, the pattern was overlay>onlay>inlay, and when compared in terms of the stress distributed to the enamel, the pattern was overlay>inlay>onlay. Additionally, it was found that the load distributed to tooth number #45 was generally greater than that distributed to tooth number #47.

**Conclusion:** In adhesive bridge restorations applied in the posterior region, it was observed that the rigidity of the material used resulted in a decrease in the load distributed to the teeth. Onlay-type supports should be preferred due to the low stress exposure of the teeth.

***Keywords:*** *Finite Element Method, Lithium Disilicate, Polymer Infiltrated Ceramic Network as Posterior Partial Indirect Restorations*

**Two-body Wear of Indirect Material Margins Repaired with Bulk-Fill Composites**

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**Introduction:** The aim of this *in vitro* study was to evaluate the two-body wear performance at the marginal area between different direct bulk-fill resin composites with a CAD/CAM block and a 3D-Printed material after thermo-mechanical loading.

**Materials and Methods**: Box-shaped cavities (6x3x2mm) were prepared on the surface of flat specimens (14.5x7x3mm) obtained from Grandio Blocks/GR (VOCO) and 3D-Printed VarseoSmile Crown plus/VAR (Bego). The cavities were sandblasted with 50-µm $Al_2O_3$ particles (10 sec, 1.5-bar, 15-mm distance) for surface preparations. Following rinsing and drying processes, cavities (n=4/per group) were restored with sonic-activated SonicFill 3/SF (Kerr), thermo-viscous VisCalor/VC (VOCO), and flowable Charisma Bulk Flow ONE/BO (Kulzer) bulk-fill resin composites according to manufacturer's instructions using the materials' own adhesive systems. Each sample was polished with 800 and 1000-grit silicon carbide papers under running water for 20 sec at 300 rpm. The samples positioned to produce wear across the marginal area between the composites and indirect materials were subjected to a two-body wear test (20 N, 15.000 chewing cycles) using a dual-axis chewing simulator (CS-4.8, SD Mechatronik). Surface topography analyses were performed using a laser scanner (LAS-20, SD Mechatronik) before and after loading to calculate the wear depth on the samples. The data were analyzed with the R program. 3-way Robust ANOVA and Shapiro-Wilk tests were used. The significance level was set as $p<0.05$. The wear behaviour and margins between the composites and indirect materials were examined using a scanning electron microscope.

**Results:** Composite and indirect material groups showed statistically significant differences in wear range ($p<0.05$). The mean wear values in decreasing order were SF (98.4±13.3) > VAR (90.2±10.7) > VC (84.8±11.9) > GR (69.6±9.1) > BO (58.4±6.4). The mean wear values at the margin of indirect materials were found to be statistically significant for VC (VAR-VC=107.3±12.1; GR-VC=55.9±15) and BO (VAR-BO=68.4±18.4; GR-BO=55.6±9.1) in terms of their interactions with the direct composites ($p<0.05$).

**Conclusion:** Within the limitations of this *in vitro* study, the results showed that the wear behaviour of indirect materials was affected by the bulk-fill composite used at the margins.

***Keywords:*** *Bulk-fill composites, CAD/CAM block, Two-body wear, 3D-Printed material.*

**Evaluation of the Effect on Surface Roughness and Color Stability of Composite Resins with Different Toothpastes by Aging Effect**

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**Introduction:** The purpose of this study; evaluation of the change in surface roughness and color stability of resins composites containing different fillers, brushed with 2 different toothpastes, with the effect of thermal aging.
**Materials and Methods:**A total of 40 specimens, 20 Charisma Smart (Kulzer Dental, Germany) and 20 Omnichroma (Tokuyama Dental, Japan) resin composite specimens, were prepared with a thickness of 2 mm and a diameter of 10 mm.Resin composites obtained from different brands were also divided into 2 groups.One of the separated subgroups was brushed with Sensodyne Fresh Mint (Sensodyne GSK, UK) and the other group was scrubbed with Colgate 2-in-1 Whitening (Colgate Palmolive, USA).No brushing or thermal cycle was applied in the $t_0$ (baseline).For $t_1$ (10000 cycles) and $t_5$ (50000 cycles) brushing simulation and thermal cycling were applied.Profilometer and spectrophotometer measurements of all samples were made at $t_0$, $t_1$ and $t_5$ times.SEM and AFM examinations were performed on one specimen from each group.One-way analysis of variance and TUKEY test were used to analyze the data ($p<0,05$).
**Results:**In the examination of surface roughness, a significant difference was found between the groups only in the $t_5$ ($p<0.05$).Surface roughness of Omnichroma Colgate and Omnichroma Sensodyne groups is higher than Charisma Sensodyne group.When the effects of Sensodyne Mint and Colgate 2-in-1 Whitening toothpastes with different RDA values on the surface roughness were compared, no significant difference was found.In the color change examination; there was a significant difference between the groups in the $\Delta E$ $t_0$-$t_1$ time frame ($p<0.01$).There was also a significant difference between the groups in the $\Delta E$ $t_0$-$t_5$ time period ($p<0.01$).
**Conclusion:**As a result of the study; the surface roughness of the supranospheric Omnichroma was higher than that of the submicrohybrid Charisma Smart in the $t_5$ time period.When looking at the color change, the color stability of Omnichroma is lower than Charisma Smart in all time periods.No significant difference was found in the effects of toothpastes with different RDA values on surface roughness and color stability.

***Keywords:*** *Atomic force microscope, brushing simulator, composite resin, surface roughness, thermal aging*

*Eskişehir Osmangazi Üniversitesi Bilimsel Araştırma Projeleri Birimi tarafından 202045A228 proje kodu ile desteklenmiştir.*

**Effect of the Application of Surface Treatments Before and After Sintering on Phase Transformation of Zirconia**

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**Introduction:** The aim of this study is to investigate the effect of sandblasting and laser at different powers on the phase transformation of zirconia samples before and after sintering.
**Materials and Methods:** In this study, 180 unsintered Y-TZP zirconia samples were prepared using Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) technology. The samples were divided into 3 main groups: those with surface treatment before sintering, those with surface treatment after sintering, and those with surface treatment before sintering, followed by sintering (N=60). Then, each group was divided into 6 subgroups according to the surface treatment (n=10): Control group, sandblasting group, Er,Cr;YsGG Laser Groups (1W, 2W, 3W, 4W). XRay diffractometry (XRD) analysis was performed to examine the t→m phase transformation values in the structure of the samples. The samples with surface treatments were analyzed using X-Ray diffraction meter using Cu Kα radiation between 20-40 degrees 2θ angle, and the amount of m phase (Xm) was calculated by the Garvie-Nicholson method.
**Results:** The monoclinic phase content was found to be higher in the groups that had surface treatment before sintering. Sandblasting before and after sintering increased the phase transformation of zirconia.
**Conclusion:** Treatment of pre-sintered Y-TZP and then sintering may induce a favorable proportion of tetragonal structures. This might have a positive effect on the clinical performance of zirconia restorations.

***Keywords:*** *Zirconia, phase transformation*

**Repair Bond Strength to Aged CAD/CAM Materials after Various Pretreatments**

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**Introduction:** This in-vitro study aimed to evaluate the repair shear bond strength (SBS; MPa) of different surface pretreatments to aged CAD/CAM materials.
**Material and Method:** Hybrid ceramic (Cerasmart270, GC; CS) and nano-ceramic hybrid (Grandio Blocs; VOCO; GB) CAD/CAM blocks were cut into slabs (Isomet) (n:40 for each). Following aging in distilled water at 37°C for six months, specimens were embedded in acrylic resin, polished with 600-grit SiC paper, and randomly divided into four groups (n:10) according to the surface pretreatments; control (no pretreatment), Er:YAG laser irradiation, sandblasting with $Al_2O_3$ and bur-grinding. After applying ceramic primer (G-Multi Primer, GC), and hydrophobic bonding agent (G2-Bond, GC) to all the pretreated specimens, composite built-ups were performed using a micro-hybrid composite (Filtek Z250; 3M-ESPE) in silicone molds (3x4 mm) and polymerized (Demi Ultra; Ker). After storage in distilled water for 24 hours at 37°C, SBS was evaluated using a universal testing machine (Instron). Data were analyzed with two-way ANOVA and post hoc Tukey's tests ($p<0.05$).
**Results:** SBS was significantly influenced by the CAD/CAM material and surface pretreatments ($p<0.05$). A significant interaction between the CAD/CAM material and surface pretreatment was found ($p=0.03$). Compared to other pretreatments, significantly higher SBS was evaluated for the bur-grinded GB (28.69±2.93) and CS (27.49±3.30), while the control groups yielded significantly the lowest SBS for GB and CS (16.83±1.57 and 18.84±3.30) which were not significantly different from each other ($p>0.05$). Er: YAG laser did not significantly improve the repair SBS to GB (17.08±1.06) and CS (21.34±1.73) compared to their controls ($p>0.05$). Sandblasting presented significantly higher SBS than laser on GB (21.42±3.02) ($p<0.05$); however, resulted in no significant difference on CS (23.63±2.11) ($p>0.05$).
**Conclusion:** Bur-grinding was evaluated as the most effective repair pretreatment to aged hybrid ceramic and nano-ceramic hybrid CAD/CAM materials. Er:YAG laser could not be considered an alternative surface pretreatment to sandblasting for the tested materials.

***Keywords:*** *Bond strength, repair, laser, CAD/CAM, surface pretreatment*

## Clinical Evaluation of High-Strength Tooth-Supported Crown Restorations

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**Introduction:** The aim of the present study was to determine which cementation technique and/or cementation material proper for tooth-supported zirconia crown restorations either monolithic or veneered type.
**Materials and Methods:** A total of 64 patients requiring tooth-supported crown restorations were treated with 186 crown restorations. Half of the crown restorations were monolithic and the other half were veneered type. All crown preparation were prepared according to the principles of full-crown preparation by the occlusal surface of the target tooth was trimmed 1.5 to 2.0mm in thickness (insizal surface 1.0 to 1.5mm) and the other axial surfaces were trimmed 1.0 to 1.5 mm, with axial wall taper degrees of 6 to 8 degrees. The shallow concave-shaped with a slope chamfer type cervical margins were prepared. After taking impression, the crown shade was selected according to the patient's choice and the color of the surrounding teeth. The impression was sent to the technician center for dental crown fabrication, which involved scanning, cutting, grinding to desired contours, and then coloring, sintering, and polishing. Cementation of crown restorations were achieved using dual-cure self adhesive resin cement by conventional cementation technique. The patients were instructed to avoid chewing hard objects, maintain good oral hygiene, and revisit the clinic for follow-up as scheduled.
**Results:** The treatment results were evaluated according to the modified California Dental Association criteria immediately after the cementation procedure, and at 1, 2, and 3-year after the procedure. The marginal adaptation results of all 64 patients were evaluated as excellent, resulting in an excellent rate of 100%. Regarding the crown color match, 3 cases (4.68%) and 5 cases (7.81%) were evaluated as acceptable and unacceptable. One incisal fracture were observed on maxillary canine(1.5%). Marginal adaptation, anatomic form, crown margin integrity, and gross fracture did not show significant differences compared with the different time points (P=.999). Surface texture at different time did not change significantly (P=.907). During the 3-year follow-up no decementation was noted. The rate of "excellent" evaluation for crown restorations was 95.32% to 92.19%.
**Conclusion:** Monolithic zirconia tooth-supported crown restorations cemented with conventional cementation technique using self adhesive resin cement considered proper treatment modality for premolar and molar teeth.

***Keywords:*** *Monolitic Zirconia Crown, Clinical Evaluation, Self Adhesive Resin Cement*

## Surface Morphology of Hybrid Ceramic Material After Different Etching Protocol

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**Introduction:** Today, a large variety of CAD/CAM materials is available,such as glass-matrix ceramic, resin-matrix ceramic and polycrystalline ceramic materials. Resin-matrix ceramic materials known as hybrid materials are new ceramic/polymer materials or polymer-infiltrated ceramic-network materials that combine the positive aspects of both ceramics and composites with their respective beneficial mechanical properties. Adhesive cementation technique is essential for these restorations and can enhance their clinical long-term success. During adhesive cementation procedure, inner surface treatment of restoration fabricated by ceramic and ceramic-like materials is important procedure for reliable bonding behavior. An increase of the surface roughness and proper surface activation of indirect restorations through various surface treatments either hydrofluoric acid etching (HF) or air-particle abrasion (APA), provides better micromechanical interlocking and a stronger bond to adhesive cementation materials. The aim of the present study was to evaluate surface morphology of one hybrid ceramic material, after different treatment strategies, either HF or APA.
**Materials and Methods:** The only available CAD/CAM hybrid ceramic material VITA ENAMIC (VITA Zahnfabrik) that is comprised of two double interpenetrating parts, including a ceramic (86wt%), which is an aluminum oxide-enriched and fine-structure feldspar matrix and a polymer (14wt%) which contains urethane dimethacrylate and triethyleneglcol dimethacrylate was chosen as an indirect restorative material to be evaluated. Inner surfaces of 2 mm thick rectangular shape test specimens were treated as folows: Group1: polished surface, Group2: APA by 50 µm aluminum oxide particles, for 10 seconds at a distance of 5 mm (RONDOflex, KaVo, Germany) Group3: 5% Hydrofluoric Acid Gel (VITA Ceramic Etch, VITA Zahnfabrik) was applied for 60 seconds, Group4: 37%phosphoric acid gel (Scotchbond Universal Etchant, 3M/ESPE) was applied for 60 seconds. All test specimens were rinsed with distilled water for 10 seconds, and let dry for 24 hours before gold-sputtering followed observation using a scanning electron microscope (SEM) (JEOL 5500, JEOL Ltd, UK) with different magnifications.
**Conclusion:** 37% phosphoric acid etching and APA showed the least and medium surface roughness, respectively; whereas 5% HF acid etching achieved highest surface roughness. The application of %5HF acid etching for 60 seconds, partially dissolves the glass phase of the VITA ENAMIC and provides rough and higher surface area for bonding.

***Keywords:*** *CAD/CAM materials, Hybrid ceramic material, Surface morphology*

## The Effect of Restoration Type and Different Materials on Stress Distribution : A Finite Element Method Study

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**Introduction:** Maryland restorations are a good treatment option for single anterior tooth loss to remove less dental tissue and achieve better aesthetic results. The aim of this study is to investigate the stress distribution resulting from the rehabilitation of mandibular lateral deficiency with different types of restorations.
**Materials and Methods:** In a student phantom study, tooth #42 was extracted, and the area was prepared to resemble an extracted tooth site. Teeth #43 and #41 were prepared, and after each stage, the model was scanned and transferred to the EXOCAD program for restoration design in the same format. All data were imported into Solidworks, and the fitting process was performed. ABAQUS software was used to apply an oblique force of 100 N to the buccal-lingual corners of the models for each restoration with the properties of two different materials.
**Results:** Regardless of the results obtained, the forces applied to any tissue or restoration were not above the strength limits. The maximum principal stresses transferred to both the supporting tooth and restoration were observed more in cantilever restorations. The highest value seen in Maryland cantilever design was found to be in the Polymer Infiltrated Ceramic Network group, and in the full coverage crown cantilever design, it was found to be in the Lithium Disilicate group. In cantilever designs, the Polymer Infiltrated Ceramic Network group yielded better results, while the Lithium Disilicate group showed expected results in the full coverage crown group.
**Conclusion:** In the anterior region, as the area covered by the restoration decreases, the force transferred to the enamel increases. Additionally, using restorations with lower elastic modulus in cantilever restorations is a better option to prevent enamel fractures in the supporting tooth.

***Keywords:*** *Finite element analysis, Lithium Disilicate, Maryland Bridges, Polymer Infiltrated Ceramic Network*

**Evaluation of the Effect of Different Polishing Systems on Surface Roughness and Color Stability of Nano-Filler Resin Composite**

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**Introduction:** The aim of this study was to investigate the changes in surface roughness and color stability after thermal aging of nanofiller-containing composite restorative materials with different finishing and polishing systems.
**Materials and Methods**: A total of 91 specimens were prepared by polymerizing the composite restorative material containing nano filler in the mold using 2 mm deep and 10 mm diameter molds in accordance with the manufacturer's instructions. The prepared specimens were kept in distilled water for 24 hours at 37 C in an incubator. The specimens were polished with Clearfil Twist Dia (Kuraray, Japan), 3M ESPE Sof-Lex Spiral (3M ESPE, USA), Twist Diacomp Plus (Eve earnst vetter GmbH, Germany), OptiDisc (Kerr Corparation, USA), One Gloss (Shofu Dental Corporation, USA) according to the manufacturer's instructions. After initial measurements by atomic force microscopy (AFM), scanning electron microscopy (SEM), spectrophotometer and profilometer, the specimens were subjected to 10000 and 50000 thermal cycles respectively. At the end of each thermal cycle, the measurements were repeated. Skewness and kurtosis values (±3) were used to assess adherence to normal distribution. Generalised linear model analysis was used to compare data and multiple comparisons were made with Bonferroni correction.
**Results:** When the surface roughness values of the composites after thermal aging with different finishing and polishing systems were examined, a significant difference was found between the groups ($p<0.001$). The ΔE values indicating the color change were significantly different between the groups after thermal aging with different finishing and polishing system ($p< 0.001$).
**Conclusion:** Among the different finish and polish groups, Sof-Lex was the group with the lowest surface roughness, while OptiDisc was the group with the highest surface roughness. Among the different finish and polish groups, Clearfil Twist Dia was the group with the least color change, while OneGloss was the group with the most colour change. The ΔE values of the composite resin in all groups were above the clinically acceptable threshold of ΔE= 1.8.

***Keywords:*** *Color Change,Thermal Aging,Surface Roughness*

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## Fluoride Release of Glass Ionomer With Hexogonal Boron Nitride(Hbn) Additive

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**Introduction:** The fluoride releasing ability of a restorative material can reduce cariogenic potential and produce a remineralizing effect. The aim of this study is to evaluate the effect of hBN addition to a conventional glass ionomer cement at different weight ratios on its fluoride release and recharge abilities.
**Materials and Methods:** To modify conventional glass ionomer cement (Fuji IX GP, GC Int. Corp., Tokyo, Japan), 0.5%, 1%, and 1.5% wt hBN nanoparticles were added to its powder. Glass ionomer cement without addition of hBN nanoparticles was used as the control group for the fluoride release. Ten specimens were prepared using cylindrical teflon moulds for each experimental group (n=10). Specimens were prepared by hand mixing with a spatula at room temperature (22 °C) at a powder/liquid ratio in accordance with Fuji IX GP's manufacturer's instructions and subsequent aging (1, 7, 14, and 30 days) was simulated by the storage at 37±1°C in deionized water in an incubator. Quantitative fluoride ions releases were measured at 1, 7, 14, and 30 days using a standard ion-selective electrode (Dionex™ IonPac™ AS9-HC, Thermo Fisher Scientific Inc, USA). Before measurements, the ion-selective electrode was calibrated using a series of standards of known concentration. After 30 days, the specimens immersed in 1.23% acidulated phosphate fluoride-gel, and fluoride release were measured at 1 and 7 days.
**Results:** All groups showed the highest fluoride release on day 1. The amount of fluoride release decreased with time. None of the groups showed fluoride release as much as the initial after the fluoride recharge procedure. Analysis of variance (ANOVA) test showed that fluoride release of experimental groups were significantly higher from the control ($p<0.05$)on day 1, but no statistically significant difference was observed at other time intervals ($p>0.05$). There was no statistically significant difference between the groups in the amount of cumulative fluoride release ($p>0.05$).
**Conclusion:** The addition of hBN did not affect the fluoride release capacity of the conventional glass ionomer cement.

***Keywords:*** *Fluoride release, Glass ionomer cement, Hexagonal boron nitride*

*The authors declare that they have no competing interests.*

## Comparison of Push-Out Bond Strengths of Different Fiber Post Systems

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**Introduction:** This study compares the push-out bond strengths of 3 different fiber post systems bonded with adhesive resin cement to root canal dentin. The study's null hypothesis is that there will be no difference between the push-out bond strengths of different post systems.
**Materials and Methods:** In the study, 15 extracted single-rooted mandibular canine teeth were used. After the endodontic treatment of the teeth, they were randomly divided into 3 groups to apply different post-systems (n=5). Reforpost Refill glass fiber, Polydentia glass fiber, and AAA Transparent fiber post systems were used in this study. The posts have adhered to the root canal with Panavia F2.0 in accordance with the manufacturer's instructions. A total of 6 slices of 1 mm thickness in the transversal direction were obtained, 2 from each of the coronal, middle, and apical sections of the prepared samples. The push-out test was performed from apical to coronal at a speed of 0.5 mm/min. The maximum load at failure was recorded in Newtons (N). The push-out bond strength of each slice was calculated and expressed in (MPa). One-way analysis of variance (ANOVA) test was used to compare the data. Multiple comparisons were evaluated with the Tukey HSD test method ($p<0.05$).
**Results:** The highest push-out binding values were observed in the Polydentia group ($5.04 \pm 0.54$); the lowest values were seen in the Reforpost group ($1.5 \pm 1.03$). There was no statistical difference between the push-out binding values of the apical, middle, and coronal region of samples for Reforpost and AAA Transparent groups ($p>0.05$). In the Polydentia group; the push-out binding values of the coronal region samples were found to be significantly higher than the samples in the middle region ($p= 0.006$). When the post groups are compared with each other; the difference between the push-out binding values of all groups was statistically significant ($p<0.05$).
**Conclusion:** The surface properties of the posts can affect the push-out bonding values. Polydentia parallel post system showed the highest push-out binding values. In addition, the push-out attachment values of the posts may vary in different regions of the root canal.

***Keywords:*** *Fiber post systems, push-out test, resin cement*

## The Relation Between Laser Fluorescence Scores After Caries Removal and Microtensile Bond Strength

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**Introduction:** To compare the consistency of ICDAS scoring and laser fluorescence scores with microtensile bond strength (µTBS), and also to evaluate the effect of caries removal techniques on µTBS.
**Materials and Methods:** A total of extracted 72 human molar teeth with different ICDAS scoring (0,3,4,5) were selected (n=3). Following caries removal, a laser fluorescence score was measured with a device (DIAGNOdent Pen) at the bottom of the cavity. Scores below 30 were noted as caries absence, while scores of 30 and above were noted as caries presence. The caries removal technique groups consisted of 6 techniques as four air abrasion (Aquacare, Velopex) (AA) (bioactive-glass powder (BAG), 29µm $Al_20_3$, Cosil (30µm) and 53 µm $Al_20_3$) and two bur systems(B) (stainless-steel and ceramic). The teeth were then restored with a universal adhesive (Prime&Bond, Dentsply) and a nanohybrid composite (Neospectra ST, Dentsply). After 24 hour-water storage, the resin-dentin specimens were cut in both x and y directions with a water-cooled diamond blade (Isomet 1000, Buehler) to obtain rectangular sticks which have approximately 1 $mm^2$ surface area (n=15). Shapiro Wilk, Kolmogorov Smirnov, Mann Whitney U, One-Way Analysis of Variance, Kruskal Wallis, Dunn Tests were used for the analyses. Deem significance was set at $p<0.050$.
**Results:** Instrument type (B and AA) significantly affected the µTBS ($p=0.014$). According to the laser fluorescence score, the presence or absence of caries on µTBS was not significant ($p=0,606$). However, this difference was found to be significant according to the instrument type. For the presence of caries, the use of an AA instrument positively affected µTBS ($p=0.008$). Regarding the ICDAS scores, AA increased the µTBS in the ICDAS 5 group ($p<0,001$). The effect of a total of 6 caries removal techniques on µTBS was considered significant ($p<0,001$). The highest median value was observed in the Cosil group as 25.2 (13 - 35) MPa. The lowest median values were observed in the ceramic bur and BAG groups as 17.3 (12 - 28) and 16.35 (10 - 29) MPa, respectively.
**Conclusion:** In cases where the laser fluorescence value recorded after caries removal indicates a caries presence, AA systems can be preferred to increase the µTBS, especially for deep caries lesions. Selecting silane-coupled particles among AA systems improves µTBS.

***Keywords:*** *air abrasion, laser fluorescence, caries removal, microtensile bond strength, bioactive glass*

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# Influence Of Conditioning Time Of A One-Step Self-Etching Primer On Bonding Strength To A Lithium Disilicate Glass-Ceramic

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**Introduction:** A self-etching ceramic primer combines the function of acid conditioning and silanization during the cementation procedure. This study aimed to evaluate the microshear bond strength (μSBS) and surface-etching pattern of a self-etching ceramic primer Monobond Etch&Prime (MEP), conventional hydrofluoric acid (HF), and hydrofluoric acid followed by the application of a silane coupling agent (HFS).

**Materials and Methods:** Forty lithium disilicate glass-ceramic CAD/CAM blocks (EMX, IPS e.max CAD, Ivoclar Vivadent) were sectioned into 2-mm-thickness ceramic slices (n=195 ceramic surfaces). After wet polishing, the ceramic slices were divided randomly into 15 groups (n=10) according to the acidic agents (HF, HFS, MEP) and the conditioning protocols. In the case of HF and HFS, HF was applied passively and continuously for 10, 20, 60, or 120s, or non-continuously for 20s+air-blowing+20s. MEP was actively applied for 10s, 20s, 20s+air-blowing+20s; 60s; 120s, followed by 40s waiting reaction time. Subsequently, a cylinder mold with 2mm in diameter was placed on the ceramic surface, filled with the resin cement (Multilink N, Ivoclar Vivadent), and light-cured for 120s for the μSBS test. The failure pattern and bond strength data were analyzed using two-way ANOVA and Tukey`s HSD test. In addition, the ceramic surface etching pattern (n = 3) for each group was analyzed using scanning electron microscopy (SEM).

**Results:** The application of MEP presented comparable μSBS values to HFS with the conditioning time of the 20s, 20s+20s, 60s, and 120s ($p>0.05$). The 20s+air-blowing+20s application protocol showed significantly higher μSBS than the 20s treatment for MEP ($p<0.05$). Also, prolonged conditioning time showed no significant difference for μSBS for all the materials ($p>0.05$). MEP presented a slight dissolution of the vitreous matrix with 20s+air-blowing+20s application protocol. The prolonged conditioning time of MEP leads to more significant vitreous matrix dissolution and over-etching behavior with an increase in surface roughness and porosity.

**Conclusion:** Applying MEP for the 20s resulted in an adequate and satisfying bonding performance compared with 20s HF, followed by silane coupling. The prolonged conditioning time of MEP resulted in progressive glass matrix dissolution and over-etching behavior but not improving the bonding performance on the lithium disilicate ceramic surface.

***Keywords:*** *lithium disilicate, self-etching ceramic primer, microshear bonding strength*

## Investigation of The Effect Of Different Beverages on The Hardness of Three One-Shaded Dental Composites

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**Introduction:** Dental composites are widely used materials. With improving technology one shaded dental composites are produced and used instead of multi-layered systems because of their adaptation to all teeth shades. Today the beverages are consumed frequently and they may affect the structure of one-shaded dental composites. Thus, the aim of this study is to evaluate the effect of different beverages on the hardness of one shaded dental composites.
**Materials and Method:** In this study 3 different dental composites (Omnichroma, Charisma Diamond One and Zenchroma) were used. 21 samples (height 2 mm and the diameter 8 mm) from each dental composite were prepared and their baseline hardness was measured. Then, they were divided into 3 subgroups in terms of the beverages (n=7). For the control groups the samples were kept in distilled water. For the experimental groups the samples were immersed in lemonade and coffee for 15 minutes, 3 times a day during one week. For the experimental groups after the immersion periods, the specimens were washed with distilled water and were kept at distilled water during the rest of the day. Then, their final hardness was measured. Data were analysed statistically.
**Results:** The baseline hardness of the dental composites was statistically different ($p<0.001$). As Zenchroma had the highest hardness value, Omnichroma had the lowest hardness. Coffee decreased the hardness of Charisma Diamond One. Lemonade and coffee decreased the hardness of Zenchroma. The hardness of Omnichroma did not change statistically.
**Conclusion:** Zenchroma was the most affected material in terms of surface hardness change. The hardness of the restorative materials changes in terms of the beverages, the duration of exposure time, and the composition of the materials.

***Keywords:*** *dental composites, beverages, hardness, one-shaded*

**The Effect of An Alcoholic Beverage on Composite Resins Polished with Various Polishing Systems.**

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**Introduction:** With the increase in consuming alcoholic beverages all over the world and the demand within the aesthetical expectations of the composite restorations, the effect of alcohol consumption on composite materials needs to be evaluated. Thus, the aim of the present study is to investigate the effect of a common alcoholic beverage on the surface roughness and color of various composite materials polished with different systems.
**Materials and Methods:** In the present study, The baseline surface roughness and color values were detected in 180 disc-shaped (8mmx4mm) bulk-fill (OpusBulkFill), microhybrid (Llis) and nanohybrid (HanFil) composite resin samples polished with 3 different systems which were DiamondMaster-DM, SoflexDiscs-S, and DiamondExcel-DE. and all samples immersed in red wine for 5 days and 20 minutes per a day. Baseline and final scores of surface roughness and color values were recorded by using contact profilometer and spectrophotometer. All data were evaluated at $p<0.05$ significance level using Kruskal- Wallis and Mann-Whitney tests.
**Results:** When the baseline values of surface roughness were compared with the measurements obtained after the immersion in red wine, OPUS bulk-fill composite polished with DM or S systems did not show statistically significant difference ($p=0.628$, $p=0.334$, respectively), but it was significantly increased in the DE group ($p=0.007$). Besides, the surface roughness values of LLIS micro hybrid and HAN nanohybrid composites did not show statistically significant difference depending on the polishing systems used ($p>0.05$). According to results of the color change ($\Delta E$), immersion in red wine did not significantly affect the tested composite materials regarding the polishing systems used ($p>0.05$).
**Conclusion:** The alcoholic beverage did not cause significantly statistic discoloration regardless of the type of the composites tested or polishing methods used. However, multi-step systems can be used, instead of the one-step system involving a polishing paste used with a felt, to prevent the increase in the surface roughness of the composite materials immersed in red wine.

***Keywords:*** *Resin Composite, polishing systems, alcoholic beverage, surface roughness, color stability*

## Effect of Different Surface Treatments on Repair Bond Strength of RBCs

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**Introduction:** The aim of this study was to evaluate the effect of different surface treatments the repair bond strength of a universal nanohybrid resin based composite (RBC) restorative material before- and after-dynamic aging, by utilising micro-shear bond strength (MSBS) test.

**Materials and Methods**: For micro-shear bond strength test, total of 120 cylindrical (3mmX2mm) nanohybrid RBC specimens were prepared (ClearfilMajesty ES-2, Kuraray/Japan). The prepared specimens were divided into three groups (n=40/per group) based on surface treatment methods: a non-aged group (control group), 10,000cycle dynamic aging and 50,000cycle dynamic aging (thermocycle by 50°C and 55°C/Thermocycler The-1100, SD Mechatronik, Germany), which corresponds 1-year and 5-year clinical thermal aging. The aged and non-aged specimens were further divided into four groups: 1.aluminum oxide sandblasting+universal adhesive/self-etch mode, 2.aluminum oxide sandblasting+universal adhesive/etch-and-rinse mode, 3.universal adhesive/self-etch mode, 4.universal adhesive/etch-and-rinse mode. Subsequently, 0.8mmX2mm disc shape light cure RBC specimens were applied with direct placement technique (ClearfilMajesty ES-2, Kuraray/Japan) on the treated surfaces of all samples for repair. All specimens were stored in distilled water at 37°C in an incubator for 24-hour before micro-shear bond strength test. MSBS test was performed using a universal testing machine (Schimadzu IG-IS, Japan) at a crosshead speed 1 mm/min until failure to obtain the maximum load (P) in Newton (N). MSBS = P/CA where, P: load; CA: cross sectional area. The obtained Newton values were converted to MPa values by calculating the surface area of the specimens. Data were analyzed statistically using two-way analysis of variance (ANOVA) and Tukey at a confedence level 95% ($p<0.05$).

**Results:** Dynamic aging duration had a statistically significant effect on repair strength of MSBS ($p<0.05$). The highest MSBS data were obtained from non aged/ aluminum oxide sandblasting+universal adhesive/etch-and-rinse mode test group ($p<0.05$). Regarding aging test groups, the highest MSBS data were obtained from 10,000 and 50,000 thermal cycles with group: universal adhesive/etch-and-rinse mode and aluminum oxide sandblasting+universal adhesive/self-etch mode, respectively.

**Conclusion:** As the dynamic aging duration increased, MSBS values decreased. Depending on the application mode of universal adhesive, either self-etch mode or etch-and-rinse mode, further surface treatment by sandblasting other means air-particle abrasion had beneficial effects on MSBS values.

***Keywords:*** *Nanohybrid Composite Resin, Surface Treatments, Micro-Shear Bond Strength, Thermal Cycling, Dynamic Aging*

## Microleakage of Adhesives on Enamel Treated with Different Etching Protocols

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**Introduction:** The aim of this study was to evaluate the microleakage of light-cured and self-cured adhesives on enamel surfaces selectively etched with Er, Cr: YSGG laser or %37 phosphoric acid.
**Materials and Methods:** One hundred and twenty class V cavities were prepared on the buccal and lingual surfaces of human third molar teeth. The specimens were randomly divided into 6 groups (n=10). Group 1: Clearfil SE Bond with no conditioning, Group 2: self-etch mode Tokuyama Universal Bond with no conditioning, Group 3: Clearfil SE Bond conditioned with %37 phosphoric acid, Group 4: self-etch mode Tokuyama Universal Bond conditioned with %37 phosphoric acid, Group 5: Clearfil SE Bond conditioned with Er,Cr:YSGG laser (2780 nm, 2.5 W, 50 Hz), Group 6: self-etch mode Tokuyama Universal Bond conditioned with Er,Cr:YSGG laser. All the cavities were filled with G-ænial Posterior composite. After curing and polishing, the samples were immersed in a 2% methylene blue solution for 24 h. They were sectioned longitudinally and examined under a stereomicroscope for dye penetration. Scores were assigned to a millimeter scale (± 0.5 mm). The data were analyzed with IBM SPSS V23 and submitted by Kruskal–Wallis and Willcoxon tests ($p < 0.05$). The significance level was set as $p<0.05$.
**Results:** The lowest microleakage mean was observed in the occlusal surface Group 3 (0,08 ± 0,18) and the highest mean was noted in the cervical surface of Group 5 (0,95 ± 0,33). In the intragroup comparison, there was a significant difference in occlusal and cervical microleakage in Groups 2, 5, and 6 ($p=0.013$, $p=0.001$, and $p=0.002$, respectively).
**Conclusion:** Regardless of etching protocols and adhesive systems, less microleakage was observed the occlusal surface compare to the cervical surface. On both occlusal and cervical surfaces, phosphoric acid etching observes better results than laser etching as enamel surface treatment.

***Keywords:*** *Microleakage, adhesive systems, laser*

**Effect of Silver Diamine Fluoride on Microshear Bond Strength of Adhesive Cements to Dentin**

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**Introduction:** To investigate the effect of silver diamine fluoride (SDF) pretreatment on microshear bond strength (μSBS) of adhesive cements to dentin after immediate or delayed application.
**Materials and methods:** Dentine slices from 240 freshly-extracted human molars were collected and divided randomly into 6 groups based on the adhesive cementation. Then, according to surface treatment and application procedures, all of the groups were divided into 4 subgroups as followed (n=10): Immediate application (IA), Immediate application + Silver Diamine Fluoride (IA-SDF), Delayed application (After kept in distilled water for 1-week, DA) and Delayed application + SDF (DA-SDF). One total-etch, one universal adhesive (self-etch and total-etch modes), one self-adhesive, one resin-modified glass ionomer cement (RMGIC), and one flowable composite were used according to instructions. Two specimens from IA groups were also undergone scanning electron microscopy (SEM) evaluation. The μSBS was assessed using a universal testing machine and failure modes were recorded. Data were analyzed using a one-way ANOVA and Bonferroni tests.
**Results:** The flowable composite showed the highest μSBS values in most of the subgroups and the RMGIC had the lowest μSBS values among all. There were no significant differences among these cementation groups regarding their application procedures or surface treatments ($p>0.05$). However, IA showed higher μSBS than other subgroups of cements except for the self-adhesive group, in which DA-SDF had significantly the highest μSBS values among others. No specific evidence was gained in favor of SDF treatment at SEM analysis.
**Conclusion:** SDF pretreatment did not improve the μSBS of immediate application of adhesive cements however, its efficiency on μSBS values of delayed application depends on the type of adhesive cement.

***Keywords:*** *Microshear bond strength, silver diamine fluoride, adhesive cementation, dentin pretreatment*

## Effect of Different Wetting Agents Applied Between the Layers of Composıte on the Mıcroshear Bond Strength

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**Introduction:** In anterior direct resin restorations, various wetting agents can be used during layering. The aim of the study is to evaluate the microshear bond strength of between the composite layers to which the wetting agents are applied.
**Materials and Methods:** 36 composite resin blocks were formed by using an anterior microhybrid composite resin (G-Aenial Anterior Composite, GC) and the samples were divided into 3 groups according to wetting agents usage (n=12): Control group; GC modeling liquid group; GC Solare Universal Bond group. In the control group, no liquid was applied to the intermediate layer of the composites. In other groups, an acrylic-embedded composite was applied with different wetting liquids before polymerizing and then polymerized. Starch tubes (1mm internal diameter×2mm high) were fixed on it with a gingival protective barrier and the second layer composite was placed into the tubes with periodontal probe and polymerized. All samples were kept in an oven at 37°C for 24 hours to allow the tubes to come off and complete the polymerization period. Microshear testing was performed at 0.5 mm/min head speed (μSBS) for analysis. The types of refraction were evaluated with a stereomicroscope at x20 magnification. The distribution of the data was analyzed with Shapiro-Wilk and One-way Anova was used because it had a normal distribution. Fisher freeman halton test was used for failure mode data.
**Results:** There was no statistically significant difference between the groups in terms of microshear bonding values (p= 0.135) and failure modes (p> 0.05).
**Conclusion:** Application of universal bond and modeling liquid for shaping the micro-hybrid composite could not affect the microshear bond strenght.

***Keywords:*** *Wetting agent, Modelling liquid, Universal Bond, Microshear bond strenght, Composite*

*Bu çalışma sırasında, yapılan araştırma konusu ile ilgili doğrudan bağlantısı bulunan herhangi bir ilaç firmasından, tıbbi alet, gereç ve malzeme sağlayan ve/veya üreten bir firma veya herhangi bir ticari firmadan, çalışmanın değerlendirme sürecinde, çalışma ile ilgili verilecek kararı olumsuz etkileyebilecek maddi ve/veya manevi herhangi bir destek alınmamıştır.*

## Evaluation of Bond Strength of Universal Adhesives in Superficial and Deep Dentin

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**Introduction:** This study aims to evaluate the shear bond strength of universal adhesives at different dentin thicknesses.
**Materials and Metods:** In this study, a total of 120 extracted, caries-free, permanent human molar teeth were used with three different universal adhesive systems Hybrid Bond One (HB, Sun Medical, Japan), Nova Compo-B plus (NB, Imicryl, Turkey), Futurabond U (FB, Voco,Germany) in acid&rinse and self-etch modes and a composite resin Nova Compo-HS (Imicryl, Turkey) was used. For superficial dentin, 60 teeth were cut with a diamond saw to expose the dentin just below the dentin-enamel junction. For deep dentin, 60 specimens were cut 2 mm below the dentin-enamel junction. The cut teeth were divided into 3 groups and the groups were divided into two (n=10). Universal adhesive resins were applied to half of the groups after 37% phosphoric acid pretreatment and were restored with composite resin. Universal adhesive resins were applied to the remaining half. The samples were kept in distilled water for 24 hours. At the end of this period, a bond strength test with 1 mm/min force was applied to the samples in a universal test device (Marestek, Turkey) and the obtained data were statistically analyzed with One-Way ANOVA and Tukey HSD test (p=0.05).
**Results:** In the study, there was no difference between acidic and non-acidic applications of each universal adhesive on both superficial and deep dentin ($p>0.05$). When the superficial and deep dentin applications of all adhesive resins were compared, the shear bond strength values in deep dentin were found to be lower and statistically different ($p<0.05$). Cohesive failure for superficial dentin HB/HB+acid 17/23%, NB/NB+acid 9/17%, FB/FB+acid 17/9%, for deep dentin HB/HB+acid 17/29%,NB/ NB+acid was 0/23%, FB/FB+acid was 9/23%.
**Conclusion:**Phosphoric acid pretreatment did not affect the bond strength of universal adhesives to both superficial and deep dentin. The deep dentin bond strength of universal adhesives was lower than the superficial dentin bond strength.

***Keywords:*** *adhesion, universal, shear bond strength*

**Optimum surface treatment for CAD-CAM resin composite materials**

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**Introduction:** The purpose of this in vitro study was to explore the shear bond strength (SBS) of resin luting cement to CAD-CAM resin composite materials as influenced by air abrasion、hydrofluoric acid and pretreatment strategies.

**Materials and Methods:** One-hundred twenty six (126) composite CAD/CAM block sections (Hyramic, UPCERA) 2 mm in thickness randomly assigned to 6 experimental groups according to the applied surface treatment: (1) air abrasion vs. hydrofluoric acid, (2) no pretreatment vs. pretreatment using a silane primer (Monobond N, Ivoclar Vivadent) vs. pretreatment using an universal adhesive (Single Bond Universal, 3M). Subsequently, all experimental groups were embedded with self-setting resin and then grinded and polished up to 600 grit, resin luting cement (RelyX™ Ultimate, 3M) was polymerized onto the substrate surface using a cylindrical mold (3 × 4 mm). For each combination of the levels of the two treatment factors (2 (air abrasion vs. hydrofluoric acid) × 3 (no pretreatment vs. silane primer vs. universal adhesive)), specimens were prepared. After 24 h of water storage at 37 °C and 10000 thermo cycles (5/55 °C). The SBS of resin luting cement to pretreated materials was measured and failure types were examined. Surface topography was analyzed via scanning electron microscopy. The resulting data was analyzed using Tukey-Kramer HSD test ($\alpha = 0.05$, $n = 10$).

**Results:** The surface treatment method of air abrasion + universal adhesive had the highest SBS means, followed by universal adhesive and air abrasion group, which was significantly higher than other groups, and the difference was statistically significant ($P<0.05$).

**Conclusion:** According to the material morphology and shear bond strength, the use of air abrasion in conjunction with universal adhesive significantly improved the shear bond strength. A suitable combination of mechanical and chemical surface treatment was confirmed as an effective bonding strategy for CAD-CAM resins composite materials.

***Keywords:*** *CAD-CAM, Resin composite materials, Surface treatment, Shear bond strength*

*This abstract is supoort by Liaoning Upcera Co., Ltd. Conceptualization, Data Curation, Investigation and Writing - Original Draft: W.B., C.H. and G.R.; methodology , Validation and Writing - Review & Editing: W.B., C.H. and M.Z.; Supervision: C.H. and M.Z. All authors have read and agreed to the submitted of abstract.*

**Evaluation of the Bonding Performance of Current Adhesive Systems on Caries-Affected Dentin**

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**Introduction:** The aim of this study is to evaluate the long-term bonding performance of existing universal adhesives to sound (SD) and caries-affected (CAD) dentin using microtensile bond strength test, electron microscopy (SEM), and confocal laser scanning microscopy (CSLM) images taken from bond interfaces.
**Materisals and Methods:** A total of 120 sound and decayed human molars were ground to a flat surface by lowering the dentin level with a precision cutting device until the soft caries lesions reached the hard dentin layer. The surface microhardness was determined by Vickers microhardness test by applying 25 g load for 15 seconds and divided into 3 groups (sound dentin-SD, two levels of caries-affected dentin-D1 and D2). Dentin samples were divided into 4 subgroups; Group 1: Peak Universal Bond (PUB)+ Self-Etch (SE), Group 2: PUB+Etch and Rinse (ER), Group 3: G-Premio Bond (G-PB)+SE, Group 4: G-PB+ER. A nanohybrid universal resin composite structure was prepared on the specimens. After soaking the specimens in 37 $C^0$ distilled water for 24 hours and 1 year, the microtensile bond strength (μTBS) test and fracture type analysis, resin-dentin interface analysis by SEM and CSLM were performed. One-way analysis of variance (One-way ANOVA), Scheffe multiple comparison test and independent t-test were used for statistical analysis and the significance level was set at $p \leq 0.05$.
**Results:** After 24 hours, the SD group at PUB-SE recorded the highest bond strength value (36.80 MPa), and the D1 group at G-PB SE recorded the lowest value. (17.60 MPa). After a year, the SD group at G-PB SE recorded the highest bond strength value (30.38 MPa), while the D1 group at PUB SE recorded the lowest value. (16.67 MPa).
**Conclusion:** It was found that the Vickers test was a useful tool for differentiating between SD and CAD, that the bond strength of universal adhesives to CAD was significantly lower than SD, and that there was a significant difference between the various modes of application.

***Keywords:*** *caries-affected dentin, microhardness, universal adhesive, microtensile bond strength, confocal laser microscopy*

## The Effect of Cavity Depth on Universal Resin Shade Matching

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**Introduction:** The aim of this study was to evaluate the capability of matching the tooth color to the universal composite resin material used in cavities with different depths.
**Materials and Methods:** For this research, ten freshly extracted human molars were utilized. All teeth were scaled to remove calculus and soft tissue debris and then polished with prophylactic paste. Teeth were embedded in blocks of silicone to facilitate handling. The color parameters (CIE L*, a*, and b*) of the buccal and lingual surfaces of the teeth were then measured using a spectrophotometer (Vita Easyshade Advance, Vita, Zahnfabrik, Bad Sackingen, Germany). On each tooth's buccal and lingual surfaces, cavity preparation was performed at 6 mm width, 2 mm depth, and 4 mm depth, respectively, and cavity depth was measured using a periodontal Williams probe. Selective etching was used to apply the universal adhesive resin (G-Premio Bond, GC, Tokyo, Japan) to the cavities. For enamel and dentin replacements, Essentia (GC, Tokyo, Japan) full-strength paste composite was used, and the restoration was covered with a celluloid strip to minimize the oxygen inhibition layer and then light-cured for 40 seconds. After finishing and polishing the specimens, they were stored for 24 hours in distilled water. Using a spectrophotometer, the CIE L*, a*, and b* values of the restorative material were measured after drying the specimens. The values for color differences ($E_{00}$) were calculated using the CIEDE2000 formula. Using the obtained a * and b * values, the Hue ($\Delta H'$), and Chroma ($\Delta C'$) values of each specimen were also calculated. The color change data were statistically analyzed using independent sample t-tests ($\alpha$=.05).
**Results:** There was no statistically significant difference between buccal and lingual composite resin restorations for $\Delta E_{00}$, $\Delta H'$, and $\Delta C'$ values ($P$>.05). However, there was a statistically significant difference among buccal and lingual composite resin restorations for $\Delta L'$ values ($P$<.05).
**Conclusion:** Within the limitations of this study, the depth of cavities did not affect the shade match between the tooth and restoration. The thickness significantly affects the lightness value of color. In addition, the restorations became darker as the composite restoration's thickness increased.

***Keywords:*** *CIEDE2000, color matching, universal composite*

**Bond Strength of Fiber Reinforcement Resin Modified Glass Ionomer Cement**

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**Introduction:** This study aimed to evaluate the effect of adding glass fiber to resin-modified glass ionomer cement (RMGIC) on dentin bond strength.
**Materials and Methods:** The study design and protocol were approved by the local ethic committee (2023/49). Forty caries-free human third molars were employed. The teeth were randomly assigned into four groups (n = 10) based on the experimental RMGIC groups. The experimental groups were created by adding glass fibers (5, 10, and 20 wt%) to the powder of an RMGIC. Original RMGIC powder with no additive was set as a control group. After RMGIC was bonded to the dentin surfaces, the specimens were stored for 7 days at 37°C. The specimens were segmented into micro specimens (≈1 $mm^2$). Five micro specimens were acquired from each tooth. The micro specimens were subjected to microtensile bond strength testing (1.0 mm/min). The modes of failure were analyzed using a stereomicroscope and scanning electron microscopy. Data were statistically analyzed with ANOVA and Duncan tests ($p = 0.05$).
**Results:** The highest dentin bond strength was obtained in the control group (28.22±3.98 MPa, $p<0.05$). Adding glass fiber decreased the dentin bond strength of RMGIC. Increasing fiber weight ratios resulted in more decrease in dentin bond strength ($p<0.05$). The 20% fiber-reinforced group exhibited the lowest dentin bond strength (18.37±2.51 MPa, $p<0.05$). Most specimens failed adhesively, and the fewest specimens failed cohesively in dentin, irrespective of experimental groups.
**Conclusion:** The results show that reinforcement of RMGIC with glass fiber would adversely influence the dentin bond strength of RMGIC.

***Keywords:*** *Dentin, Glass ionomer, Glass fiber, Microtensile bond strength, Reinforcement*

## May Tomatine Be A Novel Anti-Cariogenic Agent? A Preliminary Study

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**Introduction:** Tomatine, which dissolves in dimethyl sulfoxide (DMSO), is employed as an matrixmetalloproteinase inhibitor for anti-cancer drug purposes. The objective of the research is twofold: firstly, to scrutinize the impact of tomatine on adhesive durability, and secondly, to explore its antimicrobial efficacy against cariogenic microorganisms.
**Materials ans Methods:** Forty non-carious (S) and carious (C) human molars, freshly extracted, were subjected to randomization and allocated into ten subgroups based on the utilization of pre-treatments on the exposed middle dentin surfaces (n=4, per group). The groups were classified as follows: S1-C1 (control), with no pretreatment; S2-C2 groups treated with 1% DMSO; S3-C3 groups with 0.75 µM tomatine; S4-C4 groups with 1 µM tomatine; and S5-C5 groups with 1.5 µM tomatine. The restoration procedure involved the use of the same composite material (Filtek™ Z250) and a universal adhesive in self-etch mode (Clearfil™ S3 Bond), with pretreatment agents being applied for a duration of 20 seconds.After the immersion of the teeth in distilled water at $37^0$C for 24 hours the shear bond strength (SBS) was measured using universal testing machine. The fracture modes of all de-bonded specimens were observed under a SEM at 4000x and 10000x magnification.Further, the antimicrobial effectiveness of tomatine against standard strains of *Streptococcus mutans* ATCC 25175, *Lactobacillus casei* ATCC 4646, and *Candida albicans* ATCC 10231 was assessed via microdilution method. The data were analyzed by using ANOVA, t, and Mann-Whitney U test with the significance set at $\alpha$=0.05.
**Results**: Maximum SBS was noted in S3 group. Although no significant differences were observed between the groups in terms of dentin and pretreatment agent types ($p>0.05$), all tomatine-treated groups exhibited higher bond strength compared to the control groups (S1-C1). Moreover, it was observed that the effectiveness of DMSO was higher on carious dentin compared to non-carious dentin. Although tomatine presented fungicidal activity against *C. albicans*, it displayed bacteriostatic effects against *S. mutans*, and no antimicrobial activity was observed against *L. casei.*
**Conclusion:**Tomatine, with its positive contribution to bond strength values and antimicrobial effect against certain cariogenic microorganisms, can be a promising new product to prevent secondary caries and prolong the longevity of restorative materials in the oral cavity.

***Keywords:*** *Adhesion, Cariogenic Microorganisms, Dental Caries, Tomatine*

*There is no funding/support for this study.*

**Bonding performance evaluation of a newly developed self-adhesive resin composite**

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**Introduction:** This study aimed to evaluate the microtensile bond strength (μTBS) of a newly developed self-adhesive resin composite(SA-100R) to dentin, compared with two self-adhesive resin composites and one glass-ionomer cement.
**Materials and Methods:** Freshly caries-free human molars were used under a protocol reviewed and approved by the Ethics Committee of the Hokkaido University Faculty of Dentistry (#2018-09). Flat sound dentin surfaces were exposed and polished with 600-grit SiC papers to create a standard smear layer. The dentin (n=5) was randomly divided into four groups based on materialsused, three self-adhesive resin composites (SARC): SA-100R (Kuraray Noritake Dental), Fusio (Pentron), Constic(DMG); and one glass-ionomer cement Fuji IX (GC). The materials were applied to the dentin surfaces according to the manufacturers' instructions. After storage in distilled water at 37º C for 24 h, the bonded teeth were sectioned into 1 $mm^2$resin-dentin beams and subjected to the μTBS test. The μTBS data followed normal and homogeneous distributions and were analyzed using One-Way ANOVA (α=0.05).
**Results:** SA-100R showed statistically significant higher μTBS value than those of the other materials in this study ($p<0.05$). There was no significant difference among the two self-adhesive resin composites and one glass-ionomer cement($p>0.05$).
**Conclusion:** It was found that SA-100R self-adhesive resin composite exhibited better bonding performance to dentin rather than Fusio, Constic, and Fuji IX.
**Conflict of interest:** The authors have no financial conflicts of interest concerning the presentation.

***Keywords:*** *microtensile bond strength, self-adhesive resin composite, bonding performance*

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**Fracture behavior of short fiber-reinforced CAD/CAM inlay restorations after aging**

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**Introduction:** The aim of this study was to assess the fracture-behavior of molar teeth restored with MOD inlays made of experimental short fiber-reinforced CAD/CAM composite block (SFRC CAD) before and after cyclic fatigue aging compared with commercially available hybrid CAD/CAM composites.
**Materials and Methods:** Standardized MOD cavities were prepared on 60 intact molars by one operator. The teeth were then randomly distributed into three groups.
A photoimpression of the prepared cavity was taken and then restoration was designed and milled (CEREC, Sirona Dental Systems Inc) from Cerasmart 270, Enamic and SFRC CAD blocks (n=20/group). All restorations were luted with self-adhesive dual-cure resin cement (G-Cem One). Half of restored teeth per each group (n=10) were statically loaded until fracture without aging. The remaining half were subjected to cyclic fatigue aging to 500.000 cycles ($F_{max}$=150 N), and then loaded statically to fracture. Fracture type was then visually examined. SEM and EDS were used to evaluate the microstructure of CAD/CAM materials. The data were statistically analyzed with 2-way analysis of variance (ANOVA) followed by Tukey HSD test (α=.05).
**Results:** ANOVA demonstrated that both material type and aging had a significant effect ($p<0.05$) on the load-bearing capacity values of the restorations. Visual analysis of the fracture behavior of the experimental SFRC CAD restorations revealed that chipping of only tooth structure was predominant. Teeth restored with SFRC CAD showed significantly the highest ($p<0.05$) load-bearing capacity (2535±830 N) after fatigue aging among all groups. SEM images showed the ability of short fibers in SFRC CAD composite to redirect and hinder crack propagation. With regard to fracture mode, Enamic group revealed 85% of catastrophic failure (vs. 45% and 10% for Cerasmart 270 and SFRC CAD, respectively).
**Conclusion:** The fracture crack in the experimental SFRC CAD specimens was blocked by discontinuous fibers. Large MOD cavities on molar teeth were most favorably restored with SFRC CAD inlays, yielding the highest load-bearing capacity and more restorable failures.

***Keywords:*** *CAD/CAM, fatigue aging, inlays, short fiber composite*

## Shade-Matching Ability of Novel Color-Adjusting Resin-Based Dental Composites

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**Introduction:** To evaluate the shade-matching ability of single-shade resin-based composite restorations in different thicknesses with different shades of acrylic teeth by instrumental and visual techniques.
**Materials and Methods:** Standardized 4mm diameter, 2mm and 3mm depth cavities were prepared in acrylic teeth (n=192) and filled with three different single-shade composites (Omnichroma(OM)(Tokuyama-Dental), Vittra APS Unique(VU) (FGM), Zenchroma(ZC) President-Dental), and a microhybrid composite (Filtek Z250(FZ)3M-ESPE) of A2,A3,B3,C2 shades after self-etch universal adhesive application. The L, a*,b*,C* and h* readings were obtained using VITA Easyshade V spectrophotometer. CIELab and CIEDE2000($\Delta E_{00}$) formulas were used for the calculations, the mean of $\Delta E_{00}$ values were assessed using a three-way ANOVA to determine if there was a difference between shade, material, and thickness ($p<0.05$). Forty-eight evaluators graded the shade match of 32 specimens as (A)most, (B)intermediate, (C)least compatible.
**Results:** There was a significant difference between shades ($p<0.05$), materials ($p <0.05$), and thicknesses($p <0.05$). Also, there was a significant interaction between shade*material ($p <0.05$), and shade* material* thickness ($p <0.05$). Among all combinations, the 3mm-restorations VU on C2 (12.7267±1.09409) and FZ on B3 (0.7933±0.29351) had the highest and lowest $\Delta E_{00}$ values, respectively. On the A3, B3, C2 for 2mm, and on the B3 for 3mm-thickness, only the FZ showed a value below the limit of 1.8. The best match among visual examination scores of 2mm specimens is seen for FZ on A3 shade and ZC on C2 shade (both 87.5%). VU on A2 shade had the highest match rate (68.75%) among the 3mm-specimens.
**Conclusion:** There are differences between the shade-matching results of 2mm and 3mm-restorations regarding specimen types, materials, and the tooth shades. The shade-matching abilities of single-shade dental composites are inferior to multiple-shade composites so they should be used with caution. There is no statistically significant correlation between the visual evaluation and the instrumental evaluation.

***Keywords:*** *Dental restoration failures, Shade-match, Single-shade resin composite*

*Bu bildiri Başkent Üniversitesi Araştırma Fonu tarafından desteklenmiştir.*

**Comparison of the Resistance of the Surfaces of CAD /CAM Materials to Aging: Translucency, Gloss, and Roughness.**

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**Introduction:**The objective of this study is to investigate the changes in translucency, gloss, and surface roughness of CAD/CAM rest orative materials after artificial aging.
**Materials and Method:** Cerasmart (GC Corporation), Vita Enamic (VITA Zahnfabrik), and Initial LRF (GC Corporation) were used for this study. The surfaces of the samples were prepared using three different polishing systems: Optiglaze Color, OptraFine Polishing System, or Vita Enamic Polishing Set Clinical. Surface roughness was measured using a non-contact laser profilometer (Nanovea PS50; Irvine), translucency with a UV-Vis spectrophotometer (Varian Cary 50; Varian, Inc.), and gloss with a glossmeter (Rhopoint Novo-Gloss 60$^{o}$ Glossmeter; Rhopoint House). The samples were stored in a 0.02-N citric acid solution for 7 days, and the toothbrush abrasion procedure was performed. All parameter measurements were repeated after aging. Data were analyzed using the Shapiro-Wilk and Kolmogorov-Smirnov, Kruskal-Wallis, Dunn's, Wilcoxon, and Spearman's rho tests ($p<0.05$).
**Results:** At baseline, the OptraFine Polishing System provided the smoothest surfaces for Cerasmart and Vita Enamic, while it provided the smoothest surfaces with Optiglaze Color for Initial LRF. After aging, the light transmission was found to decrease for all materials. As for gloss, the highest values were found for the samples treated with Optiglaze Color.
**Conclusion:** The surface roughness, light transmission, and gloss properties of CAD/CAM materials are affected differently by aging depending on the material and finishing/polishing system used. Aging resulted in a significant decrease in light transmission for all materials.

***Keywords:*** *CAD/CAM, surface roughness, light transmission, gloss*

**Bond Strength and Knoop Hardness Evaluation of Light-Cured Resin Materials.**

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**Introduction:** The aim of this study was to evaluate the micro-tensile bond strength (μTBS) and Knoop hardness of light-cured resin cement.
**Materials and Methods:** The study was approved by the Hokkaido University Ethics Committee (#2018-7). Flat dentin surfaces of twenty-four human molars and sliced CAD/CAM resin blocks, Katana Avencia Block 2 (Kuraray Noritake Dental, Tokyo, Japan) were polished with 600-grit SiC paper. Then samples were bonded with the respective resin cement or composite with an adhesive of each resin material, PANAVIA Veneer LC (PVL; Kuraray Noritake Dental), PANAVIA V5 (PV; Kuraray Noritake Dental), Variolink Esthetic LC (VE; Ivoclar Vivadent, Schaan, Liechtenstein) or CLEARFIL AP-X (AP; Kuraray Noritake Dental) in accordance with the manufacturer's instructions. The specimens were then light-cured from the top of the sliced block. In order to obtain the standard height for the μTBS test, AP was applied followed by primer and bonding agent to the top of the CAD/CAM resin block. Then, samples were kept in water at 37°C for 24 hours or 6 months. After the storage, the specimens were sectioned and subjected to a μTBS test (n=15). Fracture modes were analyzed under the SEM. For Knoop hardness number (KHN), slabs of each resin-based materials were prepared for 24 hours or 6 months, respectively. The data of μTBS and KHN obtained were statistically analyzed by two-way ANOVA and post hoc Tukey HSD or Games-Howell's test ($\alpha$=0.05).
**Result:** Two-way ANOVA showed that resin materials influenced significantly on μTBS and KHN after 24 hours and 6 months of water storage. PVL and AP had the highest 24-hour μTBS values. However, PVL, AP, and PV showed no significant difference and were significantly higher than VE after 6 months. AP had the highest KHN ($p < 0.05$) among all groups both 24h and 6 months
The predominant failure mode of all groups after 24 hours showed cohesive failure in cement.
**Conclusion:** In this study the light-cure cement PVL showed better bonding performance than PV and VE. However, further studies are needed to evaluate the long-term clinical performance of these materials.

***Keywords:*** *μTBS, Knoop hardness, cement, light-cure*

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**Effect of Bleaching Treatment on Shear Bond Strength of Universal Adhesive Applied with Different Modes**

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**Introduction:** Interest in aesthetic dentistry in achieving a beautiful smile has led to the popularity of tooth bleaching treatments. Lower bond strength values of adhesive systems to bleached enamel have been reported, but the effects of universal adhesives used with different modes are still unknown. The aim of this study is to evaluate the shear bond strength of a universal adhesive system applied with different etching strategies after hydrogen peroxide-containing vital bleaching.
**Materials and Methods:** Sixty bovine incisors without any cracks or defects were were mounted and labial enamel surfaces were ground flat. Specimens were randomly assigned into 4 groups: group 1: no bleach, Clearfil™ S3 Bond Universal (CSU)(Kuraray, Dental Inc, Japan) was used with etch-and-rinse mode; group 2: no bleach, CSU was used with self-etch mode; group 3: bleached with Opalescence Boost PF (Ultradent Products Inc,South Jordan, UT, ABD), CSU was used with etch-and-rinse mode; group 4: bleached with Opalescence Boost PF, CSU was used with self-etch mode. Adhesive application was done after 2 weeks storage in $37^0$ C in distilled water for all groups tested. Subsequent to respective treatments, enamel surfaces were built up with Omnichroma composite resin (Tokuyama Dental, Tokyo, Japan). The shear bond strength (SBS) test was performed after 24 hr storage in water. Failure modes were examined with a stereomicroscope (20X). The conformity to the normal distribution was examined using the Shapiro-Wilk test. Kruskall-Wallis H test was used to compare data that were not normally distributed according to groups of three or more, and Dunn's test was used for multiple comparisons. ($p < 0.05$).
**Results:** The lowest SBS values were achieved in group 1 while the highest ones in group 4. Group 1 showed significantly lower SBS values than all other groups tested($p < 0.05$). However, the differences were not significant for failure modes, cohesive failures were dominant, expecially for etch-and-rinse groups($p > 0.05$).
**Conclusion:** The present study showed that bonding performance of the universal adhesive was enhanced with the etch-and-rinse mode application to both bleached and non-bleached enamel.

***Keywords:*** *bleaching, universal adhesive, shear bond strength*

**Effect of Fluoride in the Resin Cement on the Titanium Abutment**

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**Introduction:** Implant-supported restorations can be either cement-retained or screw-retained. There is no literature information about whether the compounds in the resin cement affect the abutment structure to which they have adhered. The aim of this study is to investigate the effect of fluor in the resin cement used in the cementation of implant-based restorations on the titanium abutment.
**Materials and Methods:** 30 square titanium samples with 2 mm thickness and 10x10 mm dimensions were prepared. There are 3 groups according to the percentage of fluoride in resin cement content. The prepared dental cement was mixed with %5 (Group A), %10 (Group B) YbF3 (ytterbium trifluoride). In the control group (Group K), there was no fluoride in the dental cement. Transparent molds of 3x3 mm were placed on the ti samples. Dental cement prepared with different fluoride contents was applied into these transparent molds. After the polymerization of the cement was completed, the samples were placed in the oven. The samples, which were kept in an oven at 37 °C, were removed at the end of, the 7th day and removed from the titanium surface together with the cement in the transparent mold. The cleaned titanium surfaces were examined in potentiostat galvanostat, SEM, XRD, and AFM. Surface changes were recorded and statistical evaluations were made.
**Results:** According to the statistical results using the Rp value; The ti samples in groups A and B showed statistically significantly corrosive surfaces ($p<0,013$, $p<0.001$) than the control group. In the SEM images, a tiny pit is observed in both experimental groups compared to the control group. Al, Ti, and V are observed as the main elements in XRD patterns. According to the Ra values obtained as a result of AFM, the surface roughness of the experimental groups was higher than the control group.
**Conclusion:** We can say that the fluoride in the resin cement has a negative effect on the corrosion behavior on titanium.

***Keywords:*** *Corrosion, resin cement, titanium, ytterbium tri fluoride*

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**Effect of Soft-Drinks and Bleaching-Agent on Composite Resins' Optical Properties**

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**Introduction:** This study was aimed at investigating color and translucency change and whiteness index in 3-different composite resins treated with hydrogen peroxide after staining with soft drinks.
**Materials and Methods:** Twelve specimens were prepared from each composite resins [microhybrid (Herculite, Kerr), bulk-fill (Sonic-fill, Kerr) and nanoceramic (Ceram.X-One, Densply)]. Following baseline color measurements, the specimens were randomly divided into 4 groups according to immersion solutions (distilled water, iced dark coffee, red-bull and cola). At the end of 1$^{th}$ and 7$^{th}$ day test periods, color measurements were repeated, and color change values (ΔE) and translucency parameters (TP) were calculated. Each resin group was applied on bleaching agent (Opalescence-Boost-40%, Ultradent). Following bleaching application, ΔE and TP and changes of whiteness (ΔWID1= WID bleaching- WID baseline, ΔWID2= WID bleaching- WID staining) values were recorded. After the bleaching application, the specimens were immersion into the solution and at the end of 1$^{th}$ and 7$^{th}$ day test periods, color measurements were repeated, and ΔE, TP and ΔWID were calculated again. Data were analyzed using the Kruskal–Wallis, Friedman and Bonferroni tests at a significance level of 0.05.
**Results:** The highest level of translucency observed for the Ceram.X (2.9±0.2) specimens immersed in cola was on the 7$^{th}$ day. The lowest level of translucency observed for the Sonic-fill (23.8±3.8) specimens immersed in red bull was on the beginning. The highest level of discoloration observed for the Herculite, Sonic-fill and Ceram.X specimens on the after bleaching+7$^{th}$ day was iced dark coffee ($p<0.05$). For the Sonic-fill and Herculite specimens immersed in iced dark coffee and Ceram.X specimens immersed in distilled water and red bull, statistically significant difference in ΔWID1 and ΔWID2 values were detected ($p<0.05$).
**Conclusion:** The Sonic-fill materials were less translucency than the other resin composites. Coffee caused more staining than distilled water generally. The type of stanning solutions had effect on the whiteness of the tested materials.

***Keywords:*** *Keywords: Bulk fill, Color change, Translucency, Whiteness Index*

## Repair Bond Strength of Universal Adhesives on Nanoceramic CAD/CAM Blocks

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**Introduction:** Nowadays CAD/CAM restorations have become a part of common practice. One of the most common failures in CAD/CAM restorations is fracture or chipping as a result of trauma or fatigue from masticatory function. Repairing such defects with composite resins can be a less expensive and more straightforward alternative to replacement. However, a consensus on the ideal pretreatment for repair of the CAD-CAM ceramics is lacking. The aim of this study is to investigate the effect of different surface treatments and different universal adhesives on repair bond strength of flexible resin nanoceramic CAD/CAM restorations with or without additional silane application.

**Materials and Methods:** Three hundred twenty specimens (6×5×2 mm) were prepared from resin nanoceramic blocks (Cerasmart, GC Corporation), thermocycled (5000 cycles, 5-55°C) and assigned to four surface pretreatment protocols: control, hydrofluoric acid(HF), diamond bur(DB), tribochemical silica coating(TBC). After surface treatments, silane was applied to half of the specimens. Then, four different universal adhesives Futurabond M+(FMU), Single Bond Universal(SBU), Tokuyama Universal Bond(TBU), Clearfil Universal Bond Quick(CUQ)] was applied (n=10). Repair was simulated with a hybrid composite resin (G-aenial Posterior, GC Corporation) and specimens were re-submitted to thermocycling (5000 cycles, 5-55°C). The shear bond strength (SBS) test was performed using a universal testing machine. Failure modes were examined with a stereomicroscope (20X). The data were analyzed with ANOVA and the Bonferroni correction was used for pairwise comparisons ($p < 0.05$).

**Results:** The highest SBS values were obtained from TBC-CUQ silane(-) group. Surface treatment with TBC produced the most successful repair results for all tested groups except DB-TUB silane(-) group. TUB increased SBS when compared with other universal adhesives. For all groups tested TBC-CUQ silane(-) group was the only one which showed significantly higher SBS values than TBC-TUB silane(-)($p<0.05$). Additional silane application decreased SBS for TBC-CUQ and HF-TUB groups, while increased the values for DB-FMU and TBS-TUB groups ($p<0.05$). Cohesive failures were the most common failure type.

**Conclusion:** Pretreatment with TBC followed by the application of a universal adhesive is the best option for repairing fractures of flexible resin nanoceramic CAD/CAM restorations with composite resin.

***Keywords:*** *CAD/CAM restoration, Shear bond strength, Repair, Universal adhesive, Silane*

## The Effects of Preheating and Curing Depth of Bulk-fill Materials

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The aim of this study was to investigate the effect of preheating and curing depth on microhardness and color stability of composite resins.
40 samples were prepared using 2 types of standard molds with a diameter of 5mm, a depth of 2mm and a depth of 4mm. In Group AF/2mm and in Group AF/4mm, a nano-hybrid bulk-fill ormoser (Admira Fusion X-tra,VOCO,Germany) and in Group VC/2mm and in Group VC/4mm, a preheated bulk-fill resin composite (Viscalor Bulk,VOCO,Germany) were used. The samples were placed in molds and polymerized for 20s only from their top surfaces using a LED light curing device (Valo,Ultradent,USA). In Group VC, composite resin was placed in molds after heating to 68°C for 30 seconds using a composite heating device (Viscalor Dispenser,VOCO,Germany) according to the manufacturer's instructions. Vickers microhardness were made using microhardness tester (Shimadzu,Japan) at a load of 500gr for 15s on top and bottom surfaces. Three measurements were taken on both surfaces and the mean of this reading was recorded. The initial colors of the samples were measured using a spectrophotometer (Vita Easy Shade,Vita Zahn Fabrik,Germany) according to the CIE-L*a*b* system. Afterwards, all groups were kept in the coffee solution for 1 week and the difference between the measured colors was calculated. The data were statistically analysed with two way analyses of variance and Bonferroni test($p<0.05$). All groups showed significantly better microhardness results from top surfaces than bottom surfaces($p<0,001$). In terms of preheating, Group VC/2mm showed statistically higher microhardness results than Group AF/2mm at both top and bottom surfaces($p<0,001$). Although Group VC/4mm showed statistically higher microhardness results than Group AF/4mm at top surfaces($p<0,001$), similar results were determined at bottom surfaces($p>0.05$). Group AF/4mm showed lower microhardness results than Group AF/2mm at bottom surfaces. Similarly Group VC/4mm showed lower microhardness results than Group VC/2mm at bottom surfaces($p<0,001$). Group VC/2mm showed less color change compared to Group AF/2mm and Group VC/4mm showed less color change compared to Group AF/4mm($p<0,001$).
Within the limitations of this study, preheating was effective to improve microhardness and color stability of composite resins. Microhardness of the bottom surfaces of both composites decreases as the depth increases.

***Keywords:*** *composite, preheating, bulk-fill, microhardness, color stability*

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**Intra-cavity dentin bonding of class 1 resin-composite-restoration with/without simulated-pulpal-pressure**

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**Introduction:** The aim of this study was to examine the intra-cavity dentin bonding of class 1 resin-composite-restoration pretreated by recent self-etch adhesive systems with and without simulated pulpal-pressure (**SPP**).
**Materials and Methods**: The pulp chamber of extracted human-sound-maxillary-molars was exposed from the furcation area and then the pulp tissue was gently removed with an excavator. The pulp chamber opening and roots were covered with a silicon rubber impression material. Those treated molars were embedded in a cylindrical plastic mold filled with an acrylic resin. Standardized class 1 cavity (5.0 x 5.0 x 2.0 mm) was prepared to each molar. The cavity specimens were divided into two **SPP** groups; **N** (none-**SPP**, control) and **15** (15cm-$H_2O$-**SPP**). Four recent self-etch adhesive systems, three all-in-one adhesive systems; CLEARFIL Universal Bond Quick (**CUQ**: Kuraray Noritake Dental), Prime&Bond Universal (**PBU**: Dentsply Sirona) and Scotchbond Universal Plus Adhesive (**SUP**: 3M), and a two-step self-etch adhesive system; CLEARFIL SE Bond 2 (**SE2**: Kuraray Noritake Dental, control), were applied to the cavity walls. All pretreated cavities were restored by a two-layered incremental technique with a semi-hybrid resin composite restorative. Nine standardized beam-test pieces were trimmed from each restored specimen, and μ-TBS (n=18) to cavity-bottom dentin wall were measured. The data were examined using ANOVA, Tukey's *q*-test, *t*-test, and Weibull analysis with the level of significance at 5%.
**Results**: The mean μ-TBS of all restorations pretreated with four systems decreased by **SPP**. The values of **15** were significantly smaller than those of **N**, except **PBU** and there were although no significant differences in **15**-value among four systems. The **15**-values of Weibull modulus (Wm) and Weibull stress at a probability of failure of 10% (PF10) were statistically smaller than **N**-values, except **PBU**. For **15**, Wm and PF10 values of **PBU** and **SE2** were significantly greater than those of **CUQ** and **SBU**.
**Conclusion**: Intra-cavity dentin bonding of class 1 resin-composite-restoration pretreated by recent four self-etch adhesive systems had a tendency to be decreased by the simulated-pulpal-pressure. However, the strength of negative effect caused by the pressure did vary with the adhesive systems applied.

***Keywords:*** *Intra-cavity dentin bonding, Class 1 resin-composite-restoration, Simulated-pulpal-pressure, Micro-tensile bond strength, Weibull analysis.*

**Examination of Color Stability of CAD / CAM Materials Applied with Different Polishing System**

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**Introduction:** The aim of this study is to investigate the color change of different CAD/CAM materials after they are polished with different polishing systems and kept in various colorant drinks.
**Materials and Methods:** Three different resin-based CAD/CAM blocks, (Cerasmart, Coltene Brilliant Crios and SHOFU Block HC) were used. The CAD/CAM blocks, which prepared a total of 540 samples with a thickness of 2 mm, were divided into 3 main groups according to the polishing systems. Finishing and polishing systems applied to materials were Sof-Lex, Identoflex and Coltene Diatech polishing systems. After the polishing procedure, the samples were divided again into 3 sub-groups and kept in 3 different coloring solutions for 1 hour twice a day for 15 days. Colorant drinks were filter coffee, cola and distilled water. Color measurement was performed at the begining, 1st, 7th and 15th days using VITA Easyshade-Compact spectrometer device. Data was analyzed using one-way analysis of variance (ANOVA), Kruskal Wallis, Tukey and Dunn tests.
**Results:** At the end of 15 days, Cerasmart samples showed the lowest color change for coffee and water, where Coltene samples showed the lowest color change for cola. Regardless of CAD/CAM blocks and polishing systems, a highly statistically significant difference was found in the comparison of the beverages within themselves ($p < 0.001$). Especially coffee caused a more pronounced color change than other beverages ($p < 0.001$).
**Conclusion:** It was observed that the ΔE value is proportionally increasing with the increase of waiting time inside coloring beverages. The highest color change for each CAD/CAM material was obtained from the samples kept in coffee.

***Keywords:*** *: CAD/CAM resin block, cola, coffee, color change*

**Evaluation of Microhardness of Four Bulk-Fill Composite Resins with Different Polymerization Techniques**

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**Introduction:** This study aims to evaluate the microhardness of four different bulk fill composite resins in varying incremental thicknesses after direct and indirect polymerization.
**Materials and Methods:** Microhardness measurements were performed on four bulk fill composite resins [Filtek Posterior (3M ESPE; Seefeld, Germany), Tetric N-Ceram (Ivoclar Vivadent; Schaan, Liechtenstein), X-tra fil (Voco; Cuxhaven, Germany), and QuiXfil (Dentsply DeTrey; Konstanz, Germany)] at different incremental thicknesses (n=4x20 2 mm, 4x20 4 mm) after direct and indirect polymerization. The composites were applied to plastic rings (8 mm diameter, 2 and 4 mm depth) and irradiated with VALO™ Cordless-LED according to the manufacturer's instructions. The samples (n=4x10 2 mm, 4x10 4 mm) were then cured using the CS-110 Light&Heat Curing System according to the manufacturer's instructions. The samples (n=160) were placed in a Vickers microhardness tester and microhardness was measured at six points across the top and bottom surfaces of each sample for 15 seconds using a 500 g load. The obtained data was statistically analyzed using SPSS-27.
**Results:** The microhardness values on the top surfaces of the same composites did not show a statistically significant difference at different incremental thicknesses (2 and 4 mm layers). However, only Filtek did not show a significant difference in bottom surface microhardness. When the top and bottom microhardness values within the groups were compared, QuiXfil and Filtek did not show any difference in both polymerization techniques and two different incremental thicknesses. X-tra fil did not show any difference only in direct polymerization with 2 mm thickness.
**Conclusion:** The study revealed that Filtek Bulk Fill Posterior Composite performed better. Further studies are required to investigate the effects of different incremental thickness and polymerization techniques in in-vivo restorations.

***Keywords:*** *Bulk fill, composite, filtek, microhardness, polymerization, quixfil, x-tra fil, tetric.*

*This study is not supported.*

**Effect Of Preheating on The Repair Bond Strength of Aged Composites**

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**Introduction:** Repairing involves placing a new layer of resin-based composite (RBC) over the existing restoration with minimal impact on tooth structure compared to replacement. Therefore, repairing is considered favorable in prolonging the longevity of restorations by slowing down the restorative cycle. This study aimed to investigate whether preheating of RBCs used as repair materials could improve the repair bond strength of aged composite surfaces.
**Materials and Methods:** Three RBCs [VisCalor bulk (VSC), Tetric EvoCeram Bulk Fill (TEC), GrandioSO (GSO)] were repaired by own/other brand of RBCs. The repair was performed with/without preheating, resulting in 18 combinations, as well as with a flowable composite [Clearfil Majesty ES Flow (CMF)], representing the control repair group (n=10). After thermocycling (5,000 cycles/5-55°C), all substrates were etched with phosphoric acid. A silane-containing universal adhesive was used for the bonding procedure, and then the repair composite discs (1 mm diameter; 2 mm thickness) were applied. One day after the photopolymerization, the samples were re-thermocycled 5,000 times. The micro-shear bond strength test was performed using a universal testing machine at a crosshead speed of 1 mm/min. The data were analyzed by one-way ANOVA and Tukey's post hoc test.
**Results:** The repair with preheated VSC resulted in a significant increase in bond strength values of both the VSC and GSO substrate groups compared to conventionally applied *($p<0.001$)*. The repair with preheated TEC in the presence of VSC substrate and with preheated GSO in the presence of GSO substrate also increased bond strength values compared to their conventionally applied counterparts *($p<0.001$)*. No significant effect of preheating was found in the repair of TEC substrate with any repair material employed in the study.
**Conclusion:** The repair bond strength of aged RBCs was improved by preheating, however this impact was mostly material-dependent.

***Keywords:*** *preheating, repair, resin-based composites, shear bond strength*

**Comparison of Fracture Resistance Between Delayed and Immediate Restorations After Endodontic Treatment**

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**Introduction:** To evaluate of fracture resistance in restorations which was delayed after endodontically treatment teeth.
**Materials and Methods:** Sixty human intact premolar teeth were used in this study. Teeth were prepared disto-occlusally. After endodontic treatment, teeth were divided into 2 groups according to restoration timing (immediate or 3 months delayed). 3 months delayed were imitated by thermomechanical aging. Then,samples were divided to 6 subgroups (n=10). While Groups I (Composite resin), II (Flowable bulk fill) and III (Ribbond+flowable bulk fill) were restored immediately,Group IV (Composite resin),V (Flowable bulk fill) and VI (Ribbond+flowable bulkfill) were restored after subjected to thermo-cycling (2500 cycles,5°C-55°C) and exposed to 12500cycles in a chewing simulator. Groups IV, V and VI were stored distilled water with temporary restorative fillings. All of the teeth were fractured on the universal testing machine.Fractures were analyzed. Data were analyzed using Shapiro Wilk and one way ANOVA tests.
**Results:**The highest fracture resistance was recorded in Group III. The lowest fracture resistance was shown in Group VI. No statistically significant difference was observed among groups ($p>0.05$). Most of the repairable fractures were seen in Groups I and II.
**Conclusion:** Delaying of restorations did not effect the fracture strength of the groups. According to the results of this study, it was suggested to avoid delaying restorations for obtaining repairable surfaces.

***Keywords:*** *endodontic treatment, delayed restorations, composites*

**Effect of Aging on the Shear Bond Strength of Universal Bonding Agents Including MMP Enzyme Inhibitors**

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**Introduction:** The main reasons for our inability to obtain long-lasting restorations in the mouth are hydrolytic dissolution and degradation of the adhesive interface due to MMP enzymes with collagenolytic activity. In this study, the effect of aging on the shear bond strength of Universal bonding systems containing different MMP enzyme inhibitors was evaluated.
**Materials and Methods:** In this study, 200 caries-free extracted permanent human molars were used. The teeth were cut in the coronal axis and flat dentin surfaces were created in the occlusal region. Experimental adhesives were prepared by adding MMP enzyme inhibitors (Grape Seed Extract (GSE), Riboflavin, Hesperidin and Chlorhexidine) at 0.5% concentrations into universal bonding agents [Nova Compo-B PLUS (NCBU), IMICRYL, TRY; All Bond Universal (ABU), BISCO, USA]. The specimens were divided into 20 groups to be restored with control or experimental adhesives. The adhesives were applied according to the instructions and cylindrical rods with a diameter of 3 mm were formed on the dentin surface using the same brands of composite as the adhesives. Half of the specimens were soaked in water for 1 day. The SBS test was performed on an Instron device at a speed of 1 mm/min. The remaining samples were soaked in 37ºC distilled water for 1 year and after thermal cycling, the SBS test was performed on an Instron device at a speed of 1 mm/min. The data obtained were compared by One Way Anova test (p=0.05).
**Results:** Among all groups after aging, the highest shear bond strength was observed in the NCBU experimental group with GSE and the lowest shear bond strength was observed in the ABU experimental group with riboflavin. Compared to the control groups, it was observed that the addition of chlorhexidine to the ABU group and the addition of GSE to the NCBU group increased the shear bond strength values numerically. No statistically significant difference was observed between the bond strengths of the adhesive groups after aging and the initial bond strengths.
**Conclusion:** Aging did not have a negative effect on the shear bond strength of the experimental groups formed by adding MMP enzyme inhibitor in universal bonding agents.

***Keywords:*** *MMP enzyme inhibitors, universal adhesives*

**The Effect of Modelling Resin Used with Different Methods on the Color Stability and Roughness**

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**Introduction:** To evaluate the effect of modeling resin used with different application methods on the roughness (Ra) and color change (ΔE) of a nanohybrid composite subjected to thermal cycling and coffee discoloration.
**Material and Methods:** Forty cylinder-shaped nano-hybrid composite (G-aenial Anterior,GC,Japan) specimens were prepared using a teflon mold. Group 1(control group), no modeling resin; Group 2, modeling resin (GC Corp.,Tokyo,Japan) was applied to the specimen's surface using a composite brush. The brush was always slightly moisturized with wetting resin, and excessive material was removed using a clean paper tissue. Group 3, the excessive modelling resin was not removed using a clean paper tissue. Group 4, was prepared by applying one increment of composite (approximately 0.5mm thick), followed by one layer of modeling resin; this composite and modeling resin application was repeated twice, resulting in the total application of four increments of composite and three layers of the modeling resin. Roughness and color changes were measured after 10,000 thermocycles and 14 days. The Oneway Anova, and Analysis of Variance followed by the Bonferroni and Tamhane's T2 and Tukey test correction for pairwise comparisons was used for statistical analysis.($p<0.05$)
**Results:** The mean initial roughness of the Group 1 was significantly higher than Group 4(p:0.001), Group 2(p:0.025) and Group 3(p:0.012). After the thermal cycle, the mean roughness of the Group 1 was found significantly higher than Group 4(p:0.038). There was no statistically significant difference between the groups in terms of 14-days roughness averages. It was observed that the ΔE value increased significantly as the exposure time to the coloring solution increased in all groups. In the examinations made between the groups, there was no statistically significant difference in terms of ΔE averages after the thermal cycle. The 14-days ΔE average of the Group 1 was found significantly lower than the other groups.
**Conclusion:** It was observed that the modeling resin applied with different methods significantly reduced the roughness at the beginning. However, as the aging and coloration process increased, roughness and color change increased significantly in all groups. Application of modeling resin by different methods can affect the surface properties and discoloration of nano-hybrid composites.

***Keywords:*** *modelling resin, wetting agent, color change, surface roughness, aging*

*DS52*

**Efficacy of Conventional and İmmediate Endodontic Sealing Protocols on Shear Bond Strength to Coronal Dentin**

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**Introduction:** Restoration of the endodontic access cavity is accomplished after completion of root canal treatment, called delayed endodontic sealing (DES). During root canal treatment, the access cavity is exposed to irrigation solutions and the root canal filling paste for a while. To increase the dentin bond strength of adhesives, and to protect and strengthen the hybridized dentin, IES can be backed with a flowable resin composite layer. The aim of this study is to investigate the effect of conventional, immediate, and immediate endodontic sealing reinforced with two different flowable composites on the shear bond strength of the dentin bonding agent.
**Materials and Methods:** In the study, 50 samples prepared from human molar teeth were used. Teeth were sectioned 3 mm below the occlusal surface and then randomly divided into five groups (n=10): Group 1: Endodontic treatment procedures (ETP) + Dentin Bonding Agent (DBA) + composite; Group 2: DBA + composite; Group 3: DBA + ETP + composite; Group 4: DBA+ flowable composite + ETP + composite; Group 5: DBA + bulk-fill composite + ETP + composite. Endodontic treatment procedures (20 min. 3% NaOCl, 3 min 17% EDTA, 1 min 3% NaOCl 1 min. distilled water, 10 min. epoxy type sealer applying and cleaning the dentin surface with 70% alcohol) were the same in all groups. After applying DBA (Clearfil Liner Bond F) according to the manufacturer's instructions, the composite build-ups were created using cylindrical molds (diameter: 2 mm, height: 3 mm) for the microshear bond strength tests. Failure analysis of fractured surfaces was examined with a stereomicroscope at ×40. Data were analyzed using the one-way analysis of variance and the Tukey test.
**Results:** The highest micro shear bonding values were observed in the first group (DES). The values of the first and second groups were found to be statistically significantly higher than the flowable composite and bulk fill applied IES groups ($P<0.05$). No statistically significant difference was found between the values of the third group and the other groups ($p>0.05$).
**Conclusion:** When a self-etch dentin bonding agent is used, DES increases the shear bond strength of the restoration to the dentin tissue.

***Keywords:*** *coronal dentin, immediate endodontic sealing, shear bond strength*

**Evaluation of The Effects of Different Surface Treatments on The Repair of Fiber-Reinforced Dentin Composite with Posterior Composite**

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**Introduction:** This study aimed to evaluate the effects of different surface treatments on the repair bond strength between a fiber-reinforced dentin composite and a posterior composite.
**Materials and Methods:**40 fiber-reinforced dentin composite resin blocks 4x4x4 mm in size were divided into 8 different groups according to the surface preparation methods; (G1) negative control group, (G2) adhesive application, (G3) 50% dimethylsulfoxide (DMSO) application ,(G4) 50% DMSO + adhesive application, (G5) 37% phosphoric acid etch+ adhesive application (G6) air abrasion + adhesive application, (G7) 37% phosphoric acid etch + 50% DMSO application + adhesive application, (G8) air abrasion + 50% DMSO application + adhesive application group. The composite surfaces were repaired in two layers with a posterior composite. Composite sticks were subjected to a micro tensile bond strength test. Fractured surfaces were evaluated using a stereomicroscope (x25)
Short fiber reinforced composite samples' surfaces were investigated by scanning electron microscope. Shapiro Wilk, one-way ANOVA, and Tukey HSD tests were used for statistical evaluation.
**Results:**The highest average micro tensile bond strength values were recorded in the eighth group. The lowest mean values were found in the negative control group. Statistically significant μTBS values were obtained in all adhesive-applied groups. SEM images showed that acid etching partially removed residues on the composite surface, while the air abrasion damaged the fiber structures.
**Conclusion:** In the repair of fiber reinforced dentin composite with posterior composite, it was detected that the adhesive applied groups showed higher average bond strength than the negative control group. It was noted that the application of 50% DMSO without the application of adhesive did not statistically increase the success of the bonding. Acid etch and air abrasion applications on the fiber composite surface roughened with the bur did not provide a statistically significant additional contribution when compared to the group in which only the adhesive was applied.
**Clinical Significance:** Adhesive application is an effective strategy for repairing a fiber- reinforced dentin composite, without needing additional surface treatments and DMSO application.

***Keywords:*** *Short fiber reinforced composite, Composite repair, Dimethylsulfoxide, Microtensile bond strength*

## Effect of Chlorhexidine and Boric Acid on Dentin Shear-Bond Strength

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**Introduction:** Disinfection of the dental cavity is important to eliminate microorganisms from the dental cavity and to remove the debris and smear layer from dentine before restorative materials. Boric acid (BA) is an antimicrobial, anti-inflammatory and antioxidant agent which might be used as an alternative to chlorhexidine (CHX) during restorative dental applications. The aim of this study is to evaluate the effects of CHX and BA as cavity disinfection agents on the shear bond strength of composite resin to human dentin.

**Materials and Methods:** Forty-eight extracted, noncarious third molars were used in this study. The occlusal surface of each tooth was prepared to expose superficial dentin. A standard smear layer was created by using 600,800 and 1200-grit silicon carbide (SiC) abrasive papers under tap water. Teeth were randomly divided into three groups according to the cavity disinfection agent used (n=16). As follows: Group 1: control (saline solution); Group 2: CHX (0.2 %); Group 3: BA (0.75%). The dentin surfaces were treated with the test solutions for 60 seconds. A bonding agent (GC Premio Bond, GC Corporation, Tokyo, Japan) was applied and resin composite (GC Bulkfill Injectable, GC Corporation, Tokyo, Japan) build-ups were created by using polyethylene tubes (1 mm diameter and 2 mm length). A shear bond strength test was applied to the samples until fracture. The data was calculated as MPa and was statistically analyzed using one-way ANOVA test.

**Results:** Findings of this study demonstrated that there were no significant differences between the groups ($p>0.05$). Mean values of the tested groups are 33,003(±15,273), 32,580(±10,494) and 35,650(±11,184) respectively. Neither CHX nor BA affected negatively the shear bond strength of the resin materials when compared to saline treated surface. BA treated samples have less cohesive failure (19%) in composite resin while comparing with CHX (25%) and saline (31%) groups.

**Conclusion:** Boric acid would be a suitable alternative as a substitute for CHX in terms of cavity disinfection. However clinical and laboratory studies are required to evaluate the effects of BA on the clinical performance of adhesives and long-term bond strength.

***Keywords:*** *Cavity disinfection, chlorhexidine, boric acid, shear bond strength*

**Evaluation of Shear Bond Strength of Microhybrid Composite Resin to DME Materials**

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**Introduction:** Evaluation of the shear bond strength of a microhybrid composite resin to different materials used for Deep Margin Elevation (DME).
**Materials and Methods:** Standard 2 mm deep and 3 mm wide cavities were created in 60 acrylic blocks. DME materials; Metafil Flo (Sun Medical, Japanese), Aura Easyflow (SDI, Germany) and Bulk Base Hard flowable composites (Sun Medical, Japan), Nova Compo HS Microhybrid composite (Imicryl, Turkey), RivaLigtcure HV resin modifies glass ionomer cement (SDI, Australia) and Equia Fort HT high viscosity glass ionomer cement (Tokyo, Japan) were applied to the cavities (n=10). The surface was sandblasted using 50 µm aluminum oxide with an Airflow (E.M.S. Electro Medical Systems, Swiss) device. In accordance with the manufacturer's instructions, 20 seconds of universal bond (Nova Compo-B Plus, Imicryl, Turkey) was applied and cured for 10 seconds. Composite ridges (Nova Compo HS) were created using standard teflon rings. For shear bond strength, a force of 1 mm/min was applied with a notch-shape apparatus (Ultradent) until fracture occurred at the bond interface of each sample. The Newton values obtained were converted to MPa by dividing the surface area and statistical analyzes were performed with the Oneway Anova test ($p<0.05$).
**Results:** The bond strengths of the groups were, respectively; Nova Compo HS 31.12MPa, Aura EasyFlo 25.67MPa, MetafilFlo 24.10 MPa, Bulk Base Hard 22.89 MPa, RivaLigtcure HV 21.42 MPa, Equia Forte HT 20.86 MPa. There was no statistical difference between the Shear Bonding values of Microhybrid Composite Resin to DME Materials ($P>0.05$).
**Conclusion:** Different types of restorative materials can be used for deep margin elevation prior to composite restoration.

***Keywords:*** *DME, Composite, Bond*

**Bond Strength and Stability of Universal Adhesives to Coronal and Root Dentin**

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This study evaluated the bond strength and stability of universal adhesives to cervical root dentin (deep margin dentin) and crown dentin.

This in vitro study used 80 extracted human molars. The teeth were cut under water cooling to obtain deep dentin surfaces at the coronal and root margins. After obtaining a standard smear layer on the dentin surface using 600, 800, 1000, and 1200 grit abrasives, the samples were embedded in acrylic resin with their occlusal surfaces exposed. Afterward, crowns and roots, 4 different dentin bonding systems (Clearfil SE Bond (CSE), Single Bond Universal (SBU), Prime&Bond Universal (PBU) and Tetric N-Bond Universal (TBU) and 2 different durations (24 hours, and 6 hours) months after aging in water) were divided into 8 groups to test the bond strength in. After adhesive systems were applied to the dentin surfaces in self-etch mode, blocks of 2 mm diameter and 4 mm height were prepared with a composite resin (Ceram.x Sphere TEC one). The other group was subjected to a fracture bond strength test after being kept in distilled water for 6 months. One Way Anova and Tukey HSD tests were used for statistical analysis of the data obtained (P=0.05). Two samples per group were prepared and examined under SEM microscopy to evaluate the morphology of the bonding interface.

All adhesive systems used in the study showed higher bond strength values to crown dentin compared to root dentin, both after 24 hours and 6 months. There was no statistically significant difference between the bond strength values of adhesive systems after 24 hours for both root and crown. After 6 months of aging, TBU found the most stable and highest bond strength in both crown and root, and the lowest bond strength was observed in the SBU group, and the difference between these two bondings was statistically significant. After six months of aging, the bond strength value remained stable for CSE, PBU, and TBU in root dentin, and only for TBU in crown dentin. After six months of aging, bond strength values of all adhesive systems decreased more in the crown than in the root.

***Keywords:*** *Bond Strength To Deep Margin, Bond Strength To Root Dentin, Deep Margin Elevation, Root Dentin, Universal Adhesive Systems.*

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# The Effects of Different Pediatric Iron Syrups on the Color Stability of Restorative Materials Used in Pediatric Dentistry

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**Introduction:** The aim of this study is to examine the effect of two different iron syrups on color stability in different restorative materials.
**Materials and Methods**: Using 3 different restorative materials (composite, compomer, and light-cured reinforcement glass ionomer cement) 15 specimens (8 mm x 2 mm) were produced for each. Each sample was kept at 37°C for 24 hours for rehydration. Specimens were divided into three solution groups (n=5) and immersed in two iron syrups (Ferrum Hausman and Ocean Microfer) and distilled water. Iron syrups were prepared to contain approximately 100 mg of iron in 250 ml of solution. Color changes between baseline and measurements at 4, 8, 24, 48, and 72 h were calculated with CIE L*a*b* parameters and then the color difference (ΔE) was calculated. The CIELAB system provides values for L*a*b*, where L* represents lightness, a* the red green axis, and b* the yellow-blue axis. Colour mesurements for all samples was obtained using a spectrophotometer (Minolta CM 3700d, Konica Minolta, Japan). The obtained data were evaluated statistically using Kruskal Wallis H test and Mann Whitney U test.
**Results**: The difference between the ΔE values of the restorative materials immersed in distilled water was statistically insignificant. The ΔE value of light cured reinforcement glass ionomer cement from the samples immersed in Ferrum Hausman solution was found to be significantly higher than the other samples. The difference between the ΔE values of the restorative materials in the control and Ocean Microfer groups was not statistically significant.
**Conclusion**: Ferrum Hausman iron syrup produced more coloration over 72 hours than Ocean Microfer syrup. Especially Ferrum Hausman iron syrup coloring on light-cured reinforcement glass ionomer cement material is significantly higher than other materials.

***Keywords:*** *Color stability, Restorative material, Iron syrup*

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## The Effect of Different Adhesive Cements and Restoration Materials on Tooth Stress: Fea

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**Introduction:** This study aims to investigate the stress distribution in sound first mandibular molar teeth with restored onlay cavities using hybrid ceramic (HC) and lithium disilicate porcelain (LDC), which are cemented with different adhesive cements.

**Materials and Methods:** The task involves the preparation of a mandibular right molar on a dentate model for an onlay restoration using recommended onlay cavity preparation parameters. The mandibular typodont model scanned (E4, 3Shape, Copenhagen, Denmark) and digital scan data was converted to an STL file, which was utilized to design an onlay restoration (Exocad Dental CAD2.2, exocad GmbH, Darmstadt, Germany). These files were transferred to the Abaqus program for stress analysis .A force of 600N was applied to the restored tooth to compare the stress distrubutions in dental tissues and dental materials as a result of the applied oclusal forced. We created six models using two different restoration materials (LDC,HC) and 3 different resin cements which has different elastite modulus an different poisson ratio. RC1=resin cement (variolinkII), RC2=resin cement (variolinkII,high poisson ratio), RC3= Experimental resin cement (high elastite modulus) Group1 (restoration material=LDC,RC1), Group2 (restoration material=LDC,RC2), Group3 (restoration material=LDC,RC3), Group4 (restoration material=HC,RC1), Group5 (restoration material=HC,RC2), Group6 (restoration material=HC,RC3).

**Results:** According to FEA results, the maximum stress value in the enamel (5.799 MPa) and cement (50.76 MPa) was observed in group5, while the maximum stress value in the restoration group was observed in group1 (125.60 MPa). The minimum stress value in the enamel was observed in group3 (3.449 MPa), while the minimum stress value in the cement was observed in group1 (33.97 MPa). The minimum stress value in the restoration was observed in group5 (89.44 MPa).

**Conclusion:** According to the study, the elastic modulus and Poisson's ratio of the restoration material and resin cement used have affected the distribution of stress that occurs. When using a hybrid ceramic with a lower elastic modulus and a resin cement with a lower elastic modulus, the highest stress values were observed in the enamel and cement, while the lowest stress values were observed in the restoration.

***Keywords:*** *onlay, finite element analysis (FEA), hibrid ceramic, lithium disilicate, elactic modulus,stress analysis,poisson ratio*

**Effect of Charcoal-based Dentifrices on Surface Roughness of a Composite Resin**

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**Introduction:** The use of charcoal-based dentifrices is growing in popularity, but there is a limited scientific data on their effects about composite restorations. The aim of this study was to investigate the effect of various charcoal-based dentifrices on the surface roughness of a composite resin.
**Materials and Methods:** Forty specimens (8 mm diameter x 2 mm thick) were obtained using a microhybrid composite resin (G-ænial Anterior, GC). The specimens were randomly divided into five groups (n=8): three charcoal-based dentifrices (Splat Special Blackwood, Prokudent Black Brilliant, and Colgate Optic White), one conventional dentifrice (Colgate Max Fresh) and distilled water. The specimens were subjected to the simulation for 4 minutes using an electrical toothbrush with a standardized force of 2 N. Surface roughness was measured with a contact type profilometer at baseline and after toothbrushing. A representative specimen from each group was visualized by a scanning electron microscope. Data were analyzed using one-way analysis of variance (ANOVA), paired sampe t-test, and Games Howell test ($p<0.05$).
**Results:** There was a significant increase in surface roughness after brushing with both Prokudent Black Brilliant ($p=0.003$) and Colgate Optic White ($p<0.001$) compared to baseline. Colgate Optic White caused significantly higher surface roughness compared to the other groups ($p<0.05$). Scanning electron microscope images confirmed the findings of surface roughness. Prokudent Black Brilliant and Colgate Optic White led to greater morphological changes in the composite surface.
**Conclusion:** The findings of the present study suggested that charcoal-based dentifrices could increase the surface roughness of the microhybrid composite resin and may impact the longevity of composite restorations accordingly. It may be recommended that patients are informed about the abrasive properties of charcoal-based dentifrices on their composite restorations.

***Keywords:*** *Charcoal-based dentifrice, composite resin, toothbrush, surface roughness, scanning electron microscope*

**Effect of Coffee on Color Stability and Translucency in Single-Shade Universal Resin Composites**

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**Introduction:** The aim of this study was to investigate the effect of staining by coffee on the color stability and translucency of different single-shade universal resin composites and a multishade universal resin composite.
**Materials and Methods:** In the study, 50 samples (n=10) were prepared from 5 different composite resins: Omnichroma(Tokuyama, Japan), Zenchroma(President Dental, Germany), Charisma Diamond One(Kulzer, Germany), Vittra APS Unique(FGM, Brazil), and Neo Spectra ST(Dentsply, North Carolina, USA).
Color changes (ΔE00) and translucency parameter (TP00) measurements were made with a spectrophotometer at baseline and after 24 hours of immersion in coffee. Color values were calculated using the CIEDE 2000 color formula. Data were analyzed by one-way ANOVA method and paired-samples t-test. ($p<0.01$).
**Results:** The highest color change was determined in the Vittra APS Unique group, and the lowest color change was determined in the Neo Spectra ST group in composite resin samples after 24 hours of immersion in coffee ($p<0.001$).
Among the composites baseline, Neo Spectra ST and Charisma Diamond One showed low TP values, respectively, and high TP values of Omnichroma and Vittra APS Unique, respectively ($p<0.001$). After coloration with coffee, Neo Spectra ST and Charisma Diamond One showed low TP values, and Omnichroma and Zenchroma had high TP values among composites, respectively ($p<0.001$).
**Conclusion:** As a result of short-term coloration, multi-shade universal composite resin showed less color change than Single-Shade Universal Composite Resins. Differences in color change and TP were detected between Single-Shade Universal Composite Resins

***Keywords:*** *Color Stability, Multi-shade universal composite resin, Single-Shade Universal Composite Resin, , Translucency parameter*

## Effect of Nano-silica on Bonding Properties of Dental Universal Adhesives

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**Introduction:** Dental universal adhesives are widely applied in restoration because of their ease of use and versatility. However, most of the dental universal adhesives are lack of adhesion strength and fatigue resistance. To enhance the bonding strength and durability, nano-silica was dopped into the adhesive system in this work. The relationships between silica content and adhesive-dentin bonding strength were investigated under varying adhesive film thickness.
**Materials and Methods:** Nano-silica with particle size of 50 nm were doped into the dental universal adhesives with weight contents of 0%, 1%, 2%, 3% and 4%. To evaluate the bonding strength between adhesive and dentine, 260 fresh cow teeth were selected and embedded in cylindrical molds with self-curing acrylic resin. To obtain a 3mm diameter dentin surface, the teeth surface was then ground and polished with abrasive paper up to 600 grit. The dentine was randomly divided into 26 groups, 10 in each, according to the adhesives film thickness of around 0, 4, 8, 12, 16, and 20μm, respectively. After coated with adhesive, the samples were lightly cured for 10s. Then, resin luting cements (RelyX™ Ultimate, 3M) were applied and polymerized on the adhesives film to form a cylinder (Φ3×4mm). Samples were stored in 37°C water for 24h before the shear bond strength of adhesive to dentin was measured. To evaluate the bonding durability, 10000 rounds 5/55ºC thermal cycling aging tests were also conducted. The surface morphology was analyzed via scanning electron microscope. The resulting data were analyzed through Multiple Factor ANOVA test (α=0.05, n=10).
**Results:** With the nano-silica content of around 2wt% and adhesive film thickness of around 8μm, the bonding strength between adhesive and dentine reached the maximum of 28 MPa. Meanwhile the adhesive strength did not decrease significantly after10000 rounds of thermal cycling aging tests.
**Conclusions:** Doping nano-silica can improve the bonding strength of dental universal adhesives, as well as the operation performances.

***Keywords:*** *nano-silica, universal adhesives, shear bond strength, dentin*

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**Evaluation of Shear Bond Strength of Calcium Silicate Based Materials**

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**Introduction:** Due to favorable biological and physical properties, calcium silicate-based cements are widely used as biocompatible materials in vital pulp treatments. This study aimed to evaluate the shear bond strength (SBS) of two resin-based calcium silicate-based cements to composite resin using different adhesive systems.
**Materials and Methods:** Sixty acrylic blocks with a hole in the centre (3mm in depth and 5mm in diameter) were prepared for the study and divided into two groups, depending on the calcium silicate cement used: TheraCal LC and TheraCal PT (Bisco, Schaumburg, IL, USA). The samples were subdivided into three groups (n = 10, each) according to three different adhesive systems as a two-step total-etch system (acid etching with 35% phosphoric acid + Single Bond 2 ( 3M ESPE, USA), two-step self-etch system (SE Bond, Kuraray, Japan) and a one-step self-etch system (Bond Force, Tokuyama Corp, Japan). Then, after adhesive placement, the restorative material Palfique Estelite Paste (Tokuyama, Japan) was placed over the capping material using acrylic block (3mm height and 3mm in diameter) and polymerised for 20 s. The restorated samples were kept at 37°C and 100% humidity for 48 h. SBSs were measured using a universal testing machine. Fracture modes were determined using a stereomicroscope at 25× magnification. Data were analyzed with Univariate Analysis of Variance and the Tukey HSD tests ($p<0.05$).
**Results:** TheraCal PT showed significantly higher SBS values than TheraCal LC among all adhesive strategies ($p < 0.0001$). Regardless of cements, the total etch adhesive system has statistically higher values than the two-step self-etch adhesive system ($p < 0.0001$). While there was a statistical difference between the self-etch adhesive groups in the ThereCal PT group, it was not in the ThereCal LC group. The most common type of failure in the TheraCal PT and TheraCal LC groups were mixed types.
**Conclusion:** It was concluded that ThereCal PT had better bond strength than ThereCal LC, regardless of adhesive systems.

***Keywords:*** *adhesive systems, calcium silicate based materials, composite resin, pulp therapy*

*No financial support was received for this study.*

**Effect of Sonic Application Mode on the Microtensile Bond Strength of Two Different Adhesive Systems**

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**Introduction:** The aim of this study was to compare the effects of sonic activation and slight rubbing action on the microtensile bond strengths (μTBSs) of an universal adhesive system and a self etch adhesive system to dentin.
**Materials and Methods:** Forty caries-free human molars were randomly divided into four groups (n = 10) according to the combination of the adhesive systems and application modes (slight rubbing action or sonic). Two different adhesive systems were used; universal adhesive system-Nova Compo B Plus [NC] (Imicryl, Turkey) and self-etching adhesive system-Clearfil SE Bond [SE] (Kuraray, Japan). The adhesive systems were applied with slight rubbing motion and sonic activation. Bonded teeth were restored with composite resin of the applied adhesive system. Resin composite buildups were bonded to teeth substrates after adhesive application. The bonded specimens were sectioned into beams 0.9 $mm^2$ after storage in water (24 hours/$370^0$C) and subjected to μTBS with a crosshead speed of 0.5 mm/minute.The mode of failure was determined under a stereomicroscope. The bond strength data were analyzed by two-way ANOVA and Tukey tests (α = 0.05).
**Results:** Statistically significant adhesive failures occurred in all groups.Under sonic application, the μTBS bond strength of the simplified universal adhesive system to dentin decreased significantly (P < 0.05), while the bond strength to dentin of the other two-stage self-etch adhesive system was unaffected.
**Conclusion:** Sonic application mode may exhibit different dentin adhesive bond results for different adhesive systems.

***Keywords:*** *sonic application, dental adhesive,rubbing motion,rubbing action*

**The Effect of Silver Diamine Fluoride (SDF) on The Immediate Shear Bond Strength of Self-Etch and Etch and Rinse Adhesives**

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**Introduction:** The non-invasive approach is increasingly important in adhesive dentistry. Silver diamine fluoride (SDF) is a topical fluoride solution used to arrest active caries and may prevent excessive dental tissue removal. this study aims to investigate the effect of SDF on the immediate shear bond strength of composite to dentin bonded with self-etch and etch and rinse adhesives.

**Materials and Methods**: 80 sound human third molars were cut below the CEJ and a demineralization cycle was performed on half of the samples. The samples were divided into four groups: sound dentin without SDF application, sound dentin with SDF application, demineralized dentin without SDF application, and demineralized dentin with SDF application. SDF 38 % was applied for 60 seconds and rinsed for 15 seconds. Either etch and rinse (OptiBond ™ FL) and self-etch (Clearfil SE Bond) adhesives were applied to the dentin according to the manufacturer's instructions. The composite was then placed in standard transparent cylinders and cured for 20 seconds. immediate Shear bond strength was measured using a universal testing machine. The type of failure in each sample was investigated by stereomicroscope and SEM. A three-way ANOVA test was used for statistical analysis. ($\alpha$=0.05)

**Results**: The highest average shear bond strength was observed in the sound dentin group without SDF application (26.63 ± 3.22 MPa). In contrast, the lowest average shear bond strength was observed in the demineralized dentin group with SDF application (67.18 ± 1.51 MPa). The sound dentin group had a significantly higher bond strength than the demineralized dentin group ($P < 0.001$). The use of SDF caused a significant reduction in the difference in shear bond strength between sound and demineralized dentin ($P < 0.001$). There was no significant difference in the type of failure between the groups ($P > 0.05$).

**Conclusion**: Demineralized dentin's immediate shear bond strength was significantly lower than that of healthy dentin. The use of SDF in both healthy and demineralized dentin decreased the shear bond strength. Clinicians should exercise caution when using SDF in conjunction with adhesive materials.

***Keywords:*** *SDF, Silver Diamine Fluoride, composite, self-etch adhesives, etch and rinse adhesives, bond strength*

## Shear Bond Strength of Clear Alıgner Attachments: Conventıonal vs Flowable

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**Objectives:** The objective of the present study was to evaluate the shear bond strength of different resin composite materials as clear aligner attachments. Comparison of flowable resin composites and conventional resin composites was also aimed in this study regarding the shear bond strength of clear aligner attachment systems.
**Materials and Methods:** Forty anterior teeth were randomly divided into 4 groups. The samples were polished with flour-free pumice for 10 seconds through a rubber cup, then rinsed and dried. Enamel surface was etched with 37% phosphoric acid gel for 30 seconds. After rinsing and drying, an adhesive agent (Nova Compo Ortho; Imicryl) was applied to etched surface based on the manufacturer's instructions. A transparent mold with 7.065 square millimeter diameter was used to create clear aligner attachments. The clear aligner attachment was created with Nova Compo O (Imicryl) in Group I, Spectra ST HV (Dentsply) in Group II, Vertise Flow (Kerr) in Group III, and T-Com Flow (Nexobio) in Group IV respectively. After application of each composite material, a total of 20 seconds of light curing was applied for polymerization (n=9). A universal testing machine (Devotrans Quality Control Test Equipment, Istanbul, Turkey) was used for measurement of shear bond strength. Comparison between all groups was analyzed by Nested ANOVA test. Probability value (p) below 0.05 was accepted as statistical significance
**Results:** Shear bond strength values were 16.84±5.86 for Group I (Nova Compo O), I5.98±6.78 for Group II (Spectra ST HV), 16.59±2.49 for Group III (Vertise Flow), and 24.57±6.65 for Group IV (T-Com Flow). T-Com Flow had statistically higher bond strength, and there was no difference between the other groups. In addition, no difference was found between conventional and flowable resin composite types ($p<0.05$).
**Conclusion:** There is no difference in bond strength between conventional and flowable resin composites for orthodontic clear aligner attachments. As T-Com Flow showed the highest SBS, it can be a promising option for bonding of clear aligner attachments.

***Keywords:*** *adhesion, clear aligner, resin composite, orthodontic, shear bond strength*

**Assessment of Toothpastes Through Simulated-Brushing for Surface-Roughness and Reversing-Back Composite-Discoloration**

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**Introduction:** Assessment of level of bleaching and abrasiveness for different toothpastes with various RDA values on discolored nanohybrid and microhybrid composite samples using a novel Press-on Force-Guided (PFG) Brushing Simulator.

**Material and Methods:** One-hundred-fourty disc-shaped samples were prepared using two nano-hybrid (NeoSpectraST-HV, RubyDent) and three micro-hybrid (Saremco, Gaenial-Achord, Charisma-Classic) composites and were divided into four subgroups randomly (n=7). The samples were immersed in a coffee solution for 144 hours (corresponding to 6 months of realtime consumption). The samples were brushed using the R.O.C.S. toothpastes with different RDA values [Sensitive Instant Relief (SIR), 30RDA; Sensation Whitening (SW), 100RDA, and their combination with PRO-Polishing (PP) 105RDA], by using PFG brushing simulator (Marmara University, Turkey) for 140 strokes (correspondence to one-week of realtime brushing), under 300-320g. Surface roughness (Ra) and color change (DE) were measured before and after simulated-brushing. Color changes were evaluated in Photoshop-CC software through $\Delta E_{00}$* values generated from L*,a*,b* parameters on photographs taken by mobile photography tool (MDP-2). Surface structure of samples were measured before and after brushing using a profilometer (MarSurf-PS,10,Mahr). Measurements were analyzed in SPSS-V23 software. Analysis of Variance and Bonferroni Test were used ($p<0.05$).

**Results:** Regarding the RA comparisons between toothpastes, no significant differrence was observed for any between initial and after-discoloration scores ($p\geq0.05$). A significant difference was observed between intial and after-brushing for SW ($p=0.020$), whereas SW+PP presented no significant difference ($p=0.262$). A'chord and Charisma demonstrated lower RA at baseline whereas Saremco and Ruby had higher. Regardless of the toothpaste type, all composites presented unacceptable color changes ($PT\geq1.8$). Charisma presented significantly lower $\Delta E$ among all regarding initial and after-brushing comparisons ($p<0.001$). Between discoloration and after-brushing scores, regardless of composite, all toothpastes changed discolored composite color ($\geq1.8$) after brushing. $\Delta E$ of SIR was significantly lower than SW and SW+PP toothpastes ($p=0,010$). Whereas, SIR+PP presented no significant difference compared to SW and SW+PP ($p\geq0.05$).

**Conclusion:** Toothbrushing with such toothpastes, may have a positive effect on reversing-back the discoloration of the composite materials. R.O.C.S. PRO Polishing agent may reduce the surface roughness of the composites as well as increasing the whitening effect by enhancing the color recovery.

***Keywords:*** *Abrasion, brushing simulator, color change, discoloration, surface roughness, whitening toothpaste.*

## Cytotoxicity of Composite Materials on Gingival Fibroblast Cells

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**Introduction:** There is a loss of substance in the teeth due to reasons such as caries, wear and fracture. When restoring teeth, composite resins are chosen for reasons such as aesthetics, completion in one session, and easy application. In restorations extending to the gingival and subgingival region, composite resins interact with gingival fibroblasts. It was aimed to evaluate the cytotoxic effect of composite resins used in this study on human gingival fibroblast cells.
**Materials and Methods:** In this study, the cytotoxicity effect of OptiShade*(Kerr Dental, USA)*, Filtek Universal Restorative*(3M ESPE, USA)*, G-aenial Posterior*(GC, Japan)*, Charisma Smart*(Heraeus,Kulzer, Germany)* materials, which are 4 different composite types according to their contents and filler ratios, on human gingival fibroblast cells (Hgf) was evaluated with MTT analysis at 24-hour and 1-week time intervals. In the analysis of the data, one-way analysis of variance (ANOVA) method was used to determine the interactions of variables with the control group. Statistical significance was assessed at $p < 0.05$.
**Results:** As a result of the study, Filtek Universal Restorative*(3M ESPE, USA)* showed 97%, Optishade*(Kerr Dental, USA)* 94%, G-aenial Posterior*(GC, Japan)* 89%, Charisma Smart*(Heraeus,Kulzer, Germany)* 81% cell viability.
**Conclusion:** There is a need to improve the biocompatibility of the materials.

***Keywords:*** *biocompatibility; composite resin; cytotoxicity; fibroblasts*

**Effect of Saliva and Ferric Sulfate Contamination on Immediate Dental Sealing**

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**Introduction:** It is recommended to seal freshly cut dentin surfaces with a dentin bonding agent (DBA) between sessions of indirect restorations (IDS). Contamination of the dentin surface prior to DBA application with various agents, such as saliva, may affect the bond strength of DBA to dentin. The aim of this study; To evaluate the effect of saliva and ferric sulfate contamination of the dentin to be IDS on the bond strength of the indirect restoration to dentin.
**Materials and Methods:** Caries-free molars were cut horizontally to obtain smooth dentin surfaces and divided into 4 groups according to the surface treatment before temporary restoration: Group1: Contamination with saliva and ferric sulfate (SFC)+IDS, Group2: SCF Group3: IDS Group4 : Non-treatment. IDSs were made with a universal adhesive system (Prime&Bond, Dentsply Sirona) in self-etch mode. Then, all dentin surfaces were covered with light-cured temporary filling material (DiaTemp). After 1 day, the temporary filling material was removed, and the surfaces were washed with water for 5 seconds and dried. Then, composite blocks with a radius of 1mm were adhered to the dentin surfaces with the same universal adhesive in self-etch mode. Teeth were subjected to shear breaking test after they were kept in distilled water for 24 hours. Data were analyzed by one-way Anova analysis and multiple comparison Post Hoc (Tukey) tests ($p < 0.05$).
**Results:** The highest bond strength values were obtained in the untreated group (21.12 MPa). In the uncontaminated groups, the non-IDS group (21.12 MPa) showed higher bond strength than the IDS group (12.03 MPa). In the contaminated groups, the group with IDS (17.7 MPa) showed higher bond strength than the group without IDS (7.3 MPa). In groups without IDS; The bond strength of the uncontaminated group was higher than the contaminated group. Debonding was between two bond layers in groups with IDS, and at the resin-dentin interface in groups without IDS. There was no significant difference between the IDS groups.
**Conclusion:** Contamination did not affect the bond strength of the restoration to dentin in IDS groups. Failure in IDS groups; It was between IDS and resin, and in groups without IDS; it was between dentin and resin.

***Keywords:*** *Composite Resin, Contamination, Dentin Bond Strenght, Immediate Dentin Sealing*

**Adhesive Strategies'' Impact on Discoloration due to Regenerative Endodontics: A Pilot Study**

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**Introduction:** The purpose of this in vitro study is to compare the impact of different adhesive strategies on preventing discoloration caused by mineral trioxide aggregate (MTA) in regenerative endodontic treatment.
**Materials and Methods:** Materials and Methods: Fifty extracted human incisors were prepared, and access cavities were created. The specimens were randomly allocated to five groups (n = 10) and applied different adhesive strategies: Group 1; (control) without surface treatment, Group 2; Optibond FL etch and rinse adhesive, Group 3; Clearfil SE adhesive, Group 4; Optibond XTR universal adhesive with etch and rinse mode, Group 5; Optibond XTR universal adhesive with self-etch mode. Discoloration prevention strategies were applied to the coronal portion, and the root canals were filled with human blood obtained from a volunteer. A collagen barrier and Pro Root MTA were subsequently placed in the root canals of each sample. Color measurements were taken using spectrophotometry at three-time points: initial, 1 week, and 4 weeks. Color differences (ΔE) were calculated and analyzed.
**Results:** Discoloration was visually noticeable in all teeth after 1 and 4 weeks. All groups, except for Clearfil SE Bond, exhibited significant differences compared to the control group ($p < 0.05$).
**Conclusion:** In conclusion, the use of universal adhesive groups with etch and rinse and self-etch modes resulted in less discoloration compared to the control group. Adhesive systems and application modes demonstrated varying effects in preventing discoloration in teeth undergoing regenerative endodontic treatment.

***Keywords:*** *Discoloration · Dentin tubule occlusion · dentin bonding . MTA*

## DENTAL MATERIALS – POSTER PRESENTATIONS

*DP1*

**Influence of Aging on Nanohybrid Composite's Surface Roughness Polished with Different Systems**

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**Introduction:** This in-vitro study aimed to evaluate the effect of polishing systems and aging on surface roughness (Ra; µm) and surface morphology of 2 nanohybrid composites (Harmonize; Kerr; H and Essentia;GC; E) polished with multi-step disc (Optidisc; Kerr; OP), two-step elastomer spiral (Sof-Lex Spiral; 3M ESPE; SS) and silicon-coated one-step rubber (OneGloss; Shofu; OG) polishing systems.
**Material and Methods:** 60 composite discs were prepared using a metal mold in 2mm thickness and 10mm in diameter (n=30 each composite), polymerized (Demi Ultra; Kerr) and stored in distilled water at 37 oC for 24 hours. Following storage, all the specimens were wet finished using 320-grit SIC papers (Buehler) and then each composite group was randomly divided into 3 subgroups (n=10) according to the polishing system used. Initial Ra was evaluated with a profilometer (Perthometer; Mahr 2) and then all the specimens were stored in distilled water at 37 oC for 4 years. After aging Ra was remeasured. Initial and aged surface morphology of the composites were evaluated using scanning electron microscopy (SEM JSM 6335F; JEOL). Data were analyzed using Wilcoxon, Mann-Whitney U and Kruskal-Wallis tests ($p<0.05$).
**Results:** Ra was significantly influenced by the type of the polishing system and aging ($p<0.05$). Regardless of the type of polishing system, aging significantly increased Ra in H and E. Two-step elastomer spiral (SS) showed significantly lower Ra (0.0744±0.0047; 0.097±0.024) than multi-step disc (OP) (0.0791.±0.0051; 0.157±0.059) and silicon-coated one-step rubber (OG) (0.0855±0.0033; 0.195±0.068) systems initially and after aging in H respectively ($p<0.05$). Regarding E, initially OP resulted significantly in the lowest Ra (0.0731±0.0038) ($p<0.0001$), while SS (0.0788±0.0045) showed statistically similar Ra with OG (0.0815±0.0022) ($p=0.270$). After aging, OP (0.144±0.051) yielded statistically similar Ra to SS (0.138±0.03) ($p<0.05$), which was significantly lower than OG (0.209±0.061) ($p=0.034$).
**Conclusion:** Aging significantly increase the surface roughness of nanohybrid composites regardless of the type of the polishing system used. However, polishing systems with reduced number of steps still tend to result in higher surface roughness compared to the gold standard multi-step disc systems initially and after aging.

***Keywords:*** *surface roughness, aging, nanohybrid composites, polishing system*

**Effect of Cavity Liner Materials Application on Cuspal Deflection**

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**Introduction:** This study aimed to compare the effect of different cavity liner materials on the cuspal deflection of human premolars restored with sonic-activated bulk fill composite resin material (SonicFill 2 (SF), Kerr, USA) at different time intervals.
**Materials and Methods:** Standardized Class II mesio-occluso-distal cavities were prepared (n=60). Teeth were randomly allocated to four groups(n=15). Group1: Control (no cavity liner), Group2: Conventional flowable composite (Charisma Flow (CF), Kulzer, Germany), Group3: Resin modified glass ionomer cement (Ionoseal (IS), Voco Germany Group4: Self-adhesive flowable composite (Vertise Flow (VF), Kerr, USA). In Group 1, universal adhesive (Gluma Bond Universal (GBU), Kulzer, Germany) was applied with the selective etch method and then restored with SF. In Group 2, GBU was applied with the selective etch method, and then CF was applied (1mm) and polymerized. In Groups 3 and 4, IS and VF were applied (1 mm) then GBU was applied. All teeth were restored with SF. Intercuspal distance between cusp tips was measured after cavity preparations (T0). Then cuspal deflection was measured at initial (T1), 5 min (T2), 24 h (T3), one week (T4), and two weeks (T5). All cuspal deflection measurements were performed by a digital micrometer (Asimoto, Sowa Tool & Machine Co. Ltd., Ontario, Canada). Data were analyzed by repeated measures ANOVA and Bonferroni correction test ($p<0.05$).
**Results:** No significant differences were identified between the groups when the mean cuspal deflection after cavity preparation of the teeth was compared ($p=0.417$). There was no statistically significant difference between Group 2 and Group 4 among different time intervals. The cuspal deflection at T1 and T2 was significantly lower than T0 for Group 1 and Group 3. ($p<0.05$). No significant difference was found at all time intervals except T0 ($p>0.05$).
**Conclusion:** It can be concluded that flowable liners act as a stress reliever. Applying a 1 mm layer of the self-adhering and conventional flowable composite can be recommended with sonic-activated bulk-fill composite.

***Keywords:*** *Cuspal deflection, Self-adhering flowable composite, Conventional flowable composite, Sonic fill bulk fill composite, Resin modified glass ionomer cement*

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**Dentin Bond Strength of Two Adhesive Resin Systems with Experimental Mussel-Biomimetic Primer Under Wet Conditions**

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**Introduction:** This in-vitro study measured and compared the effect of an experimental mussel-biomimetic primer on dentin bond strength of two different adhesive resin systems under wet surface conditions.
**Materials and Methods**: Occlusal surfaces of non-carious human molars were ground to create flat surfaces. After root removal from cemento-enamel-junction, the teeth were sectioned to prepare 4 dentin specimens per tooth. Each specimen was embedded in cylindrical molds with acrylic resin until parallel to the base of the mold. Dentin surfaces were polished with #600-grit silicon carbide paper to create standard smear layers. A total of 160(n=20) samples were prepared and split into eight groups. Four groups were tested using an etch-and-rinse adhesive system (Optibond Solo Plus, Kerr, USA), and the other four were tested using a self-etch adhesive system (Clearfil SE Bond, Kuraray, Japan). Each adhesive group was divided into the same subgroups - dry and wet applied adhesive resin system and dry and wet applied mussel-biomimetic primer with adhesive system. In the Clearfil SE groups, the mussel-biomimetic primer replaced Clearfil primer. Water was brushed onto dentin surfaces to mimic wet conditions for wet groups. Cylindrical composite samples (2.1mm diameter, 3 mm height) were bonded to the dentin surfaces by packing a composite resin material into cylindrical shaped plastic matrices and light cured. SBS was determined at a crosshead speed of 0.5mm/min and expressed in MPa. ANOVA and Pair wise comparison with Tukey tests were used for statistical analysis.
**Results:** Mean MPa SBS values were as follows: Dry Optibond 16.5 ±4.8 and Dry SE Bond 18.8±5.1. On wet surfaces, the bond strength values significantly dropped in Optibond to 11.7± 4.5 ($P<0.05$). On the other hand, bond strengths of Optibond with experimental primer increased to 14.9±1.7 in wet group. Similarly, SE Group bond strength values dropped to 16.8±5.8 in wet group, but the difference between dry and wet groups was not significant ($P>0.05$). However, with the experimental primer bond strengths in wet group increased to 19.0±2.1.
**Conclusion:** The results reveal that adhesion of mussel-biomimetic primer is promising when managing dentin bonding of resin under wet conditions, and the primer may be a good alternative to regular primers of adhesive systems.

***Keywords:*** *dentin, adhesion, primer, mussel, biomimetic, optibond, clearfil*

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**Evaluation of Fluoride Release from Two Different Glass Ionomer Cement**

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**Introduction:** This study aimed to investigate the fluoride release of two different glass ionomer restoratives.
**Materials and Methods:** According to the power analysis conducted before the study, 8 samples were included in each group. Ketac Molar Easymix (3M ESPE, Germany) and Fuji II LC (GC, Tokyo, Japan) were mixed according to the manufacturer's instructions and replaced in plexiglass molds. Then Fuji II LC was light-cured with Elipar Deep Cure S (M Oral Care, St. Paul, MN, USA) for 20 s. Half of the samples were immersed in distilled water for 3 months and the other half were in hydrochloric acid (pH:2) in order to mimic the oral environment in gastro-osefageal reflux patients. Fluoride levels of solutions were determined via the spectrophotometric method by using a "Hach Lange DR 3900 Spectrophotometer" with a wavelength range of 320–1100 nm and "Hach Lange LCK 323 Cuvette Test" with a measurement range of 0.1–2.5 mg/L. Independent samples t-test was used to intra-group comparisons of normally distributed data, and Mann-Whitney U tests were used to compare non-normally distributed data.
**Results:** Fluoride release of Fuji II LC in distilled water was significantly higher than Ketac Molar Easymix (p=0.002). On the other hand, the fluoride release of Ketac Molar Easymix was found to be significantly higher than Fuji II LC in hydrochloric acid (p=0.000). The fluoride release of Fuji II LC in distilled water was significantly higher than hydrochloric acid. On the contrary, Ketac Molar Easymix releases more fluoride in hydrochloric acid than distilled water (p=0.023).
**Conclusion:** Various glass ionomer cements can release fluoride at different levels. According to the material type, the pH of the environment is effective in fluoride release.

***Keywords:*** *Glass ionomer, Fluoride release*

**Effect of mouthwashes on color stability of direct and indirect composites**

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**Introduction:** This study aimed to investigate the effect of various mouthwashes on the color stability of direct and indirect composites.
**Materials and Methods:** According to the power analysis performed before the study, a total of 54 samples were included (n:6). The study groups were: Anterior Composite (Gradia Direct Anterior, GC, Japan), (AC), Universal Composite (SolareX, GC, Japan), (UC), Indirect Composite (Gradia Indirect, GC, Japan), (IC), and CAD/CAM Composite (Cerasmart, GC, Japan), (CC). Direct and indirect composite specimens were produced in disc-shaped molds. Direct composites were polymerized with Elipar Deep Cure S (3M, USA) and indirect composites were polymerized in an extra-oral oven. CAD/CAM composite blocks were cut 2 mm thickness with a precision cutting device (IsoMet 1000, USA). The surfaces of all samples were subjected to the same polishing procedures. The initial color measurement was performed with a spectrophotometer (VITA Easyshade V; VITA Zahnfabrik). Subsequently, samples were immersed in Colgate Plax (Colgate/Palmolive, Brazil), Listerine Cool Mint (Warner-Lambert Co, USA), Sensodyne (Stanfford-Miller, UK), Oral-B 3D (Procter & Gamble, Germany), and Meridol (CP GABA GmbH, Germany) mouthwashes and distilled water for a period corresponding to 1 year of application. Color measurements were repeated and analysis of variance was performed for statistical analysis ($p<0.05$).
**Results:** When the amount of color change was evaluated, a significant difference was observed between all materials and solutions ($p<0.001$). In addition, the interaction of materials and solutions together had a significant effect on color change ($p<0.001$). No significant difference was observed between the amount of coloration caused by various mouthwashes in the AC group. Colgate Plax caused significantly more discoloration in the UC and IC groups. The least color change values were obtained in the CC group.
**Conclusion:** The findings of this study revealed that mouthwashes, which play an important role in maintaining periodontal health, may cause staining on resin composite restorations. Furthermore, the fact that the amount of color change of CC was less than other groups indicates that color change also depends on the structural properties of the resin composite.

***Keywords:*** *Direct composite, Indirect composite, Coloration*

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**Repair Strength of CAD/CAM vs 3D-Printed Materials with Bulk-fill Composites**

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**Introduction:** The frequent use of indirect materials such as 3D-Printed materials and CAD/CAM composite blocks has increased the importance of their repairability. The aim of this *in vitro* study was to investigate the shear bond strength (SBS) of repaired CAD/CAM blocks or 3D-Printed materials with resin composites and the effect of thermocycling procedure on SBS.

**Materials and Methods:** A hybrid CAD/CAM block (Grandio Blocks/GB, VOCO), and a 3D-Printed material (VarseoSmile Crown Plus/VS, Bego) were used in this study. Following preparation (14.5x7x3mm) and thermocycling (1500 cycles, 5-55°C, dwell time 20s) of the samples, the surfaces were roughened with 50-µm $Al_2O_3$ particles (10s, 1.5-bar, 15-mm distance). The specimens were then repaired using thermo-viscous VisCalor/VC (VOCO) and flowable Charisma Bulk Flow ONE/BO (Kulzer) bulk-fill resin composites (n=10/per group) with the materials' own adhesive systems (Gluma Universal Bond, Kulzer; FuturaBond U, VOCO). Resin composites were placed onto the roughened surface using cylindrical silicone molds (4x4mm) for the repair procedure. Samples were assigned into two subgroups and the thermocycling procedure was repeated in only one group. The other group was not exposed to thermocycling and was described as the immediate group. All groups were loaded in an AGS-X Universal testing machine (Shimadzu; crosshead speed 1mm/min) until failure occurred. Leica MZ 75 stereomicroscope (Leica Microsystems; 20x magnification) was used for the determination of the failure type. Shapiro-Wilk, ANOVA, Fisher's Exact, and Fisher Freeman Halton tests were used for statistical analysis with the significance level $p<0.05$.

**Results:** No statistically significant difference was found between the repair bond strengths of indirect materials and direct composites ($p>0.05$). The mean SBS values in decreasing order were VS-B0(13.84±4.90)>VS-VC(11.61±6.03)>GB-VC(10.62±2.67)>GB-BO(9.85±4.41). Repair bond strength was not affected by thermocyling in any of the indirect materials used in the study. ($p>0.05$). For VS and GB, cohesive-type fracture was generally observed in group which was not subjected to thermocycling, while adhesive-type fracture was more common in thermocycled group.

**Conclusion:** The bulk-fill composite resins used in this study did not affect the repair procedure of Grandio Block and VarseoSmile Crown Plus. Although thermocycling did not affect the repair bond strength, it had a decisive effect on the failure type.

***Keywords:*** *Keywords: Bulk-fill Composite, CAD/CAM Block, Repair Bond Strength, 3D-Printed Material.*

*There is no institution that supports our research.*

## The Effect of Thickness on the Optical Properties of Milled Zirconia Ceramics

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**Introduction:** Relevance of the problem and aim of the work. Introduction of translucent zirconia had an impact on its use in aesthetic dentistry, though its optimal optical properties need to be studied further. The thickness of the restoration itself is important for the strength and aesthetics. The aim of this study was to evaluate the main optical parameters of monolithic translucent zirconia of different thicknesses and determine its role in aesthetic and prosthetic dentistry.
**Material and Methods:** A total of 26 zirconia specimens of 5 different thicknesses (0,5; 1; 1,5; 2; 4 mm) and 3 different substrates (metal, composite A2 and A4 colour) were fabricated for this study. A spectrophotometer was used to determine main optical colour parameters (CIELab) in different variations, zirconia transparency (TP) and how different thickness zirconia ceramics covered various substrates (ΔE). Pearson correlation, 2-way ANOVA and post hoc tests (α=0.05) were used for statistical analysis.
**Results:** The study showed a significant correlation between thickness and colour parameters for most variations. It was also noted that TP significantly decreased as the thickness increased (Pearson correlation -0,988; p=0,012 for A1 and -0,994; p=0,006 for A3). Furthermore, ANOVA analysis showed that the masking ability of substrates was significantly influenced by zirconia thickness and substrate colour ($p<0,05$ in all cases, even $p<0,01$ in most cases). Moreover, it was determined that these ceramics are not effective enough in blocking the colour of metal ($\Delta E>3,4$ in all cases on metal) but the thickness of 1 mm is enough to mask tooth colour substrates ($\Delta E<3,4$ on tooth coloured substrates, even $\Delta E<1,5$ for A1 zirconia).
**Conclusion:** Thickness and substrate colour substantially influence the final appearance of ceramic restorations. Monolithic translucent zirconia can be used to mask tooth colour substrates, however alternatives should be considered for masking metal abutments. Optimal masking properties of zirconia on tooth colour substrates allow to perform less invasive preparations for excellent aesthetics.

***Keywords:*** *translucent zirconia, yttria stabilized tetragonal zirconia, translucency, color stability, optical property*

**Silver Diamine Fluoride affects the Bonding of a Self-Etch Adhesive to Carious-Dentin**

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**Introduction:** To evaluate the effect of silver diamine fluoride (SDF) after different storage periods on the microtensile bond strength (MTBS) of Clearfil SE Bond 2 (SE2) to sound and affected dentin.
**Materials and Methods:** Flat mid-coronal dentin surfaces of sound and carious lesion (D2) molars were prepared. The caries tissue was firstly removed with round burs and hand-excavators following the selective removal technique. The remaining coronal hard tissues were sectioned, leaving the carious surface. The samples were randomly divided into two major control groups, sound dentin (SD; n=5) and carious dentin (CD; n=5), without SDF application. Experimental SDF groups were prepared considering substrate type (n=5) and storage periods (immediate, 1 and 2 weeks; n=5 per group). The SDF was applied on dentin surfaces in all experimental groups according to the manufacturer's instructions. The samples from the experimental groups were stored under simulated pulpal pressure using a simulated body fluid solution for up to 2 weeks. The flat surfaces from all groups were bonded with Clearfil SE Bond 2 (Kuraray Noritake), and 5-mm height resin build-ups were constructed. After distilled water storage for 24 h, samples were prepared to a microtensile bond strength (MTBS) test. Failure modes and resin-dentin interfaces were observed using a scanning electron microscope (SEM S-4000, HITACHI). Data were analyzed by One-Way ANOVA and Tukey HSD tests ($a$=0.05).
**Results:** The MTBS results showed statistically significant differences between groups ($p<0.001$; $F=4.135$). The SD group resulted in the highest bond strength (20.31 ± 3.11 MPa), and the SDF-applied group on sound dentin, and particularly immediate restored (11.42 ± 2.31MPa), presented the lowest values. The groups regarding carious dentin treated with SDF showed bond strength values ranging from 17.34 to 18.62 MPa, which were not significantly different from the SD group.
**Conclusion:** The results suggest that SDF applications on carious dentin improved the bond strength of a 2-step self-etching adhesive, reaching similar features than those observed in SD and regardless of the time between the SDF application and restoration.

***Keywords:*** *dentin, silver diamine fluoride, biomineralization, dental caries, microtensile bond strength test*

**Evaluation of Radiopacity of Bulk fill Composites Using Digital Radiography**

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**Introduction**: The aim of this study was to evaluate the radiopacity of different bulkfill composites using digital imaging.
**Materials and Methods**: Ten standart disc specimens (5×1 mm) were prepared from each of the following materials: X-tra base (Voco), Olibulk Fill (Olident), X-tra fil (Voco), EverX flow (GC), Admira Fusion X-base (Voco), Admira Fusion X-tra (Voco), Sonicfill 3 (Kerr), Beautifil Bulk, (Shofu), VisCalor bulk (Voco), EverX Posterior (GC), Tetric N-Flow Bulkfill (Ivoclar Vivadent), Tetric N-Ceram Bulkfill (Ivoclar Vivadent), Tetric EvoCeram Bulkfill (Ivoclar, Vivadent), 3M Filtek Bulkfill (3M). Following polymerization of the samples using a LED curing unit (1000 mW/cm$^2$; VALO Wireless LED, Ultradent) they were polished using Finishing Discs (Bisco) and kept in distilled water for 24 h. For the radiographic exposures a storage phosphor plate (size 4; 5.7x7.6 cm) and an X-ray machine at 70 kVp and 7 mA were used. The object to focus distance was 30 cm, the exposure time was 0.2 s. Radiographic densities of each step of the aluminum wedge, enamel, dentin, and the samples were measured digitally using the histogram function of the software available with the system (DBSWIN 5.12.0). The radiopacity values were calculated as the equivalent thickness of aluminum. Data were analyzed statistically (IBM SPSS V23) with Shapiro-Wilk, Kruskal Wallis, and Dunn tests with the significance level set at $p<0.05$.
**Results**: Statistically significant differences were detected between the radiopacity values of the tested bulkfill composites ($p<0.05$) with Tetric N-Ceram (4.15±0.34) showing the highest value and EverX Flow (1.67±0.8) the lowest. All of the tested bulkfill composites showed radiopacity values greater than the radiopacity of dentin and higher than 1 mm thickness of aluminum.
**Conclusion**: The radiopacity values of the materials used in the study met the minimum standard values recommended by the International Standards Organization and the American National Standards Institute / American Dental Association.

***Keywords:*** *Aluminum stepwedge, bulkfill composite, digital radiography, radiopacity,*

## Radiopacity of Single Shade Universal Composites Using Digital Radiography

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**Introduction:** This study was aimed to compare the radiopacity values of single shade universal composite resins (SsUCR) using digital imaging method. The radiopacity of a composite material is recommended to be equal or slightly higher than that of enamel, the Al equivalence of which is approximately twice the Al equivalence of dentin for an optimum contrast and the ideal detection of secondary caries in radiographs.
**Materials and Methods:** Specimens (5x1 mm) were prepared from the following SsURCs: Omnichroma (Tokuyama), Charisma Topaz One Shade (Kulzer), Charisma Diamond One Shade (Kulzer), Vittra APS Unique (FGM), Essentia Universal (GC), Zenchroma (President Dental), Admira Fusion X-tra (Voco), Optishade (Kerr), Olident One Shade (Olident), Sonicfill 3 (Kerr) (n=10). Polymerization of the samples with a LED curing unit (1000 mW/cm$^2$; VALO Wireless LED, Ultradent) was followed by polishing using Finishing Discs (Bisco) and immersion in distilled water for 24 h. Radiographs of the specimens were taken together with 1-mm-thick tooth slices and an aluminum step wedge using a digital imaging system. For the radiographic exposures, a storage phosphor plate (size 4; 5.7x7.6 cm) and a dental x- ray unit at 70 kVp and 7 mA were used. The object-to-focus distance was 30 cm, and the exposure time was 0.2 seconds. The gray values of the materials were measured using the histogram function of the software available with the system (DBSWIN 5.12.0), and radiopacity was calculated as the equivalent thickness of aluminum. Data were analyzed statistically (IBM SPSS V23) with Shapiro-Wilk, Kruskal Wallis, and Dunn tests. The significance level was set at $p<0.05$.
**Results:** There were statistically significant differences between the tested SsURCs ($p<0.05$). Charisma Topaz One Shade provided the highest radiopacity value (4.02±0.18), whereas Omnichroma showed the lowest (2.08±0.19). The SsURCs used in this study showed greater radiopacity values compared to radiopacity of enamel and dentin.
**Conclusion:** All of the tested SsURCs provided radiopacity values that are higher than those of dentin and 1-mm-thick Al and thus met the ISO 4049 and ANSI/ADA standards. As the radiopacity values of SsURCs are greater than dentin and enamel, it is not possible to misinterpret them as secondary caries lesions.

***Keywords:*** *Aluminum stepwedge, digital radiography, radiopacity, single shade universal resin composites*

## Degree of Conversion of Luting Materials Under CAD/CAM Blocks

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**Introduction:** The aim of this *in vitro* study was to evaluate the degree of conversion of dual-cured luting cement (Bifix QM, Voco) and flowable composite (GrandioFlow, Voco) under lithium disilicate glass-ceramic (Emax, Ivoclar Vivadent) and hybrid (Grandio Blocs, Voco) CAD/CAM blocks with different thicknesses.
**Material and Methods:** Disc-shaped CAD/CAM blocks with a diameter of 8 mm and two different thicknesses of 1.5 and 2 mm were used in this study. Bifix QM and GrandioFlow (n=3, per material) were polymerized through 1.5- and 2-mm thick CAD/CAM materials. Twenty-four samples with standard thicknesses were achieved by placing 2 adhesive tapes (3M) between the glass plate and mylar strip was used in this set up. The luting cement and flowable composite were polymerized from the upper surface of the blocks using a LED-curing unit (1000 mw/cm$^2$, Valo Cordless, Ultradent) by closing the periphery. Samples were stored in distilled water at 37°C for 24 hours. Luting materials (100 µm thickness) were examined by Fourier Transform Infrared Spectroscopy (Spectrum Two FT-IR Spectrometer, PerkinElmer) analysis and the degree of conversion (DC) were calculated. Data were analyzed with SPSS V23, One-way Anova and Kruskal Wallis tests with the significance level $p<0.05$.
**Results:** No significant difference was found in DC between Bifix QM (34.68 ± 13.21; 24.94 ± 1.93) and GrandioFlow (41.33 ± 2.28; 38.07 ± 4.57) when using 1.5 mm Emax (p=0.476) and GrandioSo (p=0.050), respectively. DC of GrandioFlow (37.94 ± 5.33) was significantly higher than Bifix QM (23.36 ± 2.03) with Emax-2 mm (p=0.011). DC of Bifix QM was found to be similar under 1.5 mm (p=0.306) or 2 mm (p=0.051) thicknesses of both Emax and GrandioSo. The difference in DC values of GrandioFlow did not show statistically significance for 1.5 mm and 2 mm thicknesses under GrandioSo and Emax (p=0.275; 0.488, respectively)**.**
**Conclusion:** Within the limitations of this *in vitro* study, it is important to select the proper luting material considering the structure and thickness of the CAD/CAM restoration, along with manufacturers' instructions.

***Keywords:*** *CAD/CAM block, degree of conversion, dual-cure resin cement, flowable composite, lithium dislocate glass-ceramic, luting material, nano-ceramic hybrid*

**Clinical performances of 3-different tooth-colored restorative materials in Class-II cavities**

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**Introduction:** This clinical trial aimed to comparatively investigate the clinical performances of 3 different tooth-colored restorative materials in the treatment of Class II cavities after 6 months.
**Materials and Methods:** Twenty five patients (10 male, 15 female) with the mean age of 23.68 ± 6.16 (Median=23) received 75 Class II restorations: 1-Alkasite (Cention N, Ivoclar, Schaan, Liechtenstein) (n:25), 2-Glass hybrid (Equia Forte HT, GC, Tokyo, Japan) (N:25) and 3-Posterior resin composite (Gradia Direct Posterior, GC, Tokyo, Japan) (n:25) under rubber-dam isolation. One operator performed all the restorations following the instructions of the manufacturers and the restorations were blindly evaluated by two examiners according to the FDI criteria after 1 week (baseline) and 6 months. Data were analysed by Chi-Square test. $P<0.05$ was considered as significant.
**Results:** Recall rate was 100% at baseline and at 6 months. At baseline, all restorations were scored as clinically excellent regarding esthetic, functional and biological properties ($p>0.05$). However; at 6-month recall, only 2 alkasite and 1 glass hybrid restorations showed clinically good scores in terms of surface gloss/luster and roughness ($p>0.05$).
**Conclusion:** After 6 months, alkasite, glass hybrid and composite resin restorative materials showed similar succesful clinical performances in the restoration of class II cavities.

***Keywords:*** *Alkasite, glass hybrid, posterior resin composite, class II cavity*

## Evaluation of Fluoride Release of Different Glass Ionomer Cements

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**Introduction:** The aim of this in vitro study is to examine the fluoride release of different glass-ionomer cements (GIC) with different surface coatings.
**Materials and Methods:** The conventional GIC (Ketac Molar Easymix-3M ESPE), high-viscosity hybrid GIC (Equia Forte Fil-GC) and high viscosity zinc-containing GIC (ChemFil Rock-Dentsply) were tested in the study. The disc-shaped specimens (7.6 x 2.1 mm) were prepared and three subgroups were created (n=7). No surface treatment was applied in the control group. In the experimental groups; petroleum jelly (Vaseline) and coat (G-Coat Plus-GC) were applied. Each specimen was placed in 15 ml centrifuge tube containing 5 ml of deionized water and kept at room temperature until the measurement time. The tubes were shaken every 24 hours. On the measurement days, the specimens were removed from deionized water and washed with 0.5 ml distilled water. The fluoride levels were measured on the 1st, 3rd, 7th, 14th, 21st, 28th and 56th days by ion selective electrode method. In addition, a total of 130-day fluoride release was determined cumulatively. The statistical analysis was performed by IBM SPSS Statistics for Windows, Version 25.0 ($p<0.05$).
**Results:** The 130-day cumulative fluoride release values were as follows in the control group; 4.768 µg/ml for Equa Forte, 0.284 µg/ml for ChemFil and 0.954 µg/ml for Ketac Molar. Fluoride release values were determined as 0.956 µg/ml for Equia Forte, 0.268 µg/ml for ChemFil and 0.397 µg/ml for Ketac Molar in petroleum jelly group. In the coat group, the values were 0.780 µg/ml for Equa Forte, 0.242 µg/ml for ChemFil and 0.343 µg/ml for Ketac Molar. In the experimental groups (petroleum jelly and coat) and control group; the highest fluoride release was determined in the Equia Forte and the lowest value was obtained in ChemFil ($p<0.001$). There was difference between the control and coat group for all materials ($p<0.05$).
**Conclusion:** The surface treatments seem to reduce fluoride release from the tested materials. The profile of fluoride release may be related with the other properties of the GIC. Further studies are necessary to support the findings.

***Keywords:*** *glass ionomer cement, flouride release, restorative materials, remineralization, surface coating*

**The Effect of Different Beverages on Color and Surface Properties of Alkasite Material**

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**Introduction:** The aim of this study was to examine the changes in color, gloss, and surface roughness values of an alkasite and a composite material that were exposed to two different acidic beverages.
**Materials and Methods:** A total of 42 samples were prepared from alkasite (Cention N, Ivoclar Vivadent) that were placed in Teflon molds (8x2 mm). 21 of them polymerized in self-cure mode, and 21 of them were polymerized with a light-curing device (n=7). 21 samples were obtained from the composite material (Palfique Estelite Paste, Tokuyama) that was placed in Teflon molds (8x2 mm) and polymerized with a light-curing device (n=7). All samples were polished by aluminum oxide discs (Sof-Lex; 3M ESPE) and baseline color, gloss, and surface roughness measurements were performed after being kept in distilled water for 24 hours. Samples were divided into 3 groups and immersed in cola, turnip, and distilled water for 24 hours. New color, gloss, and surface roughness measurements were completed and color change values (ΔE00) were calculated according to the CIEDE2000 color system. Data were analyzed using IBM SPSS version 20. Two-way analysis of variance was used to examine the effects of material and solution types on the differences between measurements (ΔE00, ΔGU, ΔRa) and Bonferroni test was used for pair-wise comparisons. Significance was evaluated at $p<0.05$ levels.
**Results:** Acidic beverages created a statistically significant change in the gloss and color ($p<0.05$), but there was no statistically significant difference in the surface roughness values ($p>0.05$). Color changes were more than the clinically acceptable value (ΔE00:1.8).
**Conclusion:** Acidic beverages may affect negatively the surface characteristics and optical properties of restorative materials. Patients should be informed about the possible color or gloss changes and acidic beverage consumption should be limited

***Keywords:*** *Alkasite, color change, gloss, surface roughness, composite restoration*

**Effect of Different Thicknesses of Multilayered Zirconia on Transparency**

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**Introduction:** The translucency of zirconia has been improved, making it possible to fabricate crowns, bridges, laminate veneers, and inlays using a single structure of zirconia. However, zirconia with improved translucency may affect the esthetic results depending on the color of the abutment tooth. The purpose of this study was to examine the effect of different thicknesses on the translucency of multilayered zirconia materials.
**Materials and Methods**: Four multilayered zirconia disks (A2 shade, Katana HTML Plus: KP, Katana STML: KS, Katana UTML: KU, Katana YML: KY, Kuraray Noritake Dental) were used. The zirconia specimens were fabricated at seven different thicknesses of 0.5, 0.7, 1.0, 1.2, 1.5, 2.0, and 2.5 mm (n=8 per thickness). Each zirconia specimen was cut, taking into consideration the zirconia shrinkage. The cut specimens were sintered according to instructions from the manufacturer. All measurements were performed on three different areas (cervical side, middle, and incisal side) of each specimen. A spectrophotometer (CM-700d, Konica Minolta) was used for color measurement, and a background white cap (Konica Minolta) and a background black cap (Konica Minolta). The TP value was calculated from the L*, a*, and b* values, which are numerical values in the CIEL*a*b* color system. Data were analyzed using one-way ANOVA and multiple comparisons of Tukey Honestly Significant Difference (HSD) test (α=0.05) (JMP Pro 16.0.0, SAS Inc.).
**Results**: TP values decreased with increasing zirconia thickness in all groups. TP values ranged from 15.2~18.5 at 0.5 mm, 12.9~17.2 at 0.7 mm, 9.1~14.9 at 1.0 mm, 7.3~13.6 at 1.2 mm, 5.2~11.0 at 1.5 mm, 2.8~8.4 at 2.0 mm and 1.6~6.0 at 2.5 mm. KU exhibited the highest TP values of the four zirconia materials. KY showed lower TP values than the other zirconia specimens on the cervical side and in the middle, however, relatively high TP values on the incisal side.
**Conclusion**: The TP values of the highly translucent zirconia specimens were affected by the thickness of the material. As zirconia thickness increased from 0.5 mm to 2.5 mm, TP values decreased significantly.

***Keywords:*** *monolithic zirconia, translucency parameter, yttria-stabilized tetragonal zirconia*

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**Dentin Bonding Evaluation of Universal Adhesives containing different concentrations HEMA**

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**Introduction:** This study aimed to evaluate the effect of three concentrations of HEMA on the microtensile bond strength ($\mu$TBS) of universal adhesives (UAs) to dentin after 24-hour and 6-month water storage.
**Materials and Methods:** Thirty-two non-carious extracted human third molars (Ethics Committee Protocol #2018/9) were sectioned to obtain mid-coronal flat dentin surfaces. Smear layers were standardized using #600 SiC papers under water. The teeth were randomly divided into 4 groups (n=8) as per adhesive: UAs (BeautiBond Xtreme, BEX), Experimental 1, BBX01), Experimental 2, BBX02), and a 2-step self-etch adhesive (FL-BOND II, FLB). BEX, BBX01 and BBX02 differed in HEMA concentration - 0%, 5%, and 10%. Flowable resin composite (BEAUTIFIL Flow Plus F00) build-ups were constructed after bonding each adhesive according to the manufacturer's instructions. Half of the teeth were stored for (24h/37°C), and the rest half for (6-month/37°C). After storage, the specimens were sectioned perpendicular to the adhesive interface into beams (1mm$^2$) to be tested under tension. Failure analysis was performed using a stereomicroscope and SEM. Data were statistically analyzed using Two-way ANOVA and Tukey HSD ($p<0.05$).
**Results:** The $\mu$TBS of BBX01, BBX02 and FLB significantly decreased after 6-month of storage ($p<0.05$). However, for BEX there were no significant differences between the two storage periods ($p>0.05$). Two-way ANOVA revealed that the $\mu$TBS were significantly affected by the storage time ($p<0.001$) but not by the adhesives ($p=0.627$). However, there was a significant interaction between the adhesives and the storage time ($p=0.012$). The failure mode was predominantly adhesive for all the materials after 24-h and 6-month.
**Conclusion:** Water-storage time decreased the bond strength for HEMA-containing universal adhesives tested. The bond strength results of the universal adhesives were compatible with those of the two-step self-etch adhesive after 24-h and 6-month water storage.

***Keywords:*** *Dental adhesives, dentin, universal adhesives, HEMA, bond strength*

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**Microshear Bond Strength of Silane-Containing Universal Adhesive to Lithium Disilicate Glass-Ceramic**

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**Introduction:** Silane-containing universal adhesive can be used to bond silica-based ceramics which claimed to have simplified operation process meanwhile achieve excellent bonding. However, there is still no clarity on whether silane-containing universal adhesive is as effective as silane treatment. The objective of this study was to compare the microshear bond strength (μSBS) of one-step silane-containing universal adhesive (Single Bond Universal-SB) with multi-step procedures to lithium disilicate glass-ceramic.
**Materials and Methods:** Disilicate glass-ceramic CAD/CAM blocks were divided into 2-mm-thickness ceramic slices (n=160 ceramic surfaces). Submitted to crystallization firing process, then the surfaces of glass-ceramic were wet polished, followed with ultrasonic bath. After surface application of 5% of hydrofluoric acid (HF) for 20s, the ceramic slices were divided randomly into 8 groups (n=20) according to the type of adhesive used (universal adheisve SB; Universal primer Monobond N-MB; Monobond N followed with Heliobond-MBH; Monobond N followed with Teric N Bond-MBTN) and two conventional resin cements for final restorations (Variolink N-VN; Multilink N-MN). For cementation procedure, a cylinder mold was placed on the ceramic surface, filled with tested resin cements, and light-cured for 120s for the μSBS test. After debonding, each specimen was examined under 25× magnification to examine the failure mode. Bond strength data were analyzed using two-way ANOVA and Tukey`s HSD test.
**Results:** Universal adhesive SB showed lower μSBS compared with silane-treated adhesives of the ceramic surface with VN and MN resin cements. SB/MN showed the lowest μSBS (10.7±3.1 MPa; $P < 0.001$). SB/VN showed significant higher μSBS compared with SB/MN (19.5±4.8 MPa; $P < 0.001$), lower μSBS compared with other groups ($P > 0.05$). There was no significant difference between the groups of MB, MBH, and MBTH with VN and NM resin cements ($P > 0.05$). The failure mode of SB/MN showed adhesive failure in almost half of the specimens (40%). The failure mode of SB/VN showed cohesive failure (75%) and mixed failure (25%), others showed most of cohesive failure.
**Conclusion:** Within the limitation of this study, it can be concluded that silane-containing universal adhesive Single Bond Universal were not as effective as multiple step silane-bonding procedures bonding strength to lithium disilicate glass with resin cements.

***Keywords:*** *microshear bond strength, lithium disilicate glass-ceramic, silane-containing adhesive, silanization*

## Accelerated Aging Effects on Color Stability of Light-Cured Resin Cement

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**Introduction:** The aim of this study was to evaluate the color stability of amine-free and amine initiator-based light-cured resin cement after water storage and accelerated aging.
**Materials and Methods:** Two commercially available light cured-resin cement were used as experimental groups in this study: PANAVIA Veneer LC (PVL; Kuraray Noritake Dental, Tokyo, Japan), which is amine-free and Variolink Esthetic LC (VE; Ivoclar Vivadent, Schaan, Liechtenstein), which contains amine-based initiator. Furthermore, one commercially available dual-cured resin cement, PANAVIA V5 (PV; Kuraray Noritake Dental) and one commercially available resin-based composite, ESTELITE Σ QUICK (ES; Tokuyama Dental, Tokyo, Japan), were used as the control group. All the specimens (1.0 ± 0.1mm in thickness and 15 ± 0.1 mm in diameter) were prepared from the four tested materials groups (N=64). For each material, 16 specimens were prepared according to the recommendations of ISO 4049:2019. Each group was further subdivided into four different conditions; dry, water, ultraviolet (UV) light exposure performing with a Sun-test and non-UV light exposure (n=4). After light curing, the specimens were measured with a spectrophotometer, and CIELab* values were recorded. The specimens were placed in each condition for a total of 7 days, and afterward, the color measurements were repeated. Color differences between dry and water, or UV light exposure and non-UV light exposure, were calculated for each specimen before and after each condition with ΔE*ab formula. The obtained ΔE values were statistically analyzed using SPSS (IBM, Tokyo, Japan). One-Way Analysis of Variance (ANOVA) was performed, followed by the Tukey test for post hoc comparisons. The level of significance was set at $p = 0.05$.
**Results:** VE showed the highest level of discoloration in water storage and UV accelerated aging. The results showed no significant differences between PVL, PV5, and ES for different conditions ($p > 0.05$).
**Conclusion:** A PVL exhibited significantly lower color change than a light-cured resin cement containing amine initiator. It also exhibited no difference between the commercially available dual-cured resin cement and the composite resin.

***Keywords:*** *Accelerated aging, Color stability, Initiators, Light cured-resin cement, Resin material*

**Efficacy of Sandblasting on The Bonding Reinforcement of Metal-Free CAD/CAM Restoratives**

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**Introduction:** The purpose of this study was to examine the efficacy of sandblast surface treatment on the bonding reinforcement of metal-free CAD/CAM restoratives.
**Materials and Methods**: A dental sandblaster (Hi-blaster3, Shofu) and four types of metal-free CAD/CAM restoratives, feldspathic ceramic (**F**; VITABLOCS Mark II, VITA), lithium disilicate ceramic (**L**; IPS e.max CAD, Ivoclar vivadent), zirconium oxide (**Z**; Lava Esthetic, 3M), and resin composite (**R**; Cerasmart 300, GC) were used. Each restorative was ground with a series of SiC paper up to 600 grit (as control; **Pol**) and then blasted with two particle-sizes of alumina-powder; 27 microns (**B27**) or 50 microns (**B50**). Cylindrical resin composite was bonded to the surfaces with a self-adhesive resin cement (PANAVIA SA Cement Universal, Kuraray Noritake Dental, **SA**) or an adhesive resin cement system (Scotchbond Universal Plus Adhesive + RelyX Universal Resin Cement, 3M, **RU**). Tensile bond strengths (TBS) were measured after the storage in water at 37°C for 24 hours (n=6). The data were analyzed using with ANOVA and Tukey's *q*-test ($q<0.05$).
**Results**: The mean TBS of **SA** (**Pol**/**B27**/**B50**) in MPa were **F**: 8.5/15.9/15.1, **L**: 7.5/10.3/16.1, **Z**: 9.2/20.4/16.1 and **R**: 6.3/9.4/13.7. The TBS values of both **B27** and **B50** were significantly greater than **Pol** value. The values of blasted restoratives significantly increased in order **R**<**L**<**F**<**Z**. The mean TBS of **RU** in MPa were **F**: 14.3/16.6/14.8, **L**: 9.4/12.4/10.9, **Z**: 20.2/24.9/19.7 and **R**: 12.8/15.8/18.7. The TBS value of only **B27** was significantly greater than **Pol** value. The values of blasted restoratives increased in order **L**<**F**<**R**<**Z**. Z indicated the greatest TBS value compared with the other three restoratives, regardless adhesive cement. Both factors of restorative-type and blasting particle-size influenced the value of TBS. The interaction effect between the two factors was significant for only **SA** cement. The effect of restorative-type on the TBS bonded with SA did vary with the blasting particle-size.
**Conclusion**: Sandblasting with alumina-powder had a beneficial efficacy to reinforce the bond strength to metal-free CAD/CAM restoratives. However, depending on the cement applied, the effect on the bond strength of restorative material varied with blasting particle-size.

***Keywords:*** *Sandblast, Metal-free CAD/CAM restorative, Adhesive resin cement, Bond strength, Alumina-powder particle-size*

**Bonding Performance of Universal Adhesives Under Different Pulp Pressure Conditions**

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**Introduction:** This study evaluated the effect of simulated pulp pressure (SPP) conditions on the bond strength of HEMA-containing or HEMA-free universal adhesives.
**Materials and Methods:** Thirty extracted sound human molars were sectioned to exposed mid-coronal flat dentin surfaces and randomly divided into two groups according to the adhesives: HEMA-containing universal adhesive (Scotchbond Universal Plus, SBUP) and HEMA-free universal adhesive (G2-Bond, G2B). Each adhesive group was further divided (n=5 teeth) following the pulp pressure simulation conditions: non-simulated – NO-SPP; simulation with distilled water – Dw-SPP, and simulation with fetal bovine serum -Fbs-SPP). Resin composite build-ups were made, and teeth were stored in water (37°C, 24 h). Teeth were sectioned in both directions to obtain 1mm$^2$ sticks and tested under tension to determine the μTBS. Data (in MPa) were statistically analyzed using Two-Way ANOVA and Tukey post hoc tests. Failure mode was observed using a stereoscope and SEM.
**Results:** The microtensile strength results were affected by adhesives systems ($p=0.006$), simulated pulp-pressure conditions ($p<0.0001$), and the interaction between them ($p<0.0001$). SBUP presented a higher overall mean bond strength (31.41±11.52 MPa) than G2B (25.17±17.48 MPa). No-SPP revealed a higher overall mean bond strength (44.88 MPa) than Dw-SPP and Fbs-SPP, which were not significantly different ($p=0.456$). For SBUP, the failure pattern was mostly adhesive. In the case of G2B, mixed failures were mainly observed in No-SPP and Dw-SPP conditions, and Fbs-SPP produced particularly adhesive failures.
**Conclusion:** Regardless of the solution employed (distilled water or fetal bovine serum), both universal adhesives' bond strength to dentin was remarkably reduced under simulated pulp pressure.
The authors have no financial conflicts of interest to disclose concerning the presentation.

***Keywords:*** *Microtensile bond strength, simulated pulpal pressure, HEMA, dentin, adhesives*

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## Effect of Colloidal Platinum Nanoparticles on Resin-Dentin Bonding Durability

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**Introduction:** The purpose of our study is to investigate the effect of colloidal platinum nanoparticles (CPN) on resin-dentin bond durability in terms of using universal adhesive.

**Materials and Methods:** The protocol was approved by the University Ethics Committee Clinical Research Administration Center, Hokkaido University Hospital (#2018-7). Sixty extracted maxillary premolars were exposed mid-coronal dentin and polished with 600-grit SiC paper for 60 s. All the specimens were divided into two groups with or without CPN pretreatment. All the specimens of these two groups were randomly subdivided into three groups (n = 10/group) as follows: Clearfil Megabond 2 (MB2), Scotchbond Universal Plus Adhesive with self-etch mode (SE-SUP), and with etch-and-rinse mode (ER-SUP). In SE-SUP groups, CPN was applied on dentin for 20 s and rinsed with distilled water before adhesive application. In the ER-SUP group, CPN was applied after etch-and-rinse. Three randomly selected beams from each tooth were subjected to a μTBS test after 24 hours or 6 months. The μTBS data was analyzed by three-way ANOVA and post hoc Tukey HSD test (α=0.05). Fracture modes were analyzed under a SEM. Additional 6 premolars were prepared for observation of the resin–dentin interface by a TEM.

**Results:** Three-way ANOVA revealed that the μTBS results were significantly influenced by the adhesive (MB2, SE-SUP, and ER-SUP) ($P<0.05$) and time (24 h and 6 m) ($P<0.05$), while no significant difference between with or without CPN pretreatment ($P=0.416$).

The fracture modes of SE-SUP without CPN pretreatment groups showed higher adhesive failure in the 6 m compared to the 24 h.

TEM showed that platinum nanoparticles deposited on the top of the hybrid layer in all the CPN groups. In SE-SUP groups, the 24 h specimens revealed hydroxyapatite in the partial demineralized hybrid layer while a blurred hybrid layer was shown in aging specimens. While the morphological features of CPN-SE-SUP interface at 24 h and 6 m did not appear to be a significant difference.

**Conclusion:** The pretreatment of CPN did not affect the resin-dentin bond strength at 24 hours and 6 months. Furthermore, more long-term experiments are needed.

***Keywords:*** *μTBS, colloidal platinum nanoparticles, bonding durability, universal adhesive*

**Bonding Performance of Self-Adhesive Resin Composites to Dentin**

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**Introduction:** Self-adhesive resin composites have been developed to simplify the restorative procedures by eliminating the technique sensitivity of the bonding procedure. Thus, this study aimed to evaluate the bonding performance of five self-adhesive resin composites to dentin after 24-hours storage.
**Materials and Methods**: Forty-five sound, extracted human molars were sectioned to remove enamel and expose mid-coronal dentin surfaces (Ethics Committee Protocol #2018/9). Smear layers were standardized using 600-grit silicon carbide paper for 60 s under copious water. Five self-adhesive resin composites (FIT SA, Shofu, Japan; HFS, Shofu, Japan; Constic, DMG, Germany; Fusio Liquid Dentin, Pentron, USA; Vertise Flow, Kerr, Italy) were used in this study. Each material was applied incrementally (2 layers) on dentin surfaces to build-up the resin blocks (4-mm thick). Each layer was light-cured according to the manufacturers` instructions with a blue LED light-curing unit (light irradiance >1000mW/cm$^2$). The samples were stored in distilled water at 37°C for 24 h and then prepared for microtensile bond strength test (n=9). Fracture mode was observed using stereoscope and scanning electron microscope. The "tooth" was used as a statistical unit. Data was analyzed using Kruskal-Wallis and pairwise comparisons (SPSS v.27, IBM, USA).
**Results**: After 24-hours storage, HFS group (21.92 MPa) showed the highest microtensile bond strength values, followed by FIT SA group (15.32 MPa) and Fusio Liquid Dentin group (14.26 MPa), which were not statistically different. Adhesive failure was the most common fracture mode observed in these three materials. Constic group (3.30 MPa) and Vertise Flow group (0 MPa) had lower microtensile bond strength values than the other materials. Both adhesive failure and pre-test failure were observed in Constic group and Vertise Flow group. Pre-test failure occurred in 74% of Vertise Flow group and 51% of Constic group.
**Conclusion**: Within the study's limitations, it is possible to conclude that the HFS resin presented the best bonding performance to dentin after 24-hours storage.

***Keywords:*** *Self-adhesive, Composite Resin, Dentin, Tensile Strength*

## Surface Hardness and Depth of Cure of Novel Bulk-Fill Composites

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**Purpose:** This study aimed that evaluate the Vickers microhardness (VHN) and depth of cure (DOC) of novel bulk-fill composites (BFC).
**Materials and Methods:** Six novel bulk-fill composite; a dual-cured BFC (Fill-Up (FUP), Coltene Whaledent, Alstatten, Switzerland), a flowable BFC (GrandioSo HeavyFlow (GHF), Voco GmbH, Cuxhaven, Germany), an ormocer-based BFC (Admira FusionXtra (AFX), Voco GmbH, Cuxhaven, Germany), a usual BFC (Filtek BulkFill (FBF), 3M Espe, St.Paul, MN, USA), a sonic-condensed BFC (SonicFill-2 (SCF), Kerr Dental, Brea, CA, USA) and a thermoviscous BFC (VisCalor (VVC), Voco GmbH, Cuxhaven, Germany) were used in study. For each BFC, 10 samples at 2 mm thickness, 10 samples at 4 mm thickness totally 20 samples (5 mm in diameter) were prepared using Teflon mold. All specimens were stored at 37°C for 24 hours before measurements. All specimens were tested for their Vickers microhardness on their top and bottom surfaces with 200 g for 15 seconds. Five measurements were performed at 1mm intervals for each specimen on bottom and top surface and finally mean of five measurements were recorded as VHN. The DOC was assessed by calculating the ratio (bottom/top) of VHN values for each specimen. The data were analyzed by Independent sample-t test, one-way ANOVA and Tukey HSD post-hoc test ($p<0.05$).
**Results:** In 2 mm thickness groups, VHN values ranged from 46.24 to 72.35 for top, 37.24 to 68.80 for bottom. The highest VHN was obtained for GHF, whilst lowest VHN was recorded for FUP at both top and bottom ($p<0.05$). Also, GHF showed highest VHN (73.17), FUP showed lowest VHN (43.13) for top; VVC had the highest VHN (63.38), FUP had the lowest VHN (31.49) values for bottom in 4 mm thickness ($p<0.05$). According to the VHN ratio, there was an effect of the type of material on the DOC of the BFC's, in 2 mm thickness, FUP and in 4 mm thickness, GHF was showed lowest values ($p<0.05$). Additionally, there was no effect of material thickness on the DOC for VVC and AFX ($p>0.05$).
**Conclusion:** The DOC of thermoviscous BFC (VVC) and ormocer-based BFC (AFX) were greater than the other materials in 4 mm in thickness.

***Keywords:*** *Bulk-fill composite; depth of cure; microhardness; thickness*

*The authors would like to thank Voco for providing the their materials.*

**The Effects of Different Finishing and Polishing Processes and Different Whitening Techniques on the Color and Surface Properties of CAD/CAM Materials**

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The primary aim of this study was to investigate the color change and surface properties of CAD/CAM materials which had finished different finishing/polishing systems. The secondary aim was to examine two different concentrations and types bleaching agents effect (ZOOM DayWhite ACP 14% Hydrogen Peroxide and ZOOM NiteWhite ACP 22% Carbamide Peroxide) on these materials.
Hybrid blocks of Cerasmart (GC Corporation, Tokyo, Japan) and Shofu Block HC (Shofu Dental Corporation, Kyoto, Japan) were used in this study. Cerasmart and Shofu Block HC CAD/CAM hybrid blocks were divided into eight subgroups according to surface treatment and bleaching techniques (n=10). The surface roughness of the samples were measured with a contact profilometer device, and the colors of the samples were measured with a spectrophotometer according to the CIELab color system. Data were statistically analyzed with Kolmogorov-Smirnov Test, Mann Whitney U Test ($p<0.05$).
The lowest roughness value before bleaching was measured from Cerasmart samples that were finished and polished with Sof-Lex XT [Ra 0.26 (0.25-0.30)]. The lowest roughness value after bleaching was measured in Cerasmart material samples that were glazed and then bleached with hydrogen peroxide [Ra 0.30 (0.23-0.46)]. Minimum color change ($\Delta E=2.07$) observed in Shofu Block HC material samples that were glazed and then bleached with carbamide peroxide. The surface roughness values of the samples increased by applying two different bleaching agents to Shofu Block HC samples treated with Sof-Lex XT discs and Cerasmart samples treated with glaze. When hydrogen peroxide bleach gel was applied to glaze-treated Shofu Block HC samples and carbamide peroxide was applied to Shofu Block HC samples, clinically acceptable color change occurred in the samples regardless of finishing and polishing. When carbamide peroxide was applied to Cerasmart samples, clinically unacceptable discoloration of the samples occurred regardless of finishing and polishing.

***Keywords:*** *CAD/CAM resin block, whitening, color, surface roughness*

**Evaluation of Bonding Property of Self-Adhesive Resin-Cement with Universal Bonding-Agent**

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**Introduction:** Recently, self-adhesive resin cement systems that can be used with universal light-curing bonding agent for tooth pretreatment have been coming into the market. Bonding property of resin cement to tooth substrate is important for long-term durability of restorations. In general, adequate curing of resin cement system is important for stable performance. On the other hand, since some opaque-shaded restorations may weaken light irradiation for resin cement, its self-curing ability is also important for resin cement to be applied for any type of shaded restorations. The aim of this study was to evaluate the bonding property of several resin cement systems to tooth in self-cure mode.
**Materials and Methods:** Three resin cement systems (G-CEM ONE with G-Premio BOND (GCO, GC), RelyX Universal with Scotchbond Universal Plus Adhesive (RXU, 3M) and PANAVIA SA Cement Universal with CLEARFIL Universal Bond Quick (PSU, Kuraray) were used in this study. Specimens of bovine anterior tooth enamel or dentin were embedded with acrylic resin. Exposed flat surface was finished with 600-grit SiC paper. Bonding area (Φ3.0mm) and cement thickness (0.1mm) were defined by plastic-sticker. Tooth pretreatment was carried out and stainless-steel rod was adhered to tooth according to the manufacturer's instructions. Half of specimens were stored at 37℃ 100% R.H. for 1hour and then stored in water at 37℃ for 23hours (24h). Another half were stored in 24h condition and then placed under thermocycling condition (5-55℃ for 5000cycles, TC5000). Shear bond strength (SBS) was measured by SHIMADZU AG-IS [Crosshead-speed 1mm/min, n=5, statistically analyzed (2-way ANOVA followed by Tukey post-hoc test, α=0.05)].
**Results:** SBS (S.D., statistically analyzed result) of GCO, RXU and PSU to enamel were 39.2(6.4, a), 33.6(7.5, ab) and 26.4(4.3, b) MPa in 24h, and 41.4(8.4, a), 29.3(3.7, ab) and 30.0(6.7, ab) MPa in TC5000. SBS (S.D.) of GCO, RXU and PSU to dentin were 35.7(5.5, a), 33.6(5.7, ab) and 28.3(4.0, ab) MPa in 24h, and 33.4(2.4, ab), 32.9(7.8, ab) and 22.5(7.0, b) MPa in TC5000.
**Conclusion:** GCO showed excellent bonding property to tooth substrate in self-cure mode. This suggests that GCO provides reliable adhesion regardless of shaded restoration type.

***Keywords:*** *Adhesion, resin cement, bonding agent, self-adhesive, universal*

*This abstract is supported by GC Corporation*

## Effects of Antibacterial Disinfectants and Adhesive Application Modes on Microleakage

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**Introduction:**The aim of this study was to evaluate the effect of different antibacterial disinfectants and application modes on the microleakage of a universal adhesive bonded to Class V cavities.
**Materıals And Methods:** Class V cavities were prepared in 50 sound premolars with enamel occlusal margins (OM) and dentin cervical margins (CM). Teeth were randomly divided into 5 groups; G1: Control, G2: 970 nm DiodeLaser (SiroLaser Xtend, Dentsply Sirona), G3: 2% Chlorhexidine Gluconate (Microvem, Altun Sterlizasyon), G4: AloeVera and Propolis Gel (Forever Aloe Gel, Forever Living Products) and G5: 0.2% Hyaluronic acid (Gengigel, Farmalink). After, G-PremioBond (GC Europe), a universal adhesive, was applied with etch&rinse (EAR) or self-etch (SE) mode, cavities were restored. Then, the teeth were stored at 37°C for 24 hours, followed by a thermocycling for 1000 cycles (5 °C/55 °C). The tooth surfaces were coated with a nail varnish and stored in 0.5% basic fuchsin for 24 hours. The teeth were then rinsed, air-dried. Two longitudinal sections in the bucco-lingual were taken for each tooth, resulting in a total of 100 sections. The sections were evaluated under a light microscope at 50x at both OM and CM, and the furthest point of dye penetration was recorded using a scoring system.
**Results**: Kruskal-Wallis, Mann-Whitney U and Chi-square tests were used to analyze the data ($p<0.05$). In OM, although there was no difference between the disinfection methods in SE mode ($p=0.77$), Group 5 was different from the other groups in EAR mode ($p=0.30$). Furthermore, there was a statistical difference between SE and EAR modes in Groups 1, 3 and 4 ($p<0.05$). Also in CM, there was no difference between disinfectant applications in both SE and EAR modes ($p>0.05$) and there was a difference between SE and EAR modes in all groups ($p<0.05$).
**Conclusıon:** None of the disinfectant solutions were able to prevent dye penetration, particularly in CM. In the CM, dye penetration was observed at higher scores than in the OM. In addition, the adhesives in EAR mode on the OM that on the enamel and in SE mode on the CM that on the dentin can be recommended independently of disinfection applications.

***Keywords:*** *Adhesion, Disinfection, Microleakage, Laser*

**Effect of SDF on Bond Strength of New Universal Adhesives.**

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**Introduction:** This study aims to evaluate the microtensile bond strength (μTBS) of Silver Diammine Fluoride treated sound dentin using a new universal adhesive and ultra-morphology observation of adhesive interfaces.
**Materials and Methods:**Thirty two extracted human third molars were collected following ethics approval by the University Ethics Committee (#2018-7). All teeth were cut to expose mid-coronal dentin and polished with 600-grits SiC under running water for 60 s. All the specimens were divided into two groups: with SDF (wSDF) and without the application of SDF on dentin (woSDF). In wSDF groups, SDF was agitated for 1 min, leave undisturbed for 2 min, and lastly rinsed by distilled water for 30 s. Then, each group were further subdivided into 2 groups (n = 8/group) according to the etching mode: (1), Scothbond Universal Plus Adhesive with self-etch mode (SSE, 3M ESPE); (2), Scothbond Universal Plus Adhesive with etch and rinse mode (SER). All specimens were restored with resin composite and were stored in distilled water 24 h prior the test. Data from the μTBS test were analyzed using Kruskal-Wallis test followed by Mann-Whitney U-test. The ultra-morphology of adhesive interfaces were evaluated by TEM.
**Results:** The use of SDF were significantly reduced in μTBS in both SSE ($p$<0.001) and SER groups ($p$=0.001). SER groups showed significantly higher μTBS than SSE groups in both woSDF group ($p$=0.002) and wSDF group ($p$=0.016). TEM images of all wSDF groups showed remaining of silver particles on the dentin surface and formation of calcium fluoride on and within the hybrid layer.
**Conclusion:** This study showed that SDF had an adverse effect on a new universal adhesive. However, the bond strength could be recovered with the use of phosphoric acid. Moreover, it was discovered that SDF form a layer of calcium fluoride and silver on and within the hybrid layer, which cannot be removed by the acid.

***Keywords:*** *Silver diammine fluoride, Microtensile bond strength, Dentin, Universal adhesive, TEM*

**Effectiveness of Er: YAG Laser-irradiation on CAD/CAM Resin Blocks for Repair**

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**Introduction:** When a fracture is encountered in a CAD/CAM composite restoration, repair with resin composite would be the first operative option from a minimal intervention perspective. To promote bonding between the restoration and the composite, some pre-treatement of the CAD/CAM composite surface is required. In this study, Er:YAG laser irradiation was performed at a painless power level on CAD/CAM composites, and the effectiveness of this irradiation of CAD/CAM composite blocks for composite repair was investigated.
**Materials and Methods:** A CAD/CAM resin composite block (CERASMART 300, GC), a universal adhesive (ScotchBond Universal Plus Adhesive, 3M Oral Car) and a resin composite (CLEARFIL AP-X, Kuraray Noritake Dental) were used. The CAD/CAM resin composite blocks were finished using #800 SiC paper and then irradiated using the Er:YAG laser at 50 mJ / 10 Hz (L). Non-laser-irradiated CAD/CAM resin composite blocks were also prepared as control (Cont). The prepared surfaces were etched with phosphoric acid and rinsed. Then they were treated with the universal adhesive according to the manufacturer's instructions, and bonded with resin composite.
The bonded specimens were stored in distilled water for 24 hours at 37°C and then subjected to a microtensile bond strength test. Statistical analysis were conducted using the t-test ($\alpha$=0.05). The failure mode of each specimen after the microtensile bond strength test was observed under a microscope.
**Results:** The microtensile bond strength of L group (60.04±21.88 MPa) was statistically significantly higher ($p<0.001$) than that of Cont group (41.49±13.66 MPa). All specimens of Cont group showed adhesive failure. Althought most of the specimens of L group showed adhesive failure, some specimens showed cohesive failure in resin.
**Conclusion:** The results of this study found that Er:YAG laser-irradiation of CAD/CAM resin composite blocks improved repair bonding using universal adhesive and resin composite.

***Keywords:*** *Lasers, Dental Bonding, Composite Resins*

*No conflicts of interest were disclosed.*

## Fatigue Bond Strength of a 2-step Universal Adhesive

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**Introduction:** The purpose of this study is to compare the fatigue bond strength of a 2-step universal adhesive and representative adhesives from each category of adhesive system.
**Materials and Methods:** The adhesives used in this study were OptiBond FL (3-step etch-and-rinse), Prime&Bond NT (2 step etch-and-rinse), Clearfil SE Bond 2 (2-step self-etch), G2-Bond Universal (2-step universal), and Scotchbond Universal Plus Adhesive (1-step universal). Fatigue bond strength testing and scanning electron microscopy analysis of adhesively bonded enamel and dentin interfaces were performed.
**Results:** For the adhesives in etch-and-rinse mode, the enamel fatigue bond strength of the 2-step universal adhesive was significantly higher than those of other adhesives, and the dentin fatigue bond strength of the 2-step etch-and-rinse adhesive was significantly lower than the others. For adhesives in self-etch mode, the enamel fatigue bond strengths of the 2-step self-etch and 2-step universal adhesives were significantly higher than that of the 1-step universal adhesive, and the dentin fatigue bond strength of the 2-step universal adhesive was significantly higher than the 2-step self-etch and 1-step universal adhesives.
**Conclusion:** The two-step universal adhesive showed higher enamel and higher or equal dentin fatigue bond strength than the other representative adhesives of other system types in etch-and-rinse mode and higher or equal enamel and higher dentin fatigue bond strength than the other systems in self-etch mode.

***Keywords:*** *Dentin, Enamel, Dental Bonding, Composite Resins*

*The research was funded by GC Corporation.*

## Marginal Fit and Clinical Performance of 3D-Printed vs CAD/CAM Overlays

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**Introduction:** Marginal adaptation is a key factor on the clinical performance and survival rate of indirect restorations. The aim of this study was to examine the internal and marginal fit and to evaluate the clinical performance of overlays made by hybrid ceramic CAD/CAM (Grandio Blocks, VOCO) and 3D-Printed (VarseoSmile Crown plus, Bego) overlays.
**Materials and Methods:** Six molar/premolar teeth of three patients requiring overlay restorations after completion of root canal treatment were selected for the study. A split-mouth study design was preferred to compare the restorations. Computer-aided impressions were taken by using Trios3 (3Shape) intraoral scanner. The internal fit and marginal adaptation of the overlay to the cavity were evaluated by means of the silicone replica technique before cementation. Replicas were sectioned buccolingually and mesiodistally into two parts and fit was examined under x200 magnification using a light-microscope (Leica Optik, Leica) and 120 measurements were recorded for six overlays. Grandio Blocks/GB and VarseoSmile Crown plus/VS overlays were adhesively luted according to manufacturers' guidelines with Bifix-Qm (Voco) and polymerized by a LED curing unit (Valo, Ultradent) for 40 sec. Patients were recalled after 1 week, 1 month, and 3 months and scored according to FDI criteria by using five-step grades. Data were analyzed with IBM SPSS V23. Independent samples t-test was used for group comparisons. Significance level was set at $p<0.05$.
**Results:** No statistically significant difference was found between GB and VS in terms of cervical ($p=0.819$), axial ($p=0.110$) and marginal dentin ($p=0.986$) values. While the mean values of cervical dentin were 140.66±19.33 µm and 153.26±82.43 µm; axial dentin were 150.21±9,59 µm and 110.12±32,54 µm; marginal dentin were 81.15±0.11 µm and 81.04±9.41 µm in GB and VS overlays, respectively. No esthetic or functional complaints were detected in the recall of the patients. In the clinical and radiographic evaluation, all the restorations were scored as 1 according to FDI criteria in terms of functional, biological, and esthetic properties.
**Conclusion:** Within the limitations of this *split mouth* study design, both of the materials demonstrated acceptable marginal integrity and clinical performances. Long-term follow-up studies are necessary to evaluate the clinical outcome.

***Keywords:*** *3D-print, CAD/CAM, marginal fit, overlay*

**Effect of Finishing Techniques on The Color Stability of Composites**

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**Introduction:** The aim of this study was to evaluate the roughness of the surface of composite resins applied with different finishing techniques and their color stability after coloring with coffee.
**Materials and Methods:** A total of 100 disc-shaped samples prepared from nanohybrid composite (Polofil NHT, Voco [N]) and microhybrid composite (Herculite Classic, Kerr [M]) resin were divided into 5 subgroups (n=10). One of the groups served as control group (no surface treatment). Experimental groups were divided according to the surface finishing protocol: bur+polishing (BP), arkansas+polishing (AP), bur+polishing with paste (BPP), and discs+polishing (DP). The initial color of the samples was detected with a spectrophotometer (VITA Easyshade V, VITA Zahnfabrik, Germany), and the surface roughness (Ra) of the samples was quantified by a profilometer (Mitutoyo SJ-210, Japan). Then the samples were exposed to the coloration process with freshly prepared coffee solution every day. After 2 days, color measurements were made again. Color change (ΔE) was calculated using the CIEDE2000 system. Mann-Whitney U test, Kruskal Wallis test and One-way analysis of variance were used for statistical analysis. The correlation between Ra and ΔE was statistically evaluated.
**Results:** DP treatment on the M surface and DP and BPP treatments on the N surface produced significantly less Ra than the other treatments and the control group ($p<0.05$). Although the BPP treatment in the M group had the lowest E value compared to other treatments, there was no statistically significant difference between this value and that of the BP and DP treatment groups ($p>0.05$). BPP treatment demonstrated a significantly lower E value in the N group compared to the other groups ($p< 0.05$). A statistically significant correlation was found between Ra and ΔE values ($p<0.05$).
**Conclusion:** Composite finishing techniques affected the surface roughness and color stability of composites. The use of discs and polishing paste in the finishing of both nanohybrid and microhybrid composites can reduce surface roughness and discoloration due to coffee consumption.

***Keywords:*** *Composite, surface roughness, colour change, finishing techniques*

**The Effect of Toothpastes on Aesthetic Composites**

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**Introductıon:** This in vitro study aimed to investigate color and surface roughness changes of 3 different aesthetic composite resins colored with coffee solution after brushing with 3 different toothpastes.
**Materials and Methods:** Ninety disc-shape composite specimens with a diameter of 6 mm and a depth of 2 mm were prepared and polishing processes were performed with Sof-Lex (3M ESPE, ST. Paul, MN, USA). The samples were randomly divided into 9 groups (n=10): 3 aesthetic composites (3M ESPE Filtek Ultimate (FU), Tokuyama Estelite Sigma Quick (SQ), Dentsply Neo Spectra ST Effects (NS)) and 3 toothpastes (Sensodyne Promine (P), Opalescence Whitening(O), R.O.C.S. Sensation Whitening(R)). To measure the Initial colors and surface roughness of the samples, spectrophotometer and profilometer were used. Composite samples were immersed in coffee solution for 6 hours, then they were washed and dried; and color and roughness measurements were repeated. Brushing was carried out with a brushing device on which an electric toothbrush was mounted. Final measurements were made after brushing simulation. Statistical analyzes were made ($p<0.05$).
**Results:** When the color change in the composites was evaluated after 6 hours of coffee coloring, it was observed that the SQ/P group underwent statistically more color change than the NS/P and NS/R groups ($p<0.05$). When the color change in the composites was evaluated after brushing compared to the baseline, when the SQ/P and NS/P groups were compared, the difference between them was found to be statistically significant ($p<0.05$). The colored composite samples of SQ/O group exhibited more color change after brushing than the NS/P and NS/R groups ($p<0.05$). The roughness changes of samples colored in coffee solution after brushing were statistically significant between FU/P and NS/P groups ($p<0.05$).
**Conclusion:** As a result of this study, it has been observed that the toothpastes used cause color change and increase in roughness in aesthetic composites.

***Keywords:*** *Toothpaste, Aesthetic composite, Color, Surface roughness*

## The Effect of Ceramic Thickness on Polymerization of Resin Cement

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**Introduction:** Indirect restorations produced from different ceramic blocks of different thicknesses have different light transmittances. This may affect the polymerization of the light-cured cementation material. The aim of this study was to evaluate the effect of different ceramic blocks and thicknesses on the polymerization of light-cured resin cement, with measurements of Vickers microchardness performed immediately and 24 hours after polymerization.
**Materials and Methods:** Samples of 0.5, 1, and 2 mm thicknesses were prepared from three different ceramic materials (resin nanoceramic- Lava Ultimate (LU), leucite-reinforced glass ceramic- IPS Empress CAD (IPS) and zirconium-reinforced lithium silicate glass ceramic- Celtra DUO (CD)). A total of 120 samples were prepared from a light-cure resin cement that was polymerized under ceramic blocks, with 10 groups including the control group (n = 12). Resin cement samples were prepared with a 6 mm-diameter, 1 mm-thick teflon mold and light-cured for 30 seconds with an LED light device. Microhardness measurements were made immediately and 24 hours after polymerization using a Vickers microhardness device on both the upper and lower surfaces of all groups. Data were analyzed using one-way ANOVA, independent t and Tukey HSD tests ($p<0.05$).
**Results:** As a result of Vickers microchardness analysis, it was found that the upper surface microhardness values of the resin cement show low values compared to the control group except for the 0.5 mm LU group ($p <0.05$). The lower surface values are low in all groups compared to the control group. In all groups, a significant difference was found in both the upper and lower surface microhardness measurements performed immediately and 24 hours after polymerization ($p <0.05$). When the lower-upper surface microhardness ratios of the resin cements were examined, all samples have passed 0.80 acceptable threshold value.
**Conclusion:** The microhardness values of light-cured resin cements are affected by different ceramic blocks and thicknesses. The microhardness of the cements increases 24 hours after polymerization.

***Keywords:*** *ceramic, polymerization, resin cement, microhardness*

**Surface Alterations of Resin Composites: Press-on-Force-Guided Brushing Simulator with Calcium-Active Whitening-Toothpastes**

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**Introduction:** The purpose was to investigate the surface roughness and the color changes of nanohybrid and microhybrid resin composites subjected to calcium active whitening toothpastes with different RDA values through a novel Press-on Force-Guided (PFG) Brushing Simulator.

**Material and Methods:** Twenty-eight disc-shape samples (10x2mm) of a nanohybrid (Herculite, Kerr) and a microhybrid (Z250, 3M) composites were prepared and randomly divided into 4 subgroups (n=7). The samples were polymerized with a LED-curing unit with an irradiance of 1000 mW/cm$^2$ (Valo Cordless, Ultradent). Finishing and polishing procedures were performed with 2 fine grits of Sof-Lex Discs (3M). Samples were stored in distilled water at 37°C for 24 hours. Composite samples were brushed with a medium-bristle toothbrush (ROCS Pro 5940, ROCS) using the PFG brushing simulator (Marmara University, Turkey) for 60.000 strokes (correspondence to 6 years clinically) in a slurry containing toothpaste with 120 RDA (Ca Active Whitening, ROCS) and 70 RDA (Electro Whitening, ROCS) under 300-320g load (200 strokes/min). In particular, surface roughness (Ra) and color change (ΔE) were investigated utilizing profilometer (MarSurf PS 10, Mahr) and spectrophotometer (Easy-Shade-5, VITA). Analysis of variance was used for repeated measurements; Bonferroni test was used for pairwise comparisons. The level of significance was set at $p<0.05$.

**Results:** After brushing Ra values did not show a significant difference ($p>0.05$) except Herculite group brushed with Electro whitening ($p=0.05$) which showed the most roughness change (36.99%). There is a significant difference between Herculite (1.163±0.701) and Z250 (0.400±0.154) in Ra values after electro-whitening brushing ($p=0.002$). No significant color change was observed in any group, regardless of composite or tooth-paste type ($p>0.05$). ΔE values of Herculite (1.007±0.463; 1.100±0.452) and Z250 (1.558±0.618; 1.196±0.835) brushed with Ca Active Whitening and Electro Whitening toothpastes were less than 1.8 respectively.

**Conclusion:** Tooth brushing with Ca active whitening toothpastes (different RDA values) affected differently on the surface roughness of Herculite and Z250 due to their filler and resin composition, but there is no effect on color.

***Keywords:*** *brushing simulator, resin composite, whitening toothpaste, surface roughness, color change*

## Hypersensitivity Laser Treatment's Effect on Shear Bond Strength of Brackets

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**Introduction:** Nowadays, lasers are widely used in dentistry, including for tooth hypersensitivity treatments. The aim of present study was to determine the effect of irradiation of Nd:YAG 1064nm and 980nm Diode lasers, used for hypersensitivity treatment, on the shear bond strength (SBS) of metal orthodontic brackets to enamel.
**Materials and Methods:** Seventy freshly extracted human premolars were artificially sensitized, using Ethylenediaminetetraacetic acid (EDTA). The teeth were treated with 1w Nd:YAG, 1.5w Nd:YAG, 1w Diode, or 1.5w Diode. After bonding the metal brackets, samples were incubated at 37° for 24 hours. Then, SBS values and adhesive remnant index (ARI) for each tooth were recorded. One-way analysis of variance (ANOVA) and Kruskal-Wallis test were used to compare the mean SBS and the distribution of ARI scores between the study groups, respectively.
**Results:** The highest and the lowest SBS mean was seen in 1w Diode (25.71Mpa) and 1.5w Nd:YAG (21.53Mpa) groups, respectively. No statistically significant difference existed between the different groups, in terms of SBS (p=0.211) and ARI distribution (p=0.066).
**Conclusion:** This study showed that using Nd:YAG and 980nm Diode lasers for hypersensitivity treatment did not affect the SBS of metal orthodontic brackets to enamel, indicating that they are safe to use for orthodontic patients.

***Keywords:*** *Dentin Sensitivity; Shear Strength; Lasers; Orthodontic Brackets; Dental Bonding.*

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## Boding Efficacy of Immediate-Dentin-Sealing Applied To CAD/CAM Ceramic Crown Restoration

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**Introduction:** This study aimed to clarify the bonding efficacy of immediate dentin sealing (IDS) to contribute to the quantitative and qualitative improvement of CAD/CAM ceramic crown restorations.
**Materials and Methods:** Forty-eight extracted human molars were prepared to obtain standardized abutment specimens and divided into three groups: a group without the IDS application (C:control), a IDS group performed by a single application of an all-in-one adhesive system (A), and a IDS group performed by the combined application of an adhesive system and a flowable resin composite (F). All specimens were restored with a ceramic crown fabricated by a chair-side CAD/CAM system and were divided into no-stress (S-) and stressed (S+) groups. After cyclic loading (78.5 N; total, 3 x 105 cycles; 90 cycles/min) on the specimens in the stressed group, all specimens were sectioned to beam-shaped specimens. The μTBS values for the occlusal (Oc) and mesioaxial (Ax) walls were measured (n=16). The obtained values were analyzed statistically with the Kruskal-Wallis test, the Steel-Dwass test, the Mann-Whitney U test and Weibull analysis.
**Results:** The quantitative bonding performance of groups A and F were superior to that of group C, regardless of the cyclic loading and abutment wall conditions. In particular, group F showed the maximum bond strength. In Weibull modulus (Wm), Weibull stress at a probability of failure of 10% and 90% (PF10/PF90) as indicator of qualitative bonding evaluation, the values of groups A and F, except in one condition (S+/Ax/PF90), were significantly greater than the values in group C, regardless of the cyclic loading and abutment wall conditions. The PF10/PF90 values under the S+ condition in group F were significantly greater than the values in group A, irrespective of the abutment wall condition. The cyclic loading clearly tended to cause the deterioration of qualitative bonding performance, regardless of IDS and abutment wall conditions.
**Conclusion:** The IDS performed by the combined application of an adhesive system and a flowable resin composite showed the maximum bond strength and the highest bond durability in the qualitative bonding performance even under the cyclic loading condition simulating clinical mastication.

***Keywords:*** *Immediate-dentin-sealing, CAD/CAM ceramic crown restoration, Cyclic loading, Micro-tensile bond strength, Weibull analysis*

**Bond Strength of Different Adhesive Systems After Er, Cr: YSGG Pretreatment**

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The aim of this study was to evaluate the microtensile bond strength (μTBS) of an etch and rinse (EAR), a self-etch (SE) and two universal adhesives (with or without acid etching) to enamel and dentin after treatment with Er,Cr:YSGG laser irradiation.

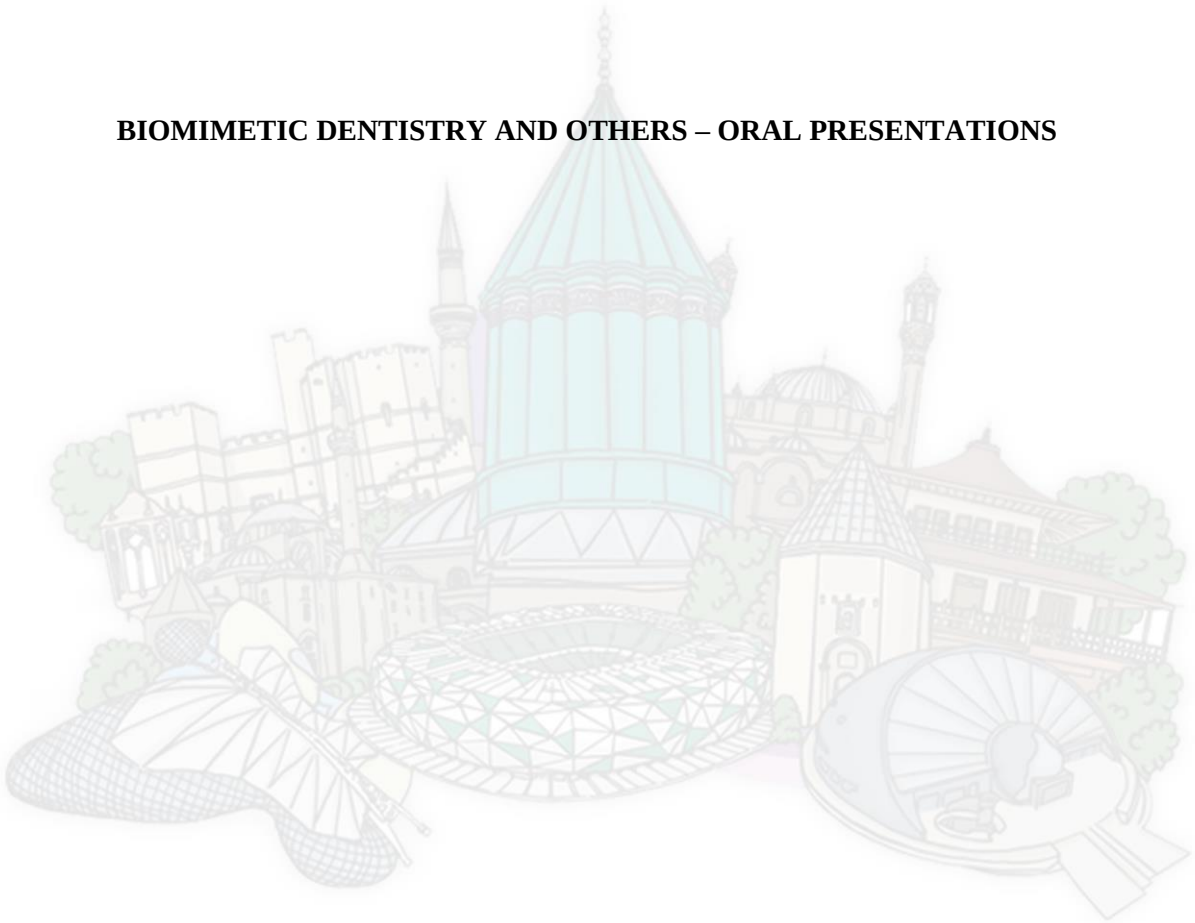
Thirty-three caries-free human third molars were used in this study. The teeth were divided into two groups, 15 for enamel and 18 for dentin. In the enamel groups, the mesial or distal surfaces of the teeth were roughened and irradiated with Er,Cr:YSGG laser, while in the dentin groups, the occlusal enamel layer was removed and the exposed dentin surfaces were irradiated with Er,Cr:YSGG laser. Then, the teeth in each group were randomly divided into six subgroups according to the adhesive procedures; G1: C-Bond (SE mode), G2: C-Bond (EAR mode), G3: AmbarBond (SE mode), G4: AmbarBond (EAR mode), G5: Clearfil SE Bond, G6: 3M SingleBond. After the application of the adhesives, composite build-ups were prepared with a resin-based microhybrid composite. The specimens were cut into 1 x 1 mm (±0.2) sticks and μTBS were performed. Fracture modes were determined under a stereomicroscope. Data were analyzed by one-way ANOVA and Tukey HSD post hoc test also Kruskal-Wallis and Mann-Whitney U test ($p<0.05$).

In the enamel groups, the highest μTBS values were observed for G6 - 3M SingleBond (25.92 ± 5.43 MPa) and the lowest for G1 - C-Bond (SE mode) (11.55 ± 2.52 MPa) ($p<0.05$). Also, in the dentin groups, G5 - Clearfil SE Bond showed the highest bond strength values (30.67 ± 5.93 MPa), while G3 - C-Bond (EAR mode) had the lowest μTBS values (13.00 ± 3.55 MPa) ($p<0.05$).

If Er,Cr:YSGG laser is used for tooth preparation or surface treatment, the results of the current study suggest that re-etching with acid phosphoric for enamel and self-etching mode for dentin are recommended.

***Keywords:*** *Adhesion, Laser, Er,Cr:YSGG, Microtensile*

## BIOMIMETIC DENTISTRY AND OTHERS – ORAL PRESENTATIONS



**Effect of Newly Developed Home Bleachıng Gel on Tooth Surface Roughness, Mıcrohardness, and Color Change**

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**Introduction:** This study was aimed to evaluate the effect of experimental bleaching gels containing chitosan and theobromine at 16% CP and 6% HP concentrations were compared with BioWhiten ProHome (6% HP) and FGM Whiteness Perfect (16% CP) bleaching gels on tooth surface roughness, microhardness, and color changes.
**Materials and Methods:** One hundred-forty four upper central incisors were used for microhardness and surface roughness analysis and color analysis, (n=12). Before the bleaching, surface roughness was measured with a profilometer, microhardness was anaylysis with a Vicker's test and color was measured with a spectrophotometer. Group 1; experimental gel containing chitosan and theobromine (16% CP), Group 2; experimental gel containing chitosan and theobromine (6% HP), Group 3; BioWhiten ProHome containing 6% HP, Group 4; FGM Whiteness Perfect containing 16% CP. Microhardness and surface roughness tests were performed under the same conditions before and after bleaching and 14 days after the bleaching application. Before the bleaching treatment, during the application (7. days), 24 hours after the treatment, and following 7th and 14th days color analysis was performed. $p < 0.05$ was considered significant.
**Results:** Although there was not a statistically significant increase in the microhardness values after bleaching in all groups ($p > 0.05$). Effective bleaching was detected in all groups, and the highest efficacy was observed in Group 4 ($p < 0.05$).
**Conclusion:** As a result, it was determined that the experimental gels containing theobromine and chitosan provided effective bleaching, and did not cause any negative effects on tooth surface roughness and microhardness.

***Keywords:*** *Hydrogen peroxide, theobromine, chitosan, carbamide peroxide, microhardness, surface roughness, vital bleaching*

## Evaluation of Color Stability of Composite CAD/CAM Materials

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**Introduction:** The aim of this study is to evaluate the effect on the coloring of CAD/CAM resin nano ceramic block polished with different methods.
**Materials and Methods:** Standardized samples were prepared from the CAD/CAM resin nano ceramic composite block (Lava Ultimate, 3M, USA). The obtained samples were divided into 2 separate groups (n=15) after polishing with Super Snap polishing disk (G1, Shofu, Japan) and Twist Dia polishing wheel (G2, Kuraray, Japan). The surface roughness values (Ra) of the samples were measured with a roughness measuring device (Mitutoyo, USA) from 3 different regions from each sample before and after polishing. The baseline, 3rd and 6th day color values (L, a, b) of the samples immersed to coffee (1 g coffee 100 ml water) for a total of 6 days were measured with a digital spectrophotometer (Vita Easy Shade, Germany). Delta E values of the obtained data were calculated and statistical analyzes were made with the One-way Anova test.
**Results:** While the Ra values of the composite CAD-CAM block sections were statistically similar ($p>0.05$) before polishing (0.27) and G1 group (0.20), the G2 (0.50) group was different ($p<0.001$). Delta E values of G1 group were different from each other on the 3rd and 6th days after coloring with coffee ($p<0.05$). Delta E values of the G2 group on the 3rd and 6th days were different from each other ($p<0.05$). When the G1, G2 groups were compared with each other, there was no statistically significant difference between the 3rd day and 6th day Delta E values ($P>0.05$). There was a statistically significant difference between the 6th day coloration value of the G1 group and the 3rd day coloration value of the G2 group ($P<0.05$).
**Conclusion:** Based on these results, it is thought that the increase in the contact time with the colorant rather than the polishing of the CAD-CAM composite blocks adversely affects the color stability.

***Keywords:*** *CAD/CAM Composite, Surface Roughness, Coloration*

**Clinical Evaluation of Implant Supported Adhesive Cemented Ti-Base Zirconia Single Crowns and FDP's: Up To 3 Years Follow Up**

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**Introduction:** The aim of this study was to clinically evaluate the biological, technical, and radiographic outcomes of adhesive cemented screw-retained zirconia single crowns and fixed dental prostheses (FDPs) supported by titanium (Ti)-base abutments, with a follow-up of up to 3 years.

**Materıals And Methods:** A total of 27 patients with 50 implant-supported adhesive cemented screw-retained Ti-base zirconia restorations (39 single crowns and 11 FDPs) were included in this study. The clinical status of the restorations was assessed using Modified USPHS criteria at the end of the observation period (mean 28.7 months). Descriptive statistics were used, and percentile comparisons in Excel were employed for evaluating USPHS scores. The Mann-Whitney U test was used to compare periodontal scores between Ti-base restorations and natural teeth, and Chi-square test was used to compare USPHS scores between the crown and FDP's with a significance level set at $p<0.05$.

**Results:** A total of 27 patients (11 women and 16 men) who received 50 implant-supported adhesive cemented screw-retained Ti-base zirconia restorations were included in this study. The mean follow-up period was 28.7 ± 3.97 months (range: 24 to 37 months) for all crowns and FDPs. No implants or restorations were lost during the follow-up period, resulting in a cumulative implant and restoration survival rate of 100%. A significant difference was found only in the decementation (adhesive failed) and discoloration criteria according to the Modified USPHS criteria.

**Conclusıon:** Within these preliminary study results, the following conclusions can be drawn:

1. Adhesive cemented screw-retained Ti-base zirconia single crowns and FDPs achieved a 3-year survival rate of 100%.
2. Ti-base abutments are a feasible and cost-effective alternative to stock or conventional abutments, and they can successfully support zirconia single crowns and FDPs.
3. Well-designed randomized clinical trials should be conducted for further evaluation.

***Keywords:*** *Monolithic, Ti-base abutment , Zirconia, Implant Supported*

## Preparation Parameters Affecting Endocrown Restoration

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**Introduction:** In recent years, endocrown restorations have become popular among biomimetic indirect restoration methods for endodontically treated teeth. Endocrowns must be appropriately prepared to meet biomechanical standards and provide suitable macro-mechanical as well as micromechanical retention. Therefore, it is essential to investigate the exact details of preparation, together with the divergence angle.Purpose:
This study aimed to evaluate the divergence angle of molar endocrowns and the effect of tooth position on the amount of divergence angle in preparations by prosthodontists.
**Materials and Methods:** In total, 160 samples of molar teeth endocrown stereolithographic files were transferred to engineering simulation software. The degree of divergence angle was measured according to buccolingual and mesiodistal walls, considering tooth position and remaining walls of the prepared tooth. Data were analyzed using one-way and multi-way analysis of variance (ANOVA) and T-tests (α=.05).
**Results:** The mean angle of buccolingual and mesiodistal divergence was 35.5 ± 11.96 and 31.8 ± 11.99 degrees, respectively. The mean angle of buccolingual and mesiodistal divergence was 33.6 ± 11.04 and 31.8 ± 11.6 degrees for the maxilla and 37.0 ± 11.46 and 33.2 ± 8.58 degrees for the mandible. The mean angle of buccal (17.44 ± 6.59), lingual (18.01 ± 6.82), mesial (17.45 ± 8.03), and distal (15.67 ± 8.39) walls were calculated. The tooth position significantly differed in the buccolingual dimension's divergence angle (p-value= 0.014). In the mandible, a significant difference among distal walls compared to other remaining walls was demonstrated (p-value< 0.05). In the maxilla as well as the mandible, a significant difference in divergence angle was observed between the right and left quadrants. Additionally, the mean difference of divergence angle in the first and second molars was significant.
**Conclusion:** Preparation parameters, including maxillary or mandibular position, quadrant position, or the number of remaining walls, did not affect internal mesiodistal and buccolingual divergence angles. The only factor that increased the buccolingual divergence angle was the position of molar teeth. Additionally, in contrast to the divergence angle, there were several factors such as tooth position (jaw, quadrant, molar teeth number), and the number of remaining walls that had an impact on the inclination of tooth walls.

***Keywords:*** *Endocrown, Biomimetic restoration, Indirect restoration, CAD/CAM system, Preparation method*

*This study was approved and supported by the Tehran University of Medical Sciences. ID (IR.TUMS.VCR.REC.1399.436)*

**Three-Year Clinical Evaluation and Survival Rate of Splinted Periodontally Compromised Anterior Teeth - a Retrospective Pilot Study**

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**Introduction:** Splinting mobile teeth is a treatment method that allows redistribution of occlusal forces from mobile teeth to their immobile neighboring teeth in order to support periodontal therapy. This retrospective study aimed to evaluate the survival and the current periodontal status of the splinted anterior teeth and the integrity of the fiber-reinforced splint restoration.

**Materials and Methods:** Severe periodontitis patients with fiber-reinforced splinted anterior teeth were assessed retrospectively. The number of tooth loss and bone loss/gain with periodontal pocket depths (PPD) were recorded for periodontal evaluation. Splint integrity and repairs during a 3-year period were recorded.

**Results:** Patients who underwent splint restoration in 2020 were recalled and 22 patients were reached. It was observed that 16 (%72.7) patients had at least one systemic disease (Diabetes; n=7, Hypertension; n=4, Other; n=5). It was observed that only one of the 132 teeth with canine-canine interdental splints was lost and accordingly the survival rate of the teeth was 96% and the average of probing pocket depths was 24.5 ± 0.8. When orthopantomographies taken during the recall session and the last radiographs taken before splint were compared, it was observed that bone filling was present in 10 (45.5%) patients, bone levels remained stable in 6 (27.2%) patients and bone resorption increased in 6 (27.2%) patients. When splint restorations were evaluated, it was found that 10 (45.5%) of 22 splints had fractures or/and debonding in at least one region, while 6 (%27.2) of the patients required splint repair at least once in 3 years.

**Conclusion:** As a result of 3-year clinical evaluation, it was observed that periodontally compromised teeth with fiber splint restorations is a predictable treatment option even in the presence of periodontal disease-related systemic disease. It is thought that the effect of fiber-reinforced splints on survival rates and periodontal status, together with other affecting factors, can be revealed more clearly with further retrospective studies with a high number of participants.

***Keywords:*** *fiber-reinforced, splint, periodontitis*

**Splint Design and Materials are Important for Stress Distribution of Mandibular Molar Tooth with Vertical Bone Defect: the FEA Study**

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**Introduction:** Periodontal splints are critical for the stability of the teeth that need nonsurgical or surgical periodontal therapies. The objective of these three dimensional-finite element analyses (3D-FEA) is to evaluate the effect of different splint designs and materials on stress distribution at mandibular molar with vertical bone loss.

**Materials and Methods:** The study involved creating six different test models to simulate splinting scenarios for the mandibular 2nd premolar, 1st and 2nd molars. Modeling for posterior mandibular 1st molar was performed as 60% vertical bone loss without furcation involvement. The Computed Tomography database including molars and premolars was used to create models. The following conditions were simulated: 1) Fiber-reinforced composite splint-buccal (FRCS-b), 2) Fiber-reinforced composite splint-lingual (FRCS-l), 3) Fiber-reinforced composite splint-occlusal (FRCS-o), 4) Composite splint-buccal (CS-b), 5) Composite splint-lingual(CS-l), 6) Composite splint-occlusal (CS-o). Vertical and oblique chewing forces were applied during loading. Stress accumulations and distributions at mandibular posterior region were examined using von Mises and maximum principal stress criteria.

**Results:** In the splint models, the lowest stresses observed in occlusal splint groups (FRCS-o, CS-o) when vertical forces applied to the cancellous bone. Vertical forces on cortical bone, lowest stresses observed in lingual groups (FRCS-l, CS-l). When oblique forces were applied to the cancellous bone and cortical bone, the lowest stresses were measured in the occlusal groups. With transverse forces on cancellous and cortical bone, lowest stress values on the affected teeth were noted in buccal and lingual splint groups (FRCS-b, FRCS-l, CS-b, CS-l). Lowest stress values on neighbor teeth were in occlusal splint groups (FRCS-o, CS-o).

**Conclusion:** FEA may not represent the dynamic features of the teeth and periodontal tissues but the findings of this study demonstrated that lowest stress values at supportive periodontal tissues were noticed in occlusal splint groups (FRCS-o, CS-o). When patients need splints for posterior region before nonsurgical or surgical periodontal therapies, occlusal splints with/without fiber seem more predictable for surrounding periodontal tissues.

***Keywords:*** *Finite Element Analyses; Periodontal splints, periodontitis, vertical bone loss*

**Clinical Effectiveness of the Mono-Block Direct Composite Crown Restoration For Severely Destroyed Endodontically Treated Teeth**

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We previously reported the success and the survival of the mono-block direct composite resin crown restoration (MDDCs) and it was validated treatment option even if they have lost their ferrule effect. However other factors related to conditions and risks of dehiscence should be taken into consideration of variety of reason for restorative treatment as habitual fracture, secondary caries extension, and repeated debondings.
We conducted a clinical study using collected date from specific records for the survival analysis for the MDDCs. Subjects underwent treatment of the MDDCs and other related dental examinations from May 2011 to February 2022 at Habara Dental Clinic, Osaka, Japan, providing baseline information. To determine the failure events as major outcome, debondings of the MDDCs, follow-up examinations were caried out and 98 of the initial enrollees completed longitudinal assessment for the study. Of these, 94 subjects without ferrule effect were included in the present analysis.
Odds ratio (OR) and 95% confidence interval of characteristics for survival of MDDCs was calculated by the logistic regression model. The final multivariate model includes 16 variables.
The overall crude OR of 0% ferrule for failure increased (crude-OR=2.32, 95%Cl:0.69-7.83, to a marginally statistically significant level and its risk might be elevated in the case with “debonded” in the stratified analysis. The mul-OR of 0% ferrule was not significantly increased (mul-OR=,1.38, 95%Cl:0.36-5.24). The OR of the SLDP for failure decreased (crude-OR=0.31,0.04-2.56), and it reached to a significance level (mul-OR=,0.05, 95%Cl:0.00-0.86). The OR of the “debonded” for failure increased (crude-OR=3.73,1.23-11.32), and its risk significantly elevated (mul-OR=,5,24, 95%Cl:1.25-21.90). No apparent association were found in level of no ferrule (0% vs 0-75% ferrule) and fiber post usage in the multivariate analyses. We concluded that the mono-block direct composite resin crown (MDDCs) restoration for severely destroyed endodontically treated tooth restoration that have lost their ferrule effect must be a treatment option.
• No financial relationships to disclose. • This study was reviewed and approved by the Ethics Committee of the Tokyo Medical and Dental University; D2020-026.

***Keywords:*** *mono-block direct composite resin crown restoration, endodontically treated teeth, ferrule,SLDP, direct restoration*

**Does Bulk Technique or Laying in Black 2 Cavities Affect Micro Leaks of Composite Resins?**

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**Introduction:** The aim of this study was to evaluate the effect of bulk and layered application of composite resins in black 2 cavities on microleakage.
**Materials and Methods:** 60 molar teeth were used in the study. Black 2 slot cavities of 2x3 mm wide and 4 mm deep were prepared on the mesial and distal surfaces of the teeth and restored with composite resins using the Clearfil Liner Bond F (n=20). Estelite Posterior Tokuyama (EP) and Filtek Z250 3M (FZ250), composite resins was applied layering 2 mm in distal cavites and with bulk technique in mesial cavities. Filtek Bulkfil 3M (FB) was applied to the cavities with bulk technique. Composite resins were polymerized by light for 20 seconds each from the occlusal, buccal and lingual surfaces. Restored teeth were immersed in 0.5% basic fuchsine solution for 24 h. Subsequently, the teeth were sectioned mesiodistally to obtain samples for observation under stereo microscope in order to determine microleakage degree. Wilcoxon statistical tests were applied with a significance level of 5% ($p < 0.05$).
**Results:** For EP and FZ250 composite resins, there was no statistically significant difference in terms of microleakage values between bulk or layered application on both the gingival and occlusal margins. The FZ250 composite resin showed statistically significantly greater microleakage at the gingival margin than the occlusal margin in both bulk and layered application. FB composite resin showed statistically significantly less microleakage than FZ250 composite resin at the gingival margin in both bulk and layered application.
**Conclusion:** There was no difference in terms of microleakage between bulk and layered applications of composite resins applied to Black 2 cavities.

***Keywords:*** *Composite resin, Microleakage, Bulkfill, Black 2, Layering Technique*

**Evaluation of Postoperative Sensitivity in Posterior Composite Resin Restoration: a Randomized Clinical Study**

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**Introduction:** Postoperative sensitivity is seen after posterior composite resin restoration applications and is one of the most important reasons for replacing restorations in the short term. Postoperative sensitivity; especially total-etch adhesive systems and polymerization shrinkage, it can be seen depending on the cavity, material or placement technique. Many new materials and techniques are being studied to reduce polymerization shrinkage. The aim of this study was to analyse the effect of applying a universal adhesive that can be used with all adhesive techniques with different adhesive techniques(total etch\self etch) and different composite placement techniques(bulk-fill technique\incremental layering technique) on postoperative sensitivity to clinically.

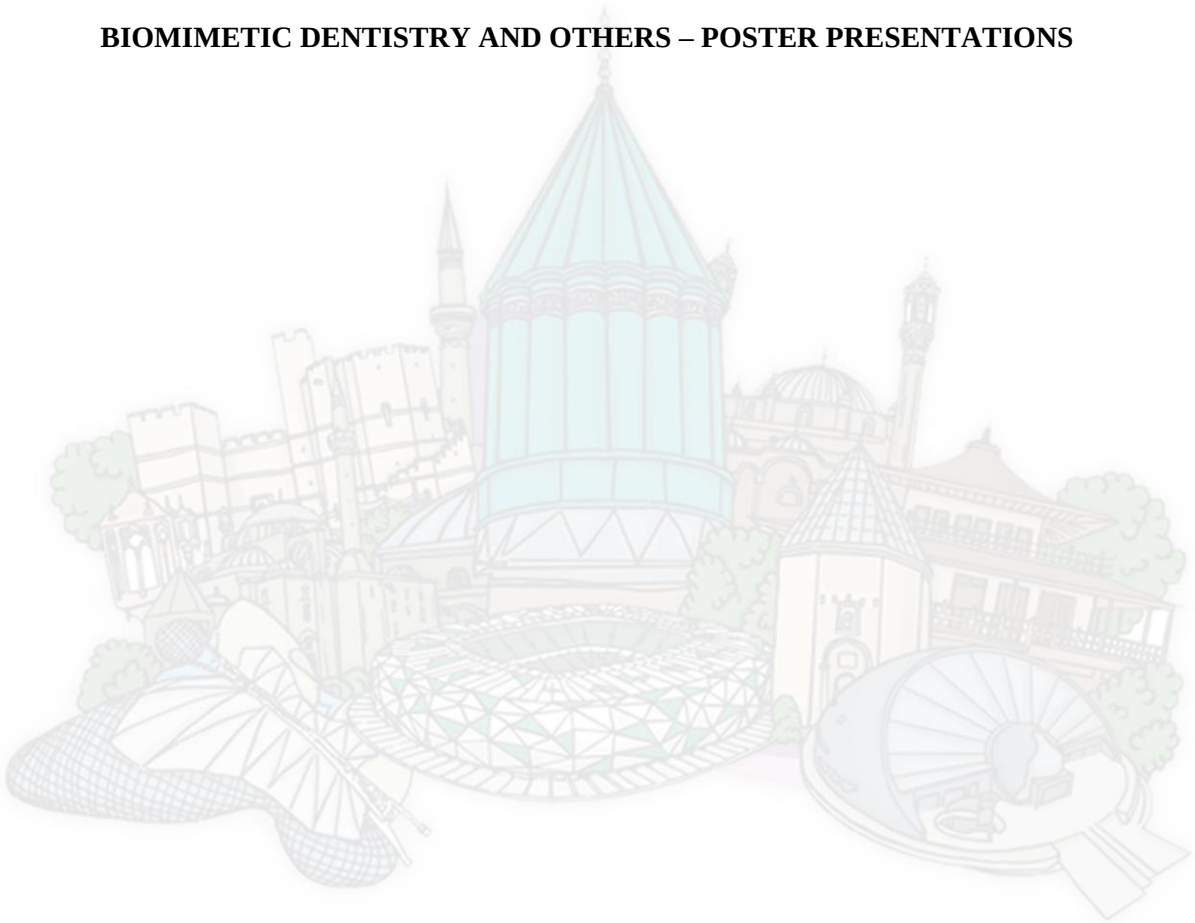
**Material and Methods**: This study planned as randomized, controlled, double-blind and split-mouth *invivo* conditions, was conducted with 70 patients with primary caries lesions in their premolars. Two restorations, one from each adhesive technique, were applied to each patient. Adhesive resin G2-Bond Universal (GC Corp. Tokyo, Japan) was applied with total-etch and self-etch techniques according to the manufacturer's instructions. Cavities were then completed with the bulk-fill technique using Tetric PowerFill (Ivoclar Vivadent, Schaan, Liechtenstein) composite resin or the incremental layering technique using G-aenial Posterior (GC Corp. Tokyo, Japan) conventional composite resin. Postoperative sensitivity was evulated at baseline (day 0), days 1, 7 and 14 with cold, air and chewing stimuli using the VAS (visual analog scale) scoring index. Remaining dentin thickness was measured using bite-wing radiographs following the restorative procedures. The Kruskal Wallis-H test and the Friedman test were used to compare the groups, and the Bonferroni multiple comparison test was used in cases where a significant difference was detected.

**Results:** No statistically significant difference was found between the sensitivity scores measured at baseline, day 1, 7 and 14 for chewing, air and cold stimulus tests ($p>0.05$). Although it is not statistically significant, it has been determined that the sensitivity scores decrease gradually between the times when the mean values were analyzed.

C**onclusion:** The results of this study revealed that, the use of universal adhesive resin with the total-etch or self-etch technique and the composite placement technique did not affect the postoperative sensitivity. According to the results of our study; no statistically significant difference was observed between the test groups in terms of postoperative sensitivity to any time or stimulus.

***Keywords:*** *Postoperative Sensitivity, Universal Adhesive, G2 Bond Universal, Bulk-Fill Composite*

## BIOMIMETIC DENTISTRY AND OTHERS – POSTER PRESENTATIONS



**Restoration and Stabilization of Periodontally Compromised Teeth with Fiber-Reinforced Composite: a Case Report (15 Months Follow-Up)**

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**Introduction:** To achieve restorations that have high fracture toughness and the ability resist to crack propagation, fiber-reinforced dental composites are used as ideal dentin-like dentin replacement materials. Fibers inhibit crack initiation and propagation, bridge the cracks, and prevent their opening and further spreading. This presentation aims to exhibit using fiber material for the direct composite restoration and stabilization of periodontally compromised teeth.
**Case:** An adult- female patient admitted to our clinic with aesthetic and periodontal concerns of upper anterior teeth. Clinical, radiographic, and intraoral examinations were performed on our patient. Teeth numbered 11 12 13 21 22 23 were periodontally damaged and had mobility. Due to the protrusive position of the left central upper tooth, the patient was not satisfied.
Completing root canal treatment of the left upper central incisor was the first step in this case. Secondly, After color selection, anesthesia was applied and isolation was provided with rubber dam. The right and left upper central incisor tooth was prepared to replace the correct position, to generate the aesthetic view. Aesthetic restorations of 11 and 21 numbered teeth were achieved with A3 and 0A3 color composite (Estelite Sigma Quick, Tokuyama, JAPAN) and G-Premio Bond (GC, Corp, Tokyo, JAPAN) were used according to the manufacturer's instructions. During the aesthetic restorative protocol, in order to the strengthen tooth structure of the left upper incisor teeth, a piece of glass fiber reinforcement material Interlig (Angelus, Londrina, Brazil) was placed palatal shell of restoration and covered with flowable dental composite Clearfil Majesty Flow (Kuraray Medical Inc.). After completing aesthetic restorative procedures, the occlusal bite was checked and palatal surfaces of 11,12,13,21,22,23 numbered teeth were prepared, etched, and bonding agent was applied. Flowable composite resin was also applied as a bed for placing the fiber-reinforced splint material. Interlig (Angelus, Londrina, Brazil) was placed, polymerized, covered with composite resin, and completed by finishing and polishing. After 15 months follow up the aesthetic outcome remained stable, there is no debonding or fracture fiber reinforced splint.
**Conclusion:** Fiber-reinforced composite restorations allow dental practitioners to accomplish conservative and low-cost restorations besides high fracture resistance.

***Keywords:*** *fiber-reinforced restorations, fiber splint,*

**Evaluation of Shear Bond Strength of Different Composite Brands**

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The aim of the study is to evaluate the shear bond strength of a nanohybrid composite resin to body and dentin composites of different brands.
In this study, 3 groups [Clearfil Majesty Esthetic Body (Kuraray, Japan); Filtek Supreme Ultra Dentin (3M ESPE, USA); Essentia Dentin (GC, Japan)] were formed using different brands (n=10). In each sample, body and dentin composite were placed 2 mm layers into an acrylic cylinder and polymerized with light-emitting diode curing unit (Valo Cordless) for 20 seconds. Then, nanohybrid composite (XS-Fil, B&E, Korea) was layered on the body/dentin composite without damaging the oxygen inhibition layer and polymerized for 20 seconds. In order to determine the shear bond strength, a force of 1 mm/min was applied with a blunt-tipped apparatus until fracture occurred at the interface of body/dentin composite and nanohybrid composite of each sample. MPa values were recorded by dividing to the sample surface area ($mm^2$). ANOVA test was used to compare the bond strengths ($p<0.05$).
No statistically significant difference was observed between the shear bond strength of body and dentin composites of different brands to a nanohybrid composite ($p>0.05$). The bond strengths were determined as 43.39 MPa in the Clearfil Majesty Esthetic group, 45.73 MPa in the Filtek Supreme Ultra group, 47.36 MPa in the Essentia group, respectively.
It is appropriate to use nanohybrid composites by layering on body and dentin composites of different brands in order to provide aesthetics.

***Keywords:*** *body composite, dentin composite, layering, nanohybrid composite, shear bond strength*

**Effect of Polyethylene Fiber on Fracture Resistance of Bulk-fill Composites**

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**Introduction:** The aim of this *in vitro* study was to evaluate the fracture resistance of sonic-activated SonicFill3 (SF) (Kerr) and flowable Charisma Bulk Flow ONE (CO) (Kulzer) bulk-fill composites with or without polyethylene-fiber (R) (Ribbond) application.

**Materials and Methods**: Class I cavities (2x2x4mm) were prepared on 40 freshly extracted human premolars of similar size and classified randomly into 4 groups (SF, SF+R, CO, CO+R). The remaining wall thicknesses of the teeth was confirmed to be 2mm. Ribbond fiber (2x2mm) was applied to cavity bases of the acryl-embedded teeth according to manufacturers' instructions and OptiBond (Kerr) (for SF, SF+R groups) and Gluma Bond (Kulzer) (for CO, CO+R groups) universal adhesives were used. All specimens were restored in a 4mm monolayer with SF and CO. Valo Cordless (Ultradent) LED-curing unit with a power output of 1000 mW/cm$^2$ was preferred for polymerization. Finishing and polishing were completed with the last 2 stages of Sof-Lex discs (Kerr). Restored teeth were stored in distilled water at 37°C for 24 hours. Fracture resistance ($F_S$) and elastic modulus ($E_M$) values were measured with a universal testing device (Shimadzu AG-X, Shimadzu Corp, Japan). Data were analyzed with IBM SPSS V23 using Independent samples T-test. The significance level was set at $p<0.05$.

**Results:** No statistically significant difference was found between the bulk-fill composites (SF and CO) without R ($p=0.167$). Similarly, no significant difference was detected between the Ribbond fiber applied groups (SF+R and CO+R) ($p=0.994$). The effect of fiber application on $F_S$ of SF ($p=0.421$) and CO ($p=0.552$) was not statistically significant. The mean maximum force values (newtons) in decreasing order were CO (761.09±224.32) > SF+R (671.08±150.51) > CO+R (669.95±358.44) > SF (580.7±269.04). The $E_M$ values of SF and CO were statistically significantly different ($p=0.009$). A statistically significant difference was observed between the $E_M$ values in the Ribbond fiber applied groups (SF+R and CO+R) ($p=0.026$). $E_M$ values of CO were statistically significantly higher regardless of Ribbond application ($p<0.001$).

**Conclusion:** Within the limitations of this in vitro study, the application of SonicFill3 and Charisma Bulk Flow ONE composites with Ribbond may be an option for clinical applications.

***Keywords:*** *bulk-fill composite, elastic modulus, fracture resistance, polyethylene fiber*

# Non-Invasive Evaulation of Marginal Adaptation of Dentin-Glass Ionomer Cement Interface Using Swept Source Optical Coherence Tomography

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**Introduction:** The purpose of this study was the evaluation of new glass ionomer material (Caredyne Restorative, GC)-dentin interfacial gaps and comparison of its effectiveness with the conventional glass ionomer material (Fuji IX GP Extra, GC) using non-invasive imaging device swept-source optical coherence tomography (SS-OCT).
**Materials and Methods:** Eighty round-shaped cavities (2mm depth and 2 mm width) were prepared in bovine incisor roots. Cavities were divided into 4 groups (n=20). Cavities in Groups 1 and 2 were treated with a tooth surface conditioner (Cavity Conditioner, GC) before the filling with the restorative material. Groups 1 and 3 were restored with Fuji IX GP Extra, and Groups 2 and 4 were restored with Caredyne Restore. All the cavities were treated with protective coating varnish (Fuji Varnish, GC) and left for chemical setting for 6 minutes according to the manufacturer's instructions. After the restorations were completed, the specimens were subjected to water storage (37 °C, 24 h). The observation surface was polished using 1000-grit silicon carbide paper. Then marginal adaptations were observed in the cross-sectional OCT images. The chi-square test and Fisher's exact test were used to determine group differences in categorical variables.
**Results:** SS-OCT was successful regarding non-invasive imaging of restoration margins and tooth structures. Different optical properties of the structures allow observation of restoration, dentin and cement-dentin interfaces. The images obtained from SS-OCT resemble interfacial gaps of the cavity margins. Marginal gaps can be observed as high signal intensity values at the cement-dentin interface. Marginal gaps are observed as following; Group1: 18/20(90%), Group2: 3/20 (15%), Group3: 20/20 (100%), Group4: 2/20(10%). Statistical significance was observed between Group1 and 2 ($p$<0.001) and Group3 and 4 ($p$<0.001). Group1 and 3 (p=0.487) and Group2 and 4 (p=1.000) showed no statistical significance difference.
**Conclusion:** It was found that the cavity adaptation of Caredyne Restore was successful compared to conventional material.

***Keywords:*** *glass ionomer cement, swept source optical coherence tomography, interfacial gaps, caredyne restore*

**Comparison of Splinting Techniques of Periodontally Compromised Mandibular Anterior Teeth**

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**Introduction:** The stability of periodontally compromised mandibular anterior teeth is critical to maintain the integrity of whole dentition. Splinting of periodontally affected teeth provides better esthetics, function and phonation for the patient with periodontitis. This study aimed to analyze the effects of the design and the materials of different splint groups on the stress accumulation and distribution on the surrounding periodontal tissues at mandibular anterior teeth with 60% horizontal bone loss model using three-dimensional finite element analysis (3D-FEA).
**Material and Metods:** Six different splint models were created, and the stress distribution on spongious and cortical bone was measured under vertical and oblique forces. The groups were designed as follows: 1) Composite-wire splint applied to the buccal surface (CWSB), 2) Composite-wire splint applied to the lingual surface (CWSL), 3) Fiber-ribbond splint with cavity preparation (FRS+C), 4) Fiber-ribbond splint without cavity preparation (FRS-C), 5) Composite splint with cavity preparation (CS+C), and 6) Composite splint without cavity preparation (CS-C).Computed Tomography images in the database were used to create models, and 3D-FEA was used to evaluate vertical and oblique forces generated during chewing. Stress accumulation and distribution on the surrounding periodontal tissues were examined using von Mises and maximum principal stress criteria.
**Results:** Results showed that splints with cavity had lower stress values in the canine and lateral tooth regions for vertical forces. However, the CWSB group had higher stress values in the canine region for oblique forces. Splint with cavity preparation had the lowest stress values in canines for vertical forces, while splint without cavity preparation had higher stress values on cancellous bone. The CS+C group had the lowest stress values in the central and canine teeth regions for oblique forces, and the CWSL group had the lowest stress values in the lateral tooth region.
**Conclusion:** This study demonstrated that splints with cavity preparation are better at distributing the load on both the canines that support the splint, and the central and lateral teeth with bone loss in the anterior region, compared to splints without cavity preparation. Therefore, it is recommended to use splint designs with cavity preparation when splinting teeth with bone loss in the anterior region.

***Keywords:*** *Finite Element Analyses, Horizontal bone loss, Periodontal splints*

# Clınıcal Evaluatıon of Prepless Dırect Composıte Lamınate Veneers: 1 Year Retrospectıve Study

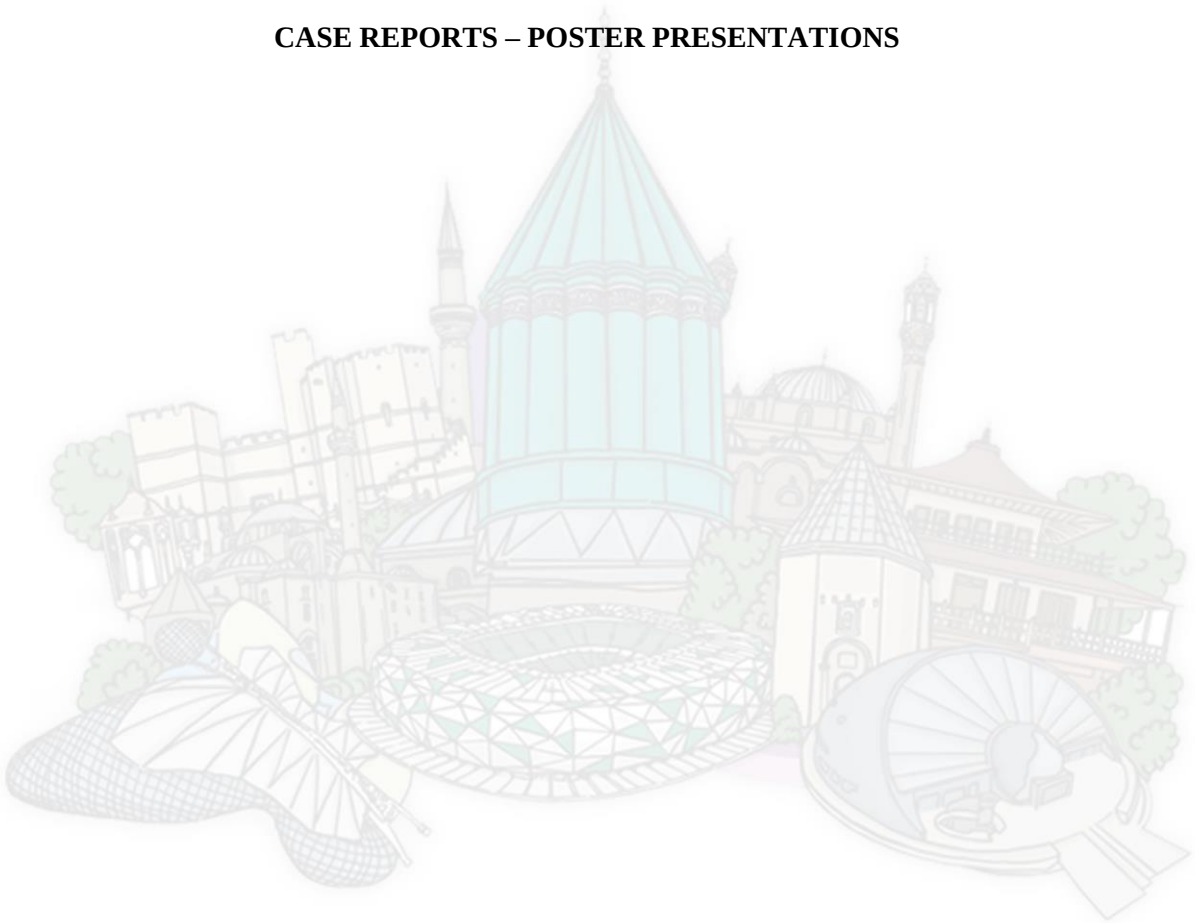
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**Introduction:** The study examined over 100 laminate veneer restorations using a modified USPHS criteria to evaluate their clinical performance and aesthetic outcomes. The purpose of the study was to investigate the effectiveness of prepless laminate veneers - biomimetic treatment option for improving esthetics, and to assess their clinical behavior.
**Materials and Methods:**: 9 patients were restored with 119 composite laminate veneers. The veneers were studied for an observation time of 1 years. Marginal integrity, marginal discoloration, surface texture, wear, postoperative sensitivity, recurrent caries were clinically examined following modified United States Public Health Service (USPHS) criteria. Each restoration was also examined for cracks, fractures, and debonding. Chi-square test was used for compare to mandibuar and maxillar restoration. Significance level was taken %95 CI ($p<0,05$)
**Results:** The lowest USPHS scores were attributed to marginal discoloration (%33 A, %59 B, %8 C) and marginal integrity (%25 A, %73 B, %2 C). Evaluation of surface texture revealed results of %64 A, %30 B, and %6 C. When evaluated for wear , the values distirbution were (%66 A, %32 B, %2 C). Wear on mandibular teeth with composite laminates was significantly higher than that observed in laminates on maxillary teeth. Postoperative sensitivity, decay, debonding, and restoration loss were not observed in any of the laminates after one year clinic service.
**Conclusion:** This short-term clinical study has shown that;
The survival rate of composite laminate veneers is very high (%100) thanks to the developing adhesion technology. It mostly preserves the original dental tissue due to its ability to be prepless, is repeatable, and cost-effective. Discoloration and marginal integrity are the clinical parameters that require the most attention. Long-term and prospectively designed studies should be conducted in the future.

***Keywords:*** *Adhesive, prepless laminate, direct composite, clinical trial*

## CASE REPORTS – POSTER PRESENTATIONS



**Aesthetic Rehabilitation of Canine Teeth in Congenital Lateral Tooth Deficiency**

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**Introduction:** There are many options for treatment planning in patients with unilateral or bilateral congenital lateral incisor deficiency. While making this choice, aesthetics, the health of the surrounding dental tissues, the type of malocclusion, the width of the cavity, the shape and volume of the canine teeth, the degree of cooperation and the socioeconomic status of the patient should be considered. Adhesive restorations are one of the preferred treatment methods because they can be applied in a single session, are aesthetic, inexpensive and repairable.
**Case report:** A 26-years-old female patient applied to our clinic. In the examination, it was determined that the patient had unilateral lateral tooth deficiency, primary canine was present in the mouth and there was a diastema between the teeth. Other treatment options were explained to the patient. The patient stated that she wanted to be treated with adhesive restorations.
The form of the number 13 canine was made similar to the form of the lateral tooth. The form of the primary tooth number 53 was made similar to the canine tooth and aesthetics was achieved. The diastema between teeth 22 and 23 was closed by enlarging the form of tooth 22.
37% phosphoric acid was applied to the teeth for 30 seconds, then the teeth were restored using 3M Single Bond 2 and 3M Filtek Ultimate Universal A1 composite according to the manufacturer's instructions.
The patient was followed up 1 year later.
**Conclusion:** Conversion of the canine to the form of the maxillary lateral incisor creates many results in terms of aesthetics and occlusion. The degree of aesthetic success in making the canine similar to the missing lateral tooth directly depends on the original shape of the upper canine teeth and the ability of the person applying the treatment to make the canine look like the lateral incisor. Acceptable aesthetics can be achieved with adhesive applications.

***Keywords:*** *Adhesive, Composite, Canine, Diastema*

## Digitally Guided Composite Restorations After Orthodontic Treatment: A Case Report

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**Introduction:** Orthodontic treatment can improve dental aesthetics and function, but it can also lead to dental problems, such as interproximal caries and tooth fractures. This case report presented the dental treatment of a 25-year-old female patient who had previously undergone a fixed orthodontic treatment for five years and resorted to Marmara University Department of Restorative Dentistry due to aesthetic concerns. The patient complained about interproximal caries and a fracture of the right maxillary lateral incisor, which negatively impacted her dental aesthetics and function. After a thorough clinical and radiographic examination, a treatment plan which included composite restorations for the interproximal caries and the fractured lateral incisor was created.

**Case Report:** In the first session office bleaching was performed with 32% hydrogen peroxide gel (Fläsh; WHITEsmile, 3×15 minutes). Before starting the restorative treatment, palatal wall was designed using a software (Meshmixer, Autodesk). The software allowed for a virtual simulation of the desired palatal walls, which was then final guide model produced using a DLP 3D printer (Photon Ultra, Anycubic). Two weeks after bleaching, composite resin restorations were completed with body shade composite (Estelite Asteria A1B, Tokuyama Dental) under rubber-dam isolation. Universal adhesive (Bond Force II, Tokuyama Dental) was preferred and polymerization was completed with 1000 mW/cm$^2$ light-curing unit (Valo Grand, Ultradent). Finishing and polishing procedures was carried out using composite polisher (Lamello, Horico Dental). Follow-up sessions were conducted at 1 week, 1 month, and 6 months and evaluated for World Dental Federation (FDI) 2-steps criteria.

**Results:** The clinical performance of the treated teeth evaluated for aesthetic properties, surface texture/staining, colour stability/translucency and anatomic form according to FDI criteria and scored as 1.

**Conclusion:** The successful outcome of this case demonstrates the effectiveness of composite resin restorations for addressing functional, aesthetic, and satisfactory concerns. The use of modern technology, including digital design and 3D printing, allowed for improved accuracy and customization, resulting in a natural-looking and durable restoration.

***Keywords:*** *3D Printing, Composite Resin Restoration, Dental Caries, Dental Models, Digital Design*

**A Combined Treatment Approach for Fluorosis: Case Report (1-year follow-up)**

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**Introduction:** Fluoride is a mineral that prevents the formation of caries in teeth. However, excessive deposition of fluoride in enamel during dentition development can cause lesions that present as opaque white spots on teeth called dental fluorosis. Depending on the severity of the fluorosis, treatment options include bleaching, microabrasion, resin infiltration, veneer, and crown applications or a combination of several methods.
**Case:** A systemically healthy 17-year-old male patient was admitted to our clinic with aesthetic concerns about his anterior teeth. Clinical and radiographic examinations of our patient were performed. After intraoral examination, white lesions on the incisal part of the vestibular surface of teeth numbered 11, 21, 31, 32, and 41 and a caries lesion on the distal surface of 11 were detected. No signs of pain, sensitivity, fracture, or periapical lesions were found. To avoid unnecessary intervention to the tooth tissue, it was decided to perform bleaching as a first step. In-office bleaching technique (35% hydrogen peroxide (Whiteness HP, FGM)) was used according to the manufacturer's instructions for three consecutive cycles. It was observed that the desired effect was not achieved 2 weeks after bleaching. The second stage of the treatment plan was resin infiltration. Following the rubber-dam isolation, resin infiltrant (ICON, DMG, Germany) was applied on white lesions according to the manufacturer's instructions for three consecutive cycles. The white lesions were partially reduced but not completely disappeared. 2 weeks after resin infiltration, composite veneer restoration was decided to perform as the third stage. After color selection, anesthesia was applied and isolation was provided with a rubber dam. The carious lesion of the right upper central incisor was removed. The reduction of white spots was limited in enamel. All the border lines of the carious lesion and white spots were beveled. Restoration of teeth was performed with A2 color composite (Asteria, Tokuyama, Japan) and completed by finishing and polishing. After one year follow up the esthetic outcome remained stable and there were no symptoms of pain, tenderness, discoloration, or white color reflection under restorations.
**Conclusion:** In cases of fluorosis, stepwise treatment is suitable for a minimally invasive approach. However, treatment options can be combined on a case-by-case basis.

***Keywords:*** *fluorosis, bleaching, resin infiltration, restoration, minimal invasive*

## Re-Attachment Protocol for An Uncomplicated Crown Fracture: a Conservative Approach

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**Introduction:** This case report aimed to describe the clinical re-attachment protocol for an uncomplicated anterior crown fracture, in a single session.
**Case Report:** This report describes a 50-year-old female patient who attended to the clinic after acute trauma. According to intraoral and radiological examination, an uncomplicated crown fracture was observed. There was no need to root-canal treatment, and the tooth fragment was preserved, therefore the re-attachment treatment was considered as the treatment plan. The fractured fragment was single unit, thus not including multiple parts. An internal dentin groove was prepared for the tooth and the fragment. Following the split-dam isolation, 37.5% phosphoric acid (Gel etchant; Kerr) was applied to both pieces and a universal adhesive agent (Adhese universal; Ivoclar Vivadent) was used in accordance with the manufacturer's recommendations. The adhesive agent was not polymerized to avoid increasing the thickness of the adhesive film layer. A flowable resin composite (G-aenial Universal Injectible; GC Corp.) was applied to both pieces and the fragment was placed in correct position. Excessive restorative material was removed and then polymerized. A slight beveling on the fracture-line was prepared, extending to both the tooth and the fragment parts, to mask the fracture-line. The vestibular surface was layered with a nano-hybrid resin composite (G-aenial Achord, GC Corp.) with the free-hand technique. Surface polishing was done by using the spiral polishing wheels (Eve Diacomp Twist; EVE Ernst Vetter GmbH) and the interdental polishing strips. The patient was called for the follow-up appointments at 1 week, 1 month, 3 months, and 6 months.
**Clinical Considerations:** The rate of success for the re-attachment was assessed through the FDI (World Dental Federation) criteria, and the results were considered acceptable for all the evaluated clinical criteria. The treatment of a crown fracture by re-attachment of its own fragment is considered a feasible and conservative treatment option.

***Keywords:*** *Adhesion, composite, crown fracture, dental esthetics, re-attachment*

**Rehabilitation of Anterior Polydiastema İn With Direct Composite Veneers**

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**Introduction:** Nowadays, with the increasing interest of patients in conservative procedures and advances in composite resins, composite laminate veneers are among the most common treatment methods in restorative dentistry.
**Case Report:** A 25-year-old female patient was admitted to our clinic because of aesthetic problems in her dental appearance. Clinical and radiographic evaluations revealed congenital tooth deficiencies and persistent deciduous teeth in the posterior region. In the anterior region, morphologically irregular incisors and polydiastemas were observed.
Treatment alternatives were explained to the patient, but she only desired to improve the appearance of her anterior teeth. Initial photographs and impressions were obtained to evaluate the positions and axis of the teeth more accurately. Teeth dimensions of upper incisors and canines were planned by working with wax-up modeling on the plaster model. A silicone index was prepared on the wax-up model.
The enamel surface was slightly roughened with medium finishing disc (Optidisk, Kerr, ABD) and etched with ortho phosphoric acid. The universal adhesive system (Kuraray Clearfil S3 Bond, Japan) was applied according to the manufacturer's instructions under rubber-dam isolation. The palatal walls of the restorations were created with the silicone index. Proximal walls were created using curved metal bands and composite resin (A1B, Estelite Asteria, Tokuyama Dental, Japan) was placed with layering technique. Polishing disks (Optidisk, Kerr, USA) and polishing paste and brush were used to complete the treatment.
**Conclusion:** After the treatment, the patient achieved the desired aesthetic appearance and was satisfied with the treatment results. At one-year follow up restorations were quite successful in terms of esthetic, functional and biologic aspects.
Direct composite restorations can be applied as an alternative to porcelain laminate veneers for the patients who do not want loss of tissue on their teeth.

***Keywords:*** *Direct composite restoration, composite veneers*

*This report is supported by Tokat Gaziosmanpaşa University*

**Conservative Rehabilitation of Crown Fractures: 2 Case Reports**

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**Introduction:** Crown fractures are the common result of traumatic injuries. Most of these fractures involve the maxillary incisors due to their position in the dental arch. There are different treatment options for the rehabilitation of traumatized teeth. In this case report, the aesthetic treatment of complicated and uncomplicated crown fractures in two patients with direct composite resin restorations is described.
**Materials and Methods:** Case-1: 30 years old patient with complicated horizontal crown fractures including coronal two-thirds of the maxillary central incisors were treated with Cvek pulpotomy in the endodontics clinic and then referred to our clinic. After determining that the pulpal and periapical tissues of the teeth were healthy, direct composite resin restoration with the help of silicone index was concluded. Minimal invasive chamfer preparation was performed on the buccal site of remaining enamel surface and palatal site was beveled. All the prepared enamel surfaces were etched with phosphoric acid, and a bonding agent (S3 Bond Universal Adhesive, Kuraray) was applied under rubber dam isolation. The palatal wall was created with a silicone index and proximal walls of the restorations were created with anterior metal strips. A nano-hybrid composite resin (Estelite Sigma Quick, Tokuyama) was used for the multi-shade layering technique. Finishing and polishing processes were completed with polishing discs and rubbers. Case-2: 15 years old patient with uncomplicated crown fractures on upper central incisors was referred due to aesthetic concerns. After clinical and radiographic examination direct composite resin restorations were planned. Buccal and palatal sites of the teeth were beveled slightly. Restorations were performed with the same techniques and materials described in Case 1.
**Conclusion:** After the treatments patients were satisfied by the desired aesthetic appearance. At one-year follow up, restorations were quite successful in terms of esthetic, functional and biological aspects.
Satisfying results were obtained with adhesive dentistry and composite resin restorations for both cases. Direct composite restorations are the most conservative treatment option for the anterior crown fractures.

***Keywords:*** *Dental trauma, Composite restoration, Adhesive dentistry, Silicone index*

*This case report is supported by Tokat Gaziosmanpaşa University.*

## Aesthetic Rehabilitation of Discolored Central Incisor Reinforced with Polyethylene-Fiber

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**Introduction:** Discoloration and loss of excessive tooth structure are common complications after root canal treatment/RCT and may affect aesthetics of healthy smile. In this case, direct resin restoration/DRR was reinforced with polyethylene-fiber after devital bleaching of discolored central incisor.

**Case report:** A 41-year-old female patient has referred to our clinic for the aesthetic rehabilitation of tooth #11. After clinical and radiological examination, the treatment plan was decided as combined bleaching regimen (devital+home) and DRR with polyethylene-fiber (Ribbond). 35% Hydrogen Peroxide (Opalescence-Endo, Ultradent) was applied intra-coronally by one-week intervals for three sessions. During devital bleaching sessions, 16% Carbamide Peroxide (Opalescence, Ultradent) was applied with custom-made bleaching trays for 14-days. Following intra-coronal bleaching, calcium hydroxide (Vision Calcium Hydroxide U.S.P.) was kept in the canal for 10-days. Under rubber dam (Nictone) isolation, old restoration was removed. After roughening the surface with 37% ortho-phosphoric acid (Panora 200 Etching Gel, Imicryl) for 30sec, adhesive agent (Solare Universal Bond, GC) was applied and polymerized with LED (Valo, Ultradent). Palatal shell was created with the guidance of silicone index using shade-AO2 (G-ænial® A'chord, GC). Aproximal surfaces were created with sectional matrix system (Quickmat Forte, Polydentia). Polyethylene-fiber was prepared in two different dimensions (7x2mm and 4x2mm) using a caliper for reinforcing the restoration. Polyethylene-fiber was wetted with bonding agent (G2-Bond, GC) and embedded in flowable composite (G-ænial Universal Flo, GC) on palatal surface. Polyethylene-fiber was placed vertically and parallel to the tooth long axis. Buccal surface was restored with A2 and A1-shades (G-ænial® A'chord). Polishing was performed with discs (Sof-Lex, 3M-ESPE) and spiral wheels (DiaComp Plus Twist, Eve). Patient was recalled after 1 week, 1 month and 3 months, scored according to FDI by using five-step grades. No aesthetic or functional complaints were detected in the patient. In the clinical and radiographic evaluation, DRR was scored as 1 according to FDI criteria in terms of functional, biological and aesthetic properties.

**Conclusion:** Ribbond application may be prepared for reinforcing anterior tooth restoration without affecting the aesthetic. The advantages of using reinforced fiber to construct an intracanal post include resin composite crown reinforcement, translucency, and relative ease of manipulation.

***Keywords:*** *Carbamide peroxide, devital bleaching, direct resin composites, polyethylene-fiber*

**Treatment of Enamel Defects with Minimally Invasive Resin Infiltration Method**

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**Introduction:** Early stage caries lesions which are called White spot lesions are non cavitated demineralised areas on tooth surface. Unsufficent oral hygiene and appliances used during orthodontics treatment can cause increased demineralisation on tooth. Patients are concerned about aesthetics due to WSL. With different treatment options, the use of resin infiltration treatment has increased demand in recent years. The object of this case report is to study the treatment of white spot lesions occured after orthodontic treatment and follow up the results.
**Case Report:** A 18-year-old female patient was is complaining about WSL on tooths 15 to 24 applied to our clinic. After clinical and radiographic examination, resin infiltration treatment was decided. Before the treatment process a gingival barier (OpalDam, Ultradent) was applied on gingiva to protect soft tisue and to provide a clean and dry enviroment. %15 hydrochloric acid gel was applied on enamel surface for 2-minute- time and then washed with water from surface for 30 sec. The tooth surface was dried with pressure air and the material containing ethanol (Icon-Dry, DMG) was applied on the surface then waited for 30 sec. To optimize the opaque colour on the surface the process was repeated twice. Then ICON(DMG, Germany) was applied on the surfaces for 3 minutes. With air water sprey applied on the surface, resin was spreaded on the surface homogeneously and the interproximal surfaces were cleaned with dental floss. Surfaces had been light cured for 40 sec. then resın ınfiltrant was applied on the surface for 1 min. and was light cured. (D-Light Pro, GC ,Tokyo, Japan). The polishing process was done using polishing discs.(Super-Snap, Shofu, Japan). After 6 months, no aesthetic or functional problems were observed with the patient's restored teeth.
**Conclusion:** Resin infiltration treatment can provide aesthetics without loss of any tooth structure therefore this method can be an alternative treatment option for WSL.

***Keywords:*** *Demineralization, no cavitation, white spot lesion, resin infiltration.*

**Direct Posterior Restorations Reinforced with Polyethylene Fiber: Case Series**

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**Introduction:** Ribbond materials have been introduced to the market in order to support healthy tooth tissue in teeth with extensive material loss, to reduce polymerization shrinkage stress, and to obtain the closest restoration to the natural tooth with direct and indirect restorations. In this case series, direct composite restorations supported using ribbond in different positions on teeth with large material loss are presented.
**Methods:** After removing the caries on the teeth, the cavity shaping was completed. Rubber-dam isolation was provided. The ribbond material was wetted with adhesive and placed on the walls. Restorations were made using the Clearfill SE Bond adhesive system, G-aenial Injectable and G-aenial Achord composite materials. Occlusion control was done and finishing and polishing processes were completed.
**CASE 1:** Root canal-treated, MO-cavity upper 1st molar tooth. Ribbond was placed in 2 different ways. First, the fiber was placed on the pulpal wall in an "I" shape in the bucco-palatal direction. After the approximal wall was formed, it was placed “O” shaped.
**CASE 2:** MOD-cavity upper 2nd premolar tooth. The ribbond was placed on the pulpal wall in an “I” shape the mesiodistal direction .
**CASE 3:** Lower 1st molar tooth. The fiber was placed in a "C" shape on the buccal-distal-lingual walls of the tooth.
**CASE 4:** Upper 1st molar tooth. The fiber was placed on the pulpal wall of the tooth in an “I” shape in the buccolingual direction.
**CASE 5:** Root canal-treated, upper 1st molar tooth. The fiber was placed in a "U" shape on the buccal-pulpal-lingual walls of the tooth.
**CASE 6:** MOD-cavity upper 1st molar tooth. The fiber was placed on the pulpal wall in an "I" shape in the bucco-palatal direction.
Restorations were evaluated according to USPHS criteria at 3 and 6 month recalls.
**Conclusion:** Similar and successful clinical performances were observed in the 6-month follow-up of the restorations. Placing the ribbond material in different directions did not affect the clinical success of the restorations.

***Keywords:*** *Direct composite restoration, Fiber-reinforced restoration, Marginal deep elevation, Ribbond.*

**Applications of Polyethylene fiber (Ribbond) and Resin Composite Bridge for Anterior Tooth Aesthetic and Periodontal Stabilization: Case Report, One Year Clinical Follow-up**

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**Introduction:** The main reasons for splinting teeth are tooth bonding to replace missing teeth or as an adjunct to periodontal treatment. This clinical report's aim is to present a conservative and cost-effective bedside procedure that uses a resin composite bridge and polyethylene fiber (Ribbond) in combination to enhance both appearance and functionality.
**Case Report:** A 28-year-old female patient who complained of an diastema between 31 and 41 teeth and mobility of her mandibular anterior teeth was referred to the Akdeniz University Restorative Dentistry Clinic by the Periodontology clinic. A polyethylene fiber (Ribbond) siplint was planned in the anterior region using an artificial resin composite tooth pontic after a clinical intraoral examination. Using the button try technique, the Dentsply Sirona Neo Spectra ST, A1 and D2 colors were chosen. Following the recording of lower arch alginate impressions, dental stone casts were made. Model silicone index was obtained, and using a technique of layering, a resin composite pontic tooth was produced.The pontic was additionally polymerized for 10 minutes. Following intraoral alignment, a light-cured gingival barrier was used to attach the pontic tooth to the lateral teeth. Between the lower anterior canine and canine teeth, lingual surfaces were marked and 2 mm wide cavity was then created. The length of the polyethylene fiber was measured on the cavity, wetted with Prime&Bond Universal adhesive resin, and stored in a dish away from dental lighting until use. After the lingual enamel surfaces were etched with 37% phosphoric acid for 15 s applying adhesive and allowing it to light-cure for 10 seconds. The fiber was photopolymerized for 40 s surface was coated with composite resin. After checking the occlusion, the last touches of finishing and polishing were applied. 1 month and year clinical follow-ups were made.
**Conclusion:** The chairside approach described in this 1 year clinical follow up report, which used a combined technique of polyethylene fibers and resin composite bridge, provided a fast, minimally invasive approach that combined the benefits of fiber-reinforced technology for a functional and durable result.

***Keywords:*** *polyethylene fiber, periodontal siplint, pontic, diastema*

**Resolution of Aesthetic Concerns with Composıte Resin Restorations: 12-Months Follow-Up**

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**Introduction:** Dental caries are one of the most common oral health issues that can significantly impact an individual's aesthetics. Especially caries seen in the anterior teeth and the unhygienic restorations made afterward disturb the patients aesthetically and undermine their self-confidence in social life. There are many treatment options that can be preferred in order to regain the anterior region aesthetics. Adhesive dentistry makes it possible to create a satisfactory aesthetic view with minimally invasive attempts in this field. This case report aims to renew old restorations that are insufficient in terms of aesthetics and hygiene under rubber dam isolation with current adhesive techniques.

**Case:** A 20-year-old female patient applied to our clinic because of the poor aesthetic appearance of her old restorations in the upper anterior region. In the anamnesis, it was learned that composite filling was applied to the anterior teeth due to caries 4 years ago. End of the clinical and radiological dental examination, the presence of secondary caries under the restorations was detected and it was decided to renew the existing restorations. After isolation with Rubberdam, all restorations were removed and caries were cleaned. Prepared enamel surfaces were roughened with 37% orthophosphoric acid (Gel Etchant, Kerr, Orange, California, USA). The universal adhesive (OptiBond FL, Kerr, Orange, California, USA) was applied according to the manufacturer's instructions. Afterward, the restorations were completed by a layering technique using direct composite resin (Estelite Sigma Quick, Tokuyama Dental, Japan-OA2/A2). Finishing and polishing were done with fine-grained diamond burs and polishing discs (Soflex, 3M ESPE). In the follow-up meeting at the end of one year, it was seen that the restorations were aesthetically pleasing for the patient and biologically successful.

**Conclusion:** Dental caries can be treated to achieve aesthetic expectations by using current adhesive techniques and materials. Direct composite resin restorations; when applied with a correct and careful indication and good patient motivation, it can be used as an alternative to other treatment options in aesthetic restorations to be made in different parts of anterior teeth.

***Keywords:*** *aesthetic, composite, tooth decay, adhesion, old restoration*

**Full Mouth Rehabilitation of a Patient Having Maxillary Trauma**

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**Introduction:** Traumatic dental injuries are common in everyday life, especially uncomplicated crown fractures and luxation.
The aim of this case report is to present the emergency treatment as well as full mouth rehabilitation of a patient with maxillary trauma.
**Case Report:** A 31-year-old woman applied to our clinic because of aesthetic concerns caused by post-traumatic fractures of her maxillary anterior teeth.
**Examination findings:** 11: Extruded tooth with an uncomplicated oblique enamel-dentin fracture, but was reimplanted in another dental hospital and splinted from the right canine to the left canine. Periapical radiography revealed radiolucency in the periapical area,
12: Uncomplicated horizontal enamel-dentin fracture,
21: Uncomplicated oblique enamel-dentin fracture
16,36,46 amalgam fillings in the teeth with secondary caries.
In the first session, #11 and 12 gave devital responses to the electrical vitality test. Since false positives and negative responses may be obtained after trauma, #12 was checked again. At the end of the third week, it turned vital.
**Treatments:** Immediate dentin sealing (IDS) was performed on tooth #12 with 2-stage self-etch adhesive (*GC G-2 Bond Universal*) and flowable composite resin (*Tokuyama Estelite Universal Flow Medium*) at the first session. Root canal treatment was completed on # 11 within two sessions using sealer and *Meta Biomed* gutta percha cones. After supragingival scaling on full mouth, re-treatment with resin composite was performed on teeth #16, 36 and 46.
Then vital bleaching was applied with *BioWhiten,* which contains 30% hydrogen peroxide, in 2 sessions. For completing the esthetic rehabilitation, #11 and 21 were restored with resin composite, and the fractured segment of #12 was luted with flowable composite resin (*Tokuyama Estelite Universal Flow Medium*) under rubber dam isolation.
**Conclusion:** The patient with trauma-related anxiety left our clinic with her aesthetic concerns resolved.
Four months later, the root canal treatment and restorations were still successful and the patient's satisfaction remained unchanged due to adhesive restorations and bleaching procedures.

***Keywords:*** *Trauma, adhesive dentistry, full mouth rehabilitation*

## Smile Makeover with Composite Veneers Using İnjection Moulding Technique

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**Introduction:** Direct composite veneers are excellent treatment options for cosmetic concerns. They are minimally invasive, aesthetically superior, and less expensive than porcelain veneers. In order to fabricate direct composite veneers, the clinician must be skilled at sculpting composite resin material. This can be especially time-consuming for smile makeovers in which numerous teeth must be treated. Injection moulding of direct composite is an option for delivering aesthetics of high quality with minimal chair time on the part of the clinician.

**Case Report:** A 35-year-old female patient came to the Restorative dentistry department with concerns about her discolored anterior teeth and the shape of her lateral incisors. We decided to use direct composite veneers with injection moulding technique after examining her smile and considering her treatment expectations. After a minimal preparation on enamel surface , Impressions were taken, and a wax-up was created. Exaclear (GC company,JAPAN) was used to create a transparent silicone matrix for injection moulding. Flowable injectable composite (G-aenial Universal Injectable, GC company, JAPAN) was injected into the silicone mould through a vent created using a bur on an handpiece after proper etching (Ultra-Etch, Ultadent company, UT,USA) and bonding (G-Premio Bond-GC company, JAPAN). PTFE tape (polytetrafluoroethylene) was used to cover the adjacent teeth to prevent excess composite from flowing onto them. Interdental and buccal finishing and polishing was then done with diamond polishing wheels (Clearfill Twist-Dia,Kuraray company,JAPAN). After six months, the patient requested that the missing tooth number 14 be restored without dental implants or preparation of the adjacent teeth, so we applied a fiber bridge to preserve the patient's smile's aesthetics.

**Conclusion:** In this case, the required adjustments were minimal and using injection moulding technique was a viable option. The choice of shade was appropriate, and enlarging the teeth resulted in a smile that appeared proportionate. We presume that these veneers will last long if we perform routine maintenance and the patient practice good hygiene. Composites are easily repairable, so any future repairs will be relatively simple. The final results have a near-porcelain surface luster, and the patient was overjoyed with this predictable smile makeover.

***Keywords:*** *Composite veneers, Injection molding, Composite resin*

## Minimal-Invasive Treatment of Missing Lateral Incisors with Fiber-Reinforced Composite Bridge

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**Introduction:** Missing lateral incisors is one of the most common congenital tooth anomalies. Treatment of such tooth anomalies in the anterior region, functionally and aesthetically with minimally invasivemethods is very important, especially in patients with incomplete growth.
**Case Report:** A-16-year-old female referred by an orthodontist after finishing her orthodontic treatm ent. Medical history was clear and clinical-radiographic examination showed bilateral missing lateral incisors and median diastema. Patient stated that she was not satisfied with the photographs and afraid to laugh. All treatment options including a removable prosthesis were discussed with the patient and her parents (due to her age). The decision was to apply fiber reinforced composite bridge until growth is complete. Button technique was used to determine the suitable resin composite shade. Rubber-dam was applied and retention grooves of 1 mm depth were prepared on the palatal surfaces of the abutment teeth. The distance between the retention grooves was measured with flexible metal tapes and pre-impregnated fiber (Interlig-Angelus) was cutted with scissors according to the length. The retention grooves were etched with orthophosphoric acid 35%(3M Scotchbond Universal Acid); a universal adhesive bond (3M Scotchbond Universal Plus) was then applied and light- cured. A thin layer of flowable composite (Tetric power-flow Ivoclar) was applied to the grooves, the fiber strips were adapted to the grooves and light-cured. The retention grooves were filled with a nano-hybrid composite and composite restorations (Diamond A1,OL and A1- Kulzer) were made directly in the mouth using the polychromatic layering-technique. The finishing process was initiated with yellow ring bur and coarse disk (3M-Sof-Lex) to produce the contours of the teeth followed by silicon polisher. Polishing twist (EVE-Diacomp), diamond paste with goat-hair brush and felt wheel (Enamel Plus Shiny-Micerium) were used after occlusion adjustment.
**Conclusion:** Although fiber-reinforced composite bridges are initially considered as a temporary method for the restoration of missing anterior teeth, it can also be applied as a permanent restoration in correctly selected cases due to its minimal invasive and simplicity. After 6-months of follow-up the periodontal health was very good, no color change was observed, and the patient was satisfied with the treatment results.

***Keywords:*** *Fiber reinforced bridge, Missing teeth, Direct composite restoration, Minimal invasive dentistry, adhesion*

## Treatment Approach to a Discolored Tooth Due to Trauma

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**Introduction:** The loss of vitality of the teeth due to trauma may cause discoloration of the teeth over time. In the rehabilitation of these teeth causing aesthetic problems, restorative approaches can be applied in addition to whitening treatment. In this case report, it is aimed to present the treatment approach applied to a male patient who applied to our clinic due to discoloration in tooth #11.

**Case Report:** In the anamnesis taken from the patient, it was learned that he was a professional football player and had trauma to his upper jaw 16 years ago. In the clinical examination, it was determined that there was a caries lesion on the mesial surface of tooth #11 and that the tooth was devital. In the radiographic examination, it was determined that the 1/3 coronal part of the root canal of the tooth could not be observed. After root canal treatment, it was decided to apply intracoronal bleaching treatment to the patient. After the patient was informed about the treatments to be performed, written consent was obtained.

During root canal treatment, the buccal wall of the root was perforated due to calcification of the root canal entrance. MTA was placed in the perforated area. At the second appointment, the main root canal was entered, enlarged and filled with gutta-percha. The cavity was then closed with temporary filling material.

At the third appointment, after the temporary filling material was removed, 2 mm thick flowable resin composite and bleaching material (Opalescence™ Endo, Ultradent Products, Inc.) were placed on the coronal entrance of the root canal and closed with temporary filling material. This application was applied until the desired tooth color was obtained. After the bleaching treatment, the tooth was restored with composite resin. The patient was asked to come for control after 3 months.

After 3 months, it was observed that the patient had no aesthetic or functional complaints in the restored teeth.

**Conclusion:** Restoring with resin composite after bleaching can meet the aesthetic demands of the patient in teeth discolored due to trauma.

***Keywords:*** *bleaching, discoloration, endo bleach, non-vital bleaching, walking bleaching method.*

**Polydiastema Treatment with Single-Shade Composite Resin: One Year Follow-up**

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**Introduction:** Diastema is a term that describes the spaces between the teeth, usually seen in the anterior region. The presence of more than one diastema is called polydiastema. The aim of this study is to rehabilitate the aesthetics for a polydiastema patient with composite resin restorations which is a non-invasive method.
**Case Report:** A 23-year-old male patient was admitted to our clinic with a complaint of aesthetics caused by gaps in his upper and lower anterior region. After the patient was informed about alternative treatments such as porcelain laminate veneers or full crown restorations, it was decided to close the diastemas with composite resin restorations. The teeth are isolated with rubber dam application. After etching with 37% orthophosphoric acid, the teeth were rinsed and dried. The adhesive agent (Single Bond, 3M ESPE, USA) was applied in accordance with the manufacturer's instructions. Direct restorations were carried out with a single-shade composite resin (Omnichroma, Tokuyama Dental, Tokyo, Japan) using mylar strip bands with free-hand technique. Finally, the restorations were finished using fine-grained diamond burs and polishing discs (Super-Snap Disk Kit, Shofu, Japan). The patient was called for 1 week, 1 month, 6 month and 1 year follow-up appoinments after the treatment. At the one year follow-up small discolorations were observed and the restorations were repolished using süper-fine polishing dics (Super-Snap Disk Kit, Shofu, Japan).
**Conclusion:** For the treatment plan of a polydiastema case, criterias such as the patient's age, the distance between the teeth of the diastema, time and cost should be considered regarding the choice between indirect and direct techniques. Direct restorations with composite resins are cost-effective compared to indirect techniques and do not require any laboratory procedures. With the developing adhesive and composite technology, direct composite resin restorations have shown that they are one of the important non-invasive or minimally invasive clinical treatment alternatives. Clinically satisfactory color adaptation, form and healthy periodontal tissue were observed in this polydiastema case treated with non-preped anterior composite restorations using a single-shade composite resin, at one year follow-up. It can also be said that using single-shade composite resin simplified the color matching process compared to multi-shade composite resin's complicated process.

***Keywords:*** *1, Polydiastema 2, Single shade composite resin 3, esthetic 4, Minimal İnvasive 5, Composite*

**Restoring Peg Laterals: A clinical report**

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**Introduction:** Conical-shaped lateral incisors with smaller mesiodistal dimensions than cervicoincisal dimensions are commonly known as peg laterals. This shape anomaly causes an unaesthetic smile and loss of function. Although there are direct and indirect options for treatment, restoration with direct adhesive restorative materials is considered as a practical and economical option. The aim of this study is to remove the unaesthetic appearance of conical-shaped lateral teeth and restore them with current adhesive resin composites in a single session.
**Materials and Methods:** A 17-year-old female patient applied to the Akdeniz University Restorative Dentistry Clinic with the complaint of discomfort with the appearance of her teeth (12, 22). After necessary evaluations, the initial tooth color was determined using the button technique. Rubber dam isolation was performed, and labio-incisal surfaces of the teeth were beveled. Enamel surfaces were etched with 37% phosphoric acid (3M Etching Gel, 3M ESPE, St.Paul, MN, USA) for 60 seconds, and a universal adhesive system (Prime & Bond UniversalTM (DentsplySirona)) was applied. Then, nano-hybrid resin composites (Dentsply SmartLite® PS, 3M ESPE, St. Paul, Mn, USA) were layered and light-cured for 20 seconds with an LED light curing unit (VALO LED light curing unit, Ultradent Products Inc, South Jordan, UT, USA). The restorations were shaped and polished to resemble the natural tooth form.
**Results:** The patient achieved a natural smile that met aesthetic standards and was satisfied with the outcome. Follow-up evaluations were performed, and the restorations were successful.
**Conclusion:** Direct adhesive restorations can provide a clinically acceptable and cost-effective treatment option for restoring the aesthetic appearance and function of conical-shaped lateral incisors. It can also be recommended as a functional and biologically healthy treatment option for young patients before deciding on more operative treatment options.

***Keywords:*** *Peg Lateral Insizor, Direct Composite Resin, , Dental Aesthetic.*

**Bleaching Treatment of Dark Colored Arrested Carious Lesions – A Case Series Report**

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Arrested (remineralized) caries lesions are inactive, highly mineralized surfaces often characterized by a dark, unaesthetic discoloration. Color change is related to stain formation caused by dyes added into the lesion during the remineralization process, such as dietary pigments, metallic ions, amino acids formed as a result of proteolytic activities, organic residues and chromogenic bacteria. In such a clinical situation, some patients are bothered by dark discolorations and demand aesthetic treatments to mask the spots.The common clinical aesthetic approach to remove stains associated with arrested caries lesions is restorative intervention, which may improve the esthetic outcome but may result in unnecessary removal of a highly mineralized tooth structure for the sake of esthetics. In addition, inadequate restorations have the potential to cause plaque buildup, secondary caries, sensitivity, and iatrogenic problems. Teeth whitening treatment is a minimally invasive approach to eliminate or improve stopped caries lesion discoloration, as it is considered safe, effective, economical, and predictable. However, unlike the intact enamel, it has been reported in the literature that these lesions develop an opaque appearance or reappear after bleaching treatment. Little is known about the clinical follow-up of coloration. In this case series, office bleaching was applied to 10 patients who applied to the clinic with aesthetic complaints due to dark-colored carious lesions and were followed up for 3 months. The patients stated that the results of the treatment immediately after bleaching and 3 months later were aesthetically satisfactory for them.

***Keywords:*** *Arrested carious lesions, Staining, Office bleaching*

**No-Post No-Core Approach to Restore Severely Damaged Premolars: Endocrowns Case-Report**

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**Introduction,:** The restoration of extensively damaged endodontically treated teeth remains a challenge. The use of post-retained restorations has been questioned because of potential tooth weakening. With progress in the development of adhesive techniques, the emergence of minimally invasive dentistry without a post or crown is challenging the post-core and crown concept. Preparation designs for coronal restorations of endodontically treated teeth have become more conservative with advances in adhesive dentistry. Endocrowns are a monoblock type of restoration that use the pulp chamber and remaining coronal tooth structure as a means of retention.
**Case Report:** 47-years old female patient came to clinic suffering from pain in teeth #44 & #45 with caries ICDAS II Code 6 and severely damaged crowns. After root-canal treatments we decided to restore the teeth with endocrowns to preserve the remnant tooth structure. A 3D digital impression (iTero Element™5D) was taken to prepare Class 3 endocrowns using Lithium disilicate blocks (IPS-e.max CAD- Ivoclar). After intraoral Try-in the cementation protocol for lithium disilicate ceramics was applied by etching the internal surface with hydrofluoric acid 4.6% (Bisco) for 20s rinsed and dried followed by ultrasonic cleaning in alcohol for 5 min and Silane (3M Silane Coupling Agent) application for 20s. The teeth surfaces were isolated by rubber-dam before etching with orthophosphoric acid 35% (3M Scotchbond Universal Acid) for 30s rinsed and dried. A universal bond (3M Scotchbond Universal Plus) was applied. A dual-cure composite resin luting agent (3M RelyX U200) was used for cementation. After **18 months** of follow up both endocrowns were in a good functional and esthetic situation with a well fit marginal integrity.
**Conclusion:** Endocrowns appear to be a promising, conservative, and inexpensive restorative option with acceptable long-term survival for endodontically treated posterior teeth. Endocrowns were shown to restore severely damaged premolars, even in the presence of extensive coronal structure loss (Class 3 endocrowns). This minimally invasive treatment strategy presents several advantages in comparison with the classical post-core approach: (1) Tooth structure preservation; (2) Reduced risk of root fracture and root perforation (3) Decreased cost, no need for sufficient interocclusal space and several appointments.

***Keywords:*** *Endocrown - Adhesive Dentistry - Minimal Invasive Dentistry*

**Rehabilitation of Vertical Dimension of Occlusion in a Severely Clenching Patient: Case Report**

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**Introduction**: In cases when clinical considerations show decrease in vertical dimension of occlusion, rehabilitation of occlusal vertical dimension should be determined on the basis of the dental restorative needs and aesthetic demands. Current ceramic materials and adhesive techniques enables the application of such treatment in a minimally invasive manner. In this presentation, clinical procedures and 2-year clinical performance of a rehabilitation of occlusal vertical dimension will be shown in a severely clenching patient.
**Case Report**: A 44-year-old female presented for treatment of existing cracked restorations on maxillary and mandibular molars in both arches. Decreased vertical dimension, caused by severely clenching and cracked old restorations, was detected in intraoral exaination. Following the primary cast model, the new vertical dimension was adjusted on the articulator by using incisal pin method. Indirect overlays (Charisma, Kulzer) according to the new vertical dimension were adhesively cemented on occlusal surfaces of posterior teeth. After 4-weeks temporization, permanent restorative procedures were started. Composite veneers (Signum, Kulzer) were adhesively cemented on the palatal surfaces of maxillary anterior teeth at the first phase of treatment. After removing failed existing restorations and secondary caries, immediate dentin sealing was performed (Tetric N bond Universal , Tetric N flow, Ivoclar Vivadent) on the preparations and impressions (Speedex, Coltene) were taken. Lithium disilicate overlays (Emax press, Ivoclar Vivadent) were cemented adhesively (Syntac Classic, Variolink Esthetic LC, Ivoclar Vivadent) under rubber dam isolation. Intact premolar teeth were restored by pressed ceramic tabletop restorations, 1 mm in thickness. The patient was examined at 6-months, 1-year and 2-year recall times.
**Conclusion**: Adhesively cemented pressed lithium disilicate overlays were 100% successfull at 2-year recall. Cold sensitivity that existed on a molar was absent within 4 weeks after cementation. Short-term clinical performance of all ceramic bonded overlays for restoration of vertical dimension of occlusion was promising even in a severely clenching patient.

***Keywords:*** *Vertical Dimention, Clenching, Partial Adhesive In-direct Restoration*

**Bio - Aesthetic Management of Varied Crown Fractures – A Clinical Technical Tıp.**

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**Introduction:** Coronal fracture of the anterior teeth is a relatively common form of dental trauma. Different treatment modalities for crown fractures are proposed, depending on the severity of the fracture as well as soft tissue damage. With the advancement in adhesive dentistry and advanced biomimetic materials, different modalities in the management of fractured crowns have been remarkably established and proved to be successful, along with satisfactory feedback from patients.

**Case report**: This poster gives an overview of the management of various case reports with different modalities, such as managing a simple case with simple reattachment techniques, with various techniques to adapt, such as pulpotomy with Bio dentine and MTA, and management of a complicated crown fracture with various techniques and a technical tip on the management of fractured tooth resembling a 'Richmond Crown', maintaining gingival health by managing the biological width.

**Conclusion**: Even though Various treatment modalities have been suggested for crown fractures, reattachment of the fractured fragment is said to be beneficial in many ways. The flip side of this technique is that realigning the tooth fragment in the arch becomes relatively easier with recently advanced adhesive. Reattachment of the fractured fragment will be beneficial for the patients, providing social and psychological satisfaction.

***Keywords:*** *Bio aesthetic, Crown fracture, Fiber post , Reattachment, Resin cement*

**Closure of the Lower Anterior Incisor Diastema with Fiber-Splinted Pontic and Build-Up: Case Report**

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**Introduction:** Closing diastemas caused by detrimental habits like tongue thrusting or tooth deficiency with an artificial resin composite dental pontic is a practical and conservative therapy. By using current adhesive system technologies, it is possible to close diastemas without preparing existing teeth. The aim of this study is to close the diastema formed because of the habit of tongue thrusting in the past with a pontic stabilized with a fiber splint bridge.
**Materials and Methods:** A 52-year-old female patient applied to the Akdeniz University Restorative Dentistry Clinic for conservative closure of the diastema between teeth 31 and 41. To obtain the pontic with the freehand technique, measurements were taken with an alginant. The initial color of the patient's teeth was determined using the button technique. The necessary isolation was provided with a rubber dam. In order to reduce the amount of diastema, direct build-up restorations were performed on teeth 31, 41. After intraoral alignment, the pontic tooth was fixed to the lateral teeth using a light-cured gingival barrier. Lingual surfaces were marked between the lower anterior canine and canine teeth, and the area where the fiber would be applied was determined. Then, a minimal cavity was prepared. Polyethylene fiber (Construct, KerrLab, USA) with an adhesive resin (Ambar Universal APS (FGM, Joinville, Santa Catarina, Brezilya) was then adapted to the middle third of the lingual surfaces of the abutment teeth and photopolymerized. A composite (3M ESPE, St.Paul, MN, USA, Neo Spectra ST Dentsply Sirona, USA) resin was applied to cover the fiber surface, and final finishing and polishing were done.
**Results:** The patient's diastema in lower anterior region, was closed in a natural aesthetic way, and patient satisfaction was achieved.
**Conclusion:** It has been observed that fiber-splinted pontic bridges are clinically acceptable. This current adhesive approach can be recommended as an aesthetic, functional, and biologically healthy treatment option for mandibular tooth deficiency and diastema.

***Keywords:*** *Pontic , Diastema , Bridge ,Fiber Splint*

## Adhesive Reattachment of Traumatized Maxillary Permanent Central Incisor: Case Report

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**Introduction:** Traumatic dental injuries (TDIs) of permanent teeth occur commonly in children and adolescents. Crown fractures of the anterior teeth, mainly the upper incisor teeth are the most often injured in accidents due to their vulnerable position in the mouth, however the lower central incisor and the upper lateral incisors are less frequently affected. This case report aims to present the conservative treatment of the traumatized immature maxillary left central incisor by performing Cvek amputation and applying reattachment procedure for the fractured tooth fragment, and clinical and radiographic follow-up of the tooth.

**Case Report:** A 9-year-old male patient applied to our clinic at the same day with a complaint of a fracture in his maxillary left central incisor due to trauma. The patient brought the broken fragment in a dry napkin. The dry fragment immediately put into SF solution for rehydration and storage. The clinical and radiographic examinations showed that the tooth had uncomplicated crown fracture with appearance of the reflection of pulp. In clinical examination, percussion and palpation sensitivity together with mobility were diagnosed. In radiographic examination, periodontal ligament widening was found. When all the information was evaluated, MTA (Mineral Trioxide Aggregate) partial amputation (Cvek amputation) was planned for the patient's related tooth. Afterwards, semi-rigid splinting was performed. 2 weeks later, the splint was removed and the final restoration was completed with 3 step dentin bonding system and flowable composite resin with the reattachment of the fractured fragment of the tooth #21. Any pathological symptom was found in the teeth in the 1st month and 3rd month follow-ups.

**Conclusion:** Vital pulp therapy and adhesive fragment reattachment can be a viable treatment option for complicated or uncomplicated crown fractures caused by trauma, especially when treating immature permanent teeth. It ensures the patient a pleasing aesthetic as well as a good function while preserving the remaining tooth structure.

***Keywords:*** *Crown fracture, reattachment, esthetic restoration, dental trauma, pulpotomy*

**A clinical case of resin-composite direct filling using 3D-printed plastic index**

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**Introduction:** DX (Digital Transformation) in the dental field has developed due to improvements in CAD/CAM, IOS and so on. Because of this development, digital technology can be used in various cases. In restorative dentistry, there have been case reports using IOS and 3D printers for direct bonding treatment, no reports have yet been found that the process has been treated all-digitally. The purpose of this study was to report one clinical case using a index which was made by full digital workflow for direct resin filling.
**Materials and Methods:** In the index production in the conventional direct bonding treatment, the processes such as impression taking, model making, wax-up and core taking were all analog or partly analog work. In this clinical case, we did these processes full-digitally, giving a satisfactory result.
**Case Report:** A 20-year-old female patient attended our hospital for class-II cavity restoration after root canal treatment of a lower left first molar. After constructing the core and preparing the abutment tooth, an optical impression was taken with IOS (Coex i500, Yoshida). A index was designed using 3D printing software (3-matic, Materialize) on the crown morphology data modeled by dental CAD software (Dental System, 3Shape). For the index, a stereolithography (SLA) 3D printer (Form3B, Formlabs) was used to form a transparent resin material (Surgical Guide V1, Formlabs) at a pitch of 0.05 mm. Then, it was washed with isopropyl alcohol for 20 minutes, and was subjected to secondary curing at 70°C for 30 minutes using a photopolymerizer (Form Cure, Formlabs). After trial fitting in the oral cavity, the shape of the index was adjusted. Then, vaseline was applied to the inside of the index, adhesive (Clearfill Megabond 2, Kuraray Noritake) was applied to the cavity, and a flowable resin composite (ESTELITE Flow Quick, Tokuyama Dental) was filled and photopolymerized. The index was removed using a remover, and the occlusion was adjusted and polished.
**Conclusion:** By using digital method, there was a work process that took less time than the conventional method. It was suggested that a full digital workflow is useful in index fabrication for direct bonding treatment.

***Keywords:*** *resin composite filling, 3D printing, plastic index, digital transformation*

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**Rehabilitation of Various Anterior Aesthetic Problems**

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**Introduction:** Many dental disorders that generate aesthetic and functional difficulties, particularly in the anterior region, have been successfully treated using adhesive restoratives. Tissue loss in the preparation of porcelain laminate, full crowns and bridges could be reduced with adhesive protocols as a cheaper option with less preparation in a single session.
The objective of this case report was to present the rehabilitation of various aesthetic problems (fracture, diastema, peg lateral, caries) in maxillary anteriors of the six patients.
**Conclusion:** Follow-ups from 6 months to 1 year revealed that the restorations were clinically successful, and the patients were satisfied. The treatment options applied in this case report should be preferred by patients and physicians as they save time and money.

***Keywords:*** *composite, adhesive, minimally invasive treatment*

**Restoration of Trauma-Related Oblique Fractures with Direct Composite Resin**

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**Introduction:** Coronal fractures of anterior teeth are one of the common consequences of dental trauma. Reattachment of a crown fragment is a conservative method in the treatment of coronal fractures. However, if the broken part cannot be found, restoring the teeth with direct resin composite provides us with a minimally invasive treatment option. In this case, it is aimed to functionally and aesthetically restore the fractures caused by falling from the scooter with resin composite.
**Case Report:** A 24-year-old female patient was referred to our university hospital for the aesthetic restoration of teeth due to fractures. As a result of the clinical and radiological examination of the patient who applied to our clinic 1 week after the accident, it was determined that the teeth #11, #21, #22 were vital and there were fractures in the oblique direction in the coronal region. Treatment of #11 #21 and #22 was planned to make direct composite resin restoration. 'TN', 'O2'and 'O3' shades (Amaris, VOCO) were selected using the button technique. High Opaque 'HO' color (Amaris, VOCO) was chosen to mask the fracture line. Following rubber dam isolation a slight bevel was prepared and surfaces were etched with 37% phosphoric acid Vococid, Voco) and a universal adhesive (Futurabond U, VOCO) was applied according to the manufacturer's instructions. Palatinal wall and proximal walls made with 'TN' and dentin layer added with 'O2'-'O3' and light cured for 20sec (VALO, Ultradent). Polishing was done by using polishing discs (Sof-Lex, 3M ESPE), spiral rubber discs (DiaComp Plus, Eve) and interdental bands (Epitex, GC). Patient was kept on recall after 1 week, 1 month and 1 year for the evaluation according World Dental Federation (FDI) criteria.
**Conclution:** At recalls, the restorations were evaluated for esthetic properties, surface texture/finishing/staining, color stability/translucency and anatomic form according to FDI criteria and scored as 1. A positive response was obtained from the vitality test repeated in each control session. We can mimic the natural teeth; using a layering technique in a minimally invasive way with the patient satistification.

***Keywords:*** *Crown fracture, Dental trauma, Direct composite resin*

**The SEAL is the DEAL**

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The poster will include 3 cases on biomimetic restorative dentistry performed at a private practise in Kolkata, India with medium follow-ups. Following the Biomimetic principle, restorative approaches were used that do not aim to create the strongest restoration, but rather a restoration that is compatible with the mechanical and biologic properties of dentin and enamel.

For carious lesion management, caries detecting dye was used to help a create peripheral seal zone of sound dentin which would provide the resulting restoration the best seal in that zone. Gold standard Clearfil SE protect bond system was used for dentin bonding management. Air abrasion using alumina was performed followed by Clearfil SE primer application for 20 secs and then bond application was done. Resin coat of 0.5mm Clearfil majestic flow was done for dentin and upto slightly beyond DEC. A wait time of 5 minutes was performed to allow the hybrid layer to mature. Following this biobase was created using EverXflow with Ribbond in order to provide better sealing ability to the restoration in areas of deep carious lesion. Following this enamel replacement was done either by direct composite or onlay technique. For enamel replacement, margins were first refined, then air abrasion was performed and followed by bonding agent application before heated composite placement. Proper finishing and polishing was then performed.

Establishing a bond takes time. If the bond can withstand the stress, the restorative technique will be successful. Advanced Adhesive dentistry focuses on developing maximum bond strength between the substrate and the restoration. Restorative procedures were performed to treat decayed vital teeth in such a way that it restores their strength and seals them from further bacterial invasion. Careful sealing against infection removes the need for aggressively preparing the teeth for crowns and drastically reduces the need for root canals.

***Keywords:*** *caries detecting dye, biobase, resin coat, ribbond, biomimetic*

# Trauma Treatment Options İn Young Permanent Teeth: Two Case Reports

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**Introduction:** Traumatic injuries of permanent teeth and supporting tissues are frequently encountered in children and young adults. Maxillary central teeth are the teeth with the highest rate of trauma due to their region and morphological conditions. The aim of this study is to present the treatment of traumatized permanent incisors.
**Case1:** A 6-year-old male patient presented with trauma due to a fall in his upper right permanent incisor. On clinical and radiographic examination, there is an open apex and subluxation injury.There is sensitivity on percussion, moderate mobility and bleeding from the gingival sulcus. Under local anesthesia, a semi-rigid splint was applied to the labial surfaces of the teeth using a twist wire (Jefix,WoolineEtch,Türkiye), bonding agent (Tokuyama,Japan) and resin composite (Tokuyama, Japan) for 2 weeks. 4 months after the treatment, it was observed that the root development and pulp vitality of the related tooth continued. Clinical and radiographic examinations after 4 months showed satisfactory aesthetic and functional results.
Case2: A 7-year-old male patient presented with trauma due to impact on his upper right permanent incisor. On clinical and radiographic examination, there is an open apex and complicated crown fracture. No spontaneous pain or mobility was detected in the involved tooth. The broken part of the related tooth was brought within 2 hours after trauma, preserved in a dry environment. Cvek amputation of the tooth was performed under local anesthesia. The pulp was taken 1-2 mm from the The pulp was taken 1-2 mm from the opening, together with the surrounding dentin, and washed with physiological saline and washed with physiological saline. After bleeding control was achieved, mineral trioxide aggregate (ProRoot MTA, Dentsply, USA) placed on the exposed area and covered with glass ionomer cement (VOCO Ionofil U, Germany). The permanent restoration of the tooth was performed using its own broken fragment. No pathology was found in clinical and radiographic examinationsin 6 months after the treatment and it was observed that root development continued.
**Conclusion:** The age of the patient and the post-traumatic period are of great importance in deciding the treatment protocol of trauma cases. As a result of the follow-up of the cases, satisfactory aesthetic and functional results were observed in clinical and radiographic examinations, and the patients are kept under follow-up.

***Keywords:*** *trauma, subluxation, complicated crown fracture*

**Complementary Restorative Therapy: Two-Year Follow-Up of Partial Adhesive Restorations After Orthodontic Treatment. A Case Series Study**

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A successful restorative treatment is only possible by addressing function and aesthetics together. Although orthodontic treatment has achieved a successful result in terms of function; shape and dimensional problems such as Bolton discrepancies or the presence of peg-laterals can negatively affect the aesthetic outcome. In such cases, partial adhesive restorations can play a complementary role together with orthodontic treatments in parallel to the minimally invasive treatment philosophy. Contrary to this situation, an aesthetic therapy can be highly invasive with only adhesive restorations and a minimally invasive approach with a pre-restorative orthodontic treatment will be much more conservative. In the literature, it has been shown that the use of pre-restorative clear aligner therapy reduces the number of restorations needed for aesthetic adjustments. In the present case series study, a two-year follow-up of 3 cases, which can be an example of the contribution of orthodontics and adhesive dentistry cooperation to minimally invasive philosophy, is presented. In the restoration phase of these cases, universal adhesives and monochromatic composite resins that emerged with the development of adhesive dentistry and composite resin materials were used and the restorations were evaluated by two independent and blind evaluators using FDI criteria. Thanks to the evolution of the technology, it has become possible to perform simpler and less invasive treatments while doing aesthetic rehabilitations. Clinicians should not only be limited to a restorative point of view but should also be able to think in a multidisciplinary way while presenting treatment options to their patients.

***Keywords:*** *partial adhesive restorations, orthodontics, restorative dentistry, monochromatic composites, universal adhesives*

**JUNE 01, 2023**

| 30 AGUSTOS CONGRESS MAIN HALL | | |
|---|---|---|
| 9.00-9.30 | REGİSTRATİON | |
| 9.30-10.00 | OPENING REMARKS | |
| SESSION 1 | | CHAIRS: Dr. Taner Yücel & Dr. Mübin Soyman |
| 10.00-11.00 | Dr. Junji TAGAMI | Promotion of advanced MID with adhesion technology. |
| 11.00-12.00 | Dr. Hidehiko SANO | Recent evolution of the microtensile bond testing |
| 12.00-13.30 | LUNCH | |
| SESSION 2 | | CHAIRS: Dr. Sema Belli & Dr. Esra Can |
| 13.30-14.30 | Dr. Sevil GÜRGAN | An overview of contemporary restorative ion releasing materials |
| 14.30-15.30 | Dr. Jack FERRACANE | “Bioactive” materials – their potential use in bonded dental restorations. |
| 15.30-16.00 | COFFEE BREAK | |
| SESSION 3 | | CHAIRS: Dr. Saadet Gökalp & Dr. Nimet Ünlü |
| 16.00-17.00 | Dr. Satoshi IMAZATO | Smart bio-active restorative materials -Designing the next-generation materials for restorative dentistry- |
| 17.00-18.00 | Dr. Mutlu ÖZCAN | Adhesion to CAD/CAM Materials: An Update |
| 19.30-23.00 - TRADITIONAL KONYA DINNER - - Historical Zazadin Han | | |

| MALAZGIRT HALL | | | |
|---|---|---|---|
| 13.30-14.30 | **Adhesion I: Bonding of Universal Adhesives**<br>Moderator: Dr. Yasushi SHİMADA<br>Dr. Pinar YILMAZ ATALI | | |
| 13.30-13.45 | DS29 | Evaluation of Bond Strength of Universal Adhesives in Superficial and Deep Dentin | Hande YALÇINKAYA CENGIZ, Hayriye Esra ÜLKER |
| 13.45-14.00 | DS40 | Effect of bleaching treatment on shear bond strength of universal adhesive applied with different modes | Betül Kübra KURUCU KARADENİZ, Emel KARAMAN |
| 14.00-14.15 | DS61 | Effect of Nano-silica on Bonding Properties of Dental Universal Adhesives | Min LIU, Guanghui FENG, Yuquan SONG, Yuexiu QIU |
| 14.15-14.30 | DS50 | Effect of Aging on the Shear Bond Strength of Universal Bonding Agents Including MMP Enzyme Inhibitors | Nurhan ÖZOĞLU, Ali Rıza ÇETİN |
| 14:30 – 14:45 - Break | | | |

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|---|---|---|---|
| 14.45-15.45 | **Adhesion II: Bonding to Caries Affected Dentin/Effect of Silver Diamine Fluoride on Bonding**<br>Moderator: Dr. Ali Riza ÇETİN<br>Dr. Shuhei HOSHİKA | | |
| 14.45-15.00 | DS31 | Evaluation of the Bonding Performance of Current Adhesive Systems on Caries-Affected Dentin | Nurgül ÇETIN TUNCER, Çağatay BARUTÇUGIL |
| 15.00-15.15 | DS21 | The relation between laser fluorescence scores after caries removal and microtensile bond strength | Özlem KANAR, Dilek TAĞTEKIN, Bora KORKUT, Funda YANIKOĞLU, Betül KARGÜL |
| 15.15-15.30 | DS65 | The effect of silver diamine fluoride (SDF) on the immediate shear bond strength of self-etch and etch and rinse adhesives | Farzaneh SHIRANI, Shirin RAVANBOD, Mohammadsoroush SEHAT, Mohammad MALEKIPOUR |
| 15.30-15.45 | DS27 | Effect Of Silver Diamine Fluoride on Microshear Bond Strength of Adhesive Cements to Dentin | Meltem MERT EREN, Ceren Elif YAVUZ, Günçe OZAN |
| 15.45-16.00 - Break | | | |
| 16.00-17.30 | **Adhesion III**<br>Moderator: Dr. Monica YAMAUTI<br>Dr. Bilge TARÇIN | | |
| 16.00-16.15 | DS55 | Evaluation of Shear Bond Strength of Microhybrid Composite Resin to DME Materials | Pervin ULUÇ, Hayriye Esra ÜLKER, Sema BELLİ |
| 16.15-16.30 | DS8 | Antibacterial Effect And Bond Strength Of The Experimental Adhesive Resin Added Nisin | Melek Hilal KAPLAN, Umut KÖKBAŞ, Alper AKKAYA, Sezer DEMİRBUĞA, Hacer BALKAYA, Kevser KURT DEMİRSOY |
| 16.30-16.45 | DS35 | Bonding performance evaluation of a newly developed self-adhesive resin composite | Yunqing LIU, Jiayuan ZHANG, Yitong LI, Md Refat Readul ISLAM, Yu TOIDA, Rafiqul ISLAM, Hidehiko SANO, Atsushi TOMOKIYO |
| 16.45-17.00 | DS66 | Shear Bond Strength of Clear Alıgner Attachments: Conventıonal vs Flowable | Türkay KÖLÜŞ, Ayşe Selenge AKBULUT |
| 17.00-17.15 | DS33 | Bond Strength of Fiber Reinforcement Resin Modified Glass Ionomer Cement | Muhittin UĞURLU, Fatmanur SARI |
| 17.15-17.30 | DS39 | Bond strength and Knoop hardness evaluation of light-cured resin materials. | Hong ZHANG, Yu TOIDA, Yuan YUAN, Md Refat Readul ISLAM, Shuhei HOSHIKA, Hidehiko SANO, Atsushi TOMOKIYO |

**Selçuk University Faculty of Dentistry Conference Hall**

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|---|---|---|---|
| 13.30-14.30 | **Surface Properties of Dental Materials; Microhardness/Roughness /Wear**<br>Moderator: Dr. Günçe OZAN - Dr. Hazal Deniz KÖSE | | |
| 13.30-13.45 | DS23 | Investigation of the effect of different beverages on the hardness of three one-shaded dental composites | Kivanc DULGER |
| 13.45-14.00 | DS24 | The effect of an alcoholic beverage on composite resins polished with various polishing systems. | Günçe OZAN, Esra YILDIZ, Ceyda Nur KAYNAK, Ceren Elif YAVUZ, Ali İhsan ÇETIN |
| 14.00-14.15 | BS1 | Effect of Newly Developed Home Bleachıng Gel on Tooth Surface Roughness, Mıcrohardness, and Color Change | Safiya TEMİZYÜREK, Derya GÜRSEL SÜRMELİOĞLU |
| 14.15-14.30 | DS10 | Two-body Wear of Indirect Material Margins Repaired with Bulk-Fill Composites | Ayşe Aslı ŞENOL, Selinsu ÖZTÜRK, Ezgi ALTUNTAŞ, Pınar YILMAZ ATALI, Bilge TARÇIN, Erkut KAHRAMANOĞLU |
| 14.30-15.00 - Break | | | |


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|---|---|---|---|
| 15.00-16.30 | **Color I**<br>Moderator: Dr. Şeyda HERGÜNER SİSO - Dr. Derya GÜRSEL SÜRMELİOĞLI | | |
| 15.00-15.15 | BS2 | Evaluation of Color Stability of Composite CAD/CAM Materials | Ezgihan ÖZEN KESKİN, H. Esra ÜLKER |
| 15.15-15.30 | DS57 | The Effects of Different Pediatric Iron Syrups on the Color Stability of Restorative Materials Used in Pediatric Dentistry | Enes Mustafa AŞAR, Murat Selim BOTSALI, Merve ALBAKIR YİĞİT |
| 15.30-15.45 | DS18 | Evaluation of the Effect of Different Polishing Systems on Surface Roughness and Color Stability of Nano-Filler Resin Composite | Sanem ÖZASLAN, Begüm TAVAS, Hatice TEPE, Özge ÇELIKSÖZ, Batu Can YAMAN |
| 15.45-16.00 | DS60 | Effect of Coffee on Color Stability and Translucency in Single-Shade Universal Resin Composites | Büşra ÖZDEMIR, Betül Kübra KURUCU KARADENIZ, Seyit Bilal ÖZDEMIR, Ömer AKBULUT |
| 16.00-16.15 | DS32 | The effect of cavity depth on universal resin shade matching | Deniz YILMAZ, Hatice BÜYÜKÖZER ÖZKAN |
| 16.15-16.30 | DS51 | The Effect of Modelling Resin Used with Different Methods on the Color Stability and Roughness | Merve AYDEMIR, Esin MURRJA, Şeyda HERGÜNER SISO, Berkay EGE |
| 16.30-17.00 | - Break | | |
| 17.00-18.00 | **Microleakage/Fluorid Release, Anticariogenic Effect of Dental Materials**<br>Moderator: Dr. Meltem MERT EREN - Dr. Merve GÜRSES | | |
| 17.00-17.15 | DS34 | May Tomatine Be A Novel Anti-Cariogenic Agent? A Preliminary Study | Musa Kazım ÜÇÜNCÜ, Emine KITIN, Oktay YAZICIOĞLU |
| 17.15-17.30 | BS9 | Does Bulk Technique or Laying in Black 2 Cavities Affect Micro Leaks of Composite Resins? | Özge YILMAZ, Nursuna Büşra ÇETINKAYA, Nevin ÇOBANOĞLU |
| 17.30-17.45 | DS19 | Fluoride release of glass ionomer with hexogonal boron nitride(hBN) additive | Rümeysa ESER, Mert KARAKAŞ, Sena BALABAN, Şükrü KALAYCI, Hacer DENIZ ARISU |
| 17.45-18.00 | DS26 | Microleakage of adhesives on enamel treated with different etching protocols | Sevim ATILAN YAVUZ, Ayşe Tuğba ERTÜRK AVUNDUK, Özcan KARATAŞ, Nurdan ÇAKIR KILINÇ, Ebru DELİKAN |
| **POSTER HALL** | | | |
| 15.30-16.10 | **Biomimetic Dentistry**<br>Moderator: Dr. Deniz GEMALMAZ - Dr. Hande ŞAR SANCAKLI | | |
| - | BP8 | Comparison of Splinting Techniques of Periodontally Compromised Mandibular Anterior Teeth | Erkin GÜLBEY, Sema BELLI, Gürcan ESKITAŞÇIOĞLU, D. Eda YAPICI GÜLBEY, Sema S. HAKKI |
| - | BP2 | Restoration and stabilization of periodontally compromised teeth with fiber-reinforced composite: a case report (15 months follow-up) | Cıgdem AKUC TASAN, Neslihan TEKCE |
| - | BP9 | Clınıcal Evaluatıon of Prepless Dırect Composıte Lamınate Veneers: 1 Year Retrospectıve Study | İrem Sena DIVANLIOĞLU, Mehmet Esad GÜVEN, Güzin KIRSAÇLIOĞLU |
| - | BP3 | Evaluation of shear bond strength of different composite brands | Gamze OKUMUŞ, Hayriye Esra ÜLKER |
| - | BP4 | Effect of Polyethylene Fiber on Fracture Resistance of Bulk-fill Composites | Aybike MANAV ÖZEN, Bengü DOĞU KAYA, Pınar YILMAZ ATALI, Erkut KAHRAMANOĞLU, Ayşe Aslı ŞENOL, Bilge TARÇIN, Cafer TÜRKMEN |
| - | BP7 | Non-invasive evaulation of marginal adaptation of dentin-glass ionomer cement interface using swept source optical coherence tomography | Mustafa Ata ÇAKALOĞLU, Takaaki SATO, Noriko HIRAISHI, Yasushi SHIMADA |

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| 16.10-17.10 | **Dental Materials I**<br>Moderator: Dr. Şebnem TÜRKÜN - Dr. Mehmet Ali KILIÇARSLAN | | |
| - | DP14 | Evaluation of Fluoride Release of Different Glass Ionomer Cements | Huseyin TEZEL, Mirna MULABDIC, Fikriye Selin KARA, Dilek AKIN, Ozlem SOGUT, Timur KOSE, Cigdem ATALAYIN OZKAYA |
| - | DP18 | Microshear bond strength of silane-containing universal adhesive to lithium disilicate glass-ceramic | Peng YU |
| - | DP15 | The Effect of Different Beverages on Color and Surface Properties of Alkasite Material | Özge DUMAN, Gizem GÜNDÜZ, Ayşehan Firdevs İYIBILIR, Meriç BERKMAN, Safa TUNCER, Mustafa DEMIRCI |
| - | DP16 | Effect of different thicknesses of multilayered zirconia on transparency | Shoko MIURA, Masanori FUJISAWA, Pekka VALLITTU, Lippo LASSILA |
| - | DP17 | Dentin Bonding Evaluation of Universal Adhesives containing different concentrations HEMA | Di WU, Ye YAO, Dongxiang MI, Fei CHEN, Shuhei HOSHIKA, Toru TANAKA, Chiharu KAWAMOTO, Monica YAMAUTI, Hidehiko SANO, Atsushi TOMOKIYO |
| - | DP19 | Accelerated aging effects on color stability of light-cured resin cement | Yu TOIDA, Md Refat Readul Islam REFAT, Buer QI, Shuhei HOSHIKA, Chiharu KAWAMOTO, Monica YAMAUTI, Hidehiko SANO, Atsushi TOMOKIYO |
| - | DP20 | Efficacy of sandblasting on the bonding reinforcement of metal-free CAD/CAM restoratives | Toshio MASEKI, Takuya MURATA, Yoichiro NARA |
| - | DP21 | Bonding performance of universal adhesives under different pulp pressure conditions | Yitong LI, Yunqing LIU, Md Refat Readul ISLAM, Rafiqu ISLAM, Shuhei HOSHIKA, Chiharu KAWAMOTO, Monica YAMAUTI, Hidehiko SANO, Atsushi TOMOKIYO |
| - | DP28 | Effect of SDF on bond strength of new universal adhesives. | Papichaya INTAJAK, Yuan YUAN, Pimpinee EAMSAARD, Shuhei HOSHIKA, Mariko MATSUMOTO, Hidehiko SANO, Atsushi TOMOKIYO |
| - | DP22 | Effect of CPN on resin-dentin bonding durability regarding adhesives | Yuan YUAN, Papichaya INTAJAK, Shihchun TING, Hongbo ZHANG, Shuhei HOSHIKA, Hidehiko SANO, Atsushi TOMOKIYO, Md Refat READUL ISLAM |
| - | DP23 | Bonding Performance of Self-adhesive Resin Composites to Dentin | Ye YAO, Di WU, Monica YAMAUTI, Toru TANAKA, Takatsumi IKEDA, Shuhei HOSHIKA, Chiharu KAWAMOTO, Hidehiko SANO, Atsushi TOMOKIYO |
| - | DP9 | Silver diamine fluoride affects the bonding of a self-etch adhesive to carious-dentin | Carolina CIFUENTES-JIMENEZ , Lucas LADEIRA VIEIRA, Di WU, Pedro ÁLVAREZ-LLORET, Monica YAMAUTI, Hidehiko SANO, María Victoria BOLAÑOS-CARMONA |
| - | DP5 | Evaluation of Fluoride Release from Two Different Glass Ionomer Cement | Mediha BÜYÜKGÖZE-DINDAR, Meltem TEKBAŞ-ATAY, Cem TOKATLI, Handan YILDIRIM-IŞIK |

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| 30 AGUSTOS CONGRESS MAIN HALL | | |
|---|---|---|
| SESSION 4 - CHAIRS: Dr. Mine Betül Üçtaşlı & Dr. Şebnem Türkün | | |
| 8.30-9.30 | Dr. Bart Van MEERBEEK | Bonding without compromise |
| 9.30-10.30 | Dr. Füsun ÖZER | Denture base acrylic resin materials with antimicrobial agents |
| 10.30-11.00 - COFFEE BREAK | | |
| SESSION 5 - CHAIRS: Dr. Esra Yıldız | | |
| 11.00-12.00 | Dr. Toru NIKAIDO | Challenge and innovation of adhesive materials and technologies in the aging society |
| 12.00-13.30 - LUNCH | | |
| SESSION 6 - CHAIRS: Dr. Haşmet Ulukapı & Dr. Hande Şar Sancaklı | | |
| 13.30-14.30 | Dr. Yasushi SHIMADA | New potentiality of caries management using adhesive materials |
| 14.30-15.30 | Dr. Esra CAN | Partial Indirect Adhesive Posterior Restorations |
| 15.30-16.00 - COFFEE BREAK | | |
| SESSION 7 - CHAIRS: Dr. Deniz Gemalmaz & Dr. Necla Demir | | |
| 16.00-17.00 | Dr. Davey ALLEMAN | The black, white and gray of crack management |
| 17.00-18.00 | Dr. David ALLEMAN | Using adhesive protocols in private dental practice: The six lessons approach to 'Biomimetic Restorative Dentistry' |

| MALAZGIRT HALL | | | |
|---|---|---|---|
| 9.45-11.15 | **Restoration of Endodontically Treated Teeth/Fiber Reinforced Restorations**<br>Moderator: Dr. Hayriye Esra ÜLKER - Dr. Nazli ŞİRİNSÜKAN | | |
| 9.45-10.00 | DS6 | Fracture Resistance of 3D Additive Manufacturing-Based Endocrowns Luted with Various Resin Cements | Sevde Gül BATMAZ, Zeynep Ceren ÇELIK, Seda Nur KARAKAŞ, Cihan KÜDEN |
| 10.00-10.15 | DS3 | Effect of Remaining Walls and IDS on Fracture Strength of Endocrowns After Thermomechanical Aging | Nazmiye DÖNMEZ, Esra CAN, Nazlı ŞIRINSÜKAN, Ayça SARIALIOĞLU GÜNGÖR, Mağrur KAZAK, Betül Aycan UYSAL |
| 10.15-10.30 | DS20 | Comparison of Push-Out Bond Strengths of Different Fiber Post Systems | Merve GÜRSES, Ali Rıza ÇETIN, Oğuz Kaan TÜYSÜZ, Ali Kamuran ÖZKAN |
| 10.30-10.45 | DS36 | Fracture behavior of short fiber-reinforced CAD/CAM inlay restorations after aging | Deniz BARLAS, Sufyan GAROUSHI, Pekka Kalevi VALLITTU, Mine Betül ÜÇTAŞLI, Lippo LASSILA |
| 10.45-11.00 | BS4 | Preparation Parameters Affecting Endocrown Restoration | Mohammad LARI, Sara ABTAHI, Hakimeh SIADAT, Marzieh ALIKHASI |
| 11.00-11.15 | DS49 | Comparison of fracture resistance between delayed and immediate restorations after endodontic treatment | Zeynep Buket KAYNAR, Gözde AKBAL, Nazmiye DÖNMEZ |
| 11.15-11.30 - Break | | | |
| 11.30-12.30 | **Clinical Studies**<br>Moderator: Dr. Sadullah UCTASLİ - Dr. Çağatay BARUTÇUGİL | | |
| 11.30-11.45 | DS15 | Clinical evaluation of high-strength tooth-supported crown restorations | Merve ERDOG ÖZGUR, Sadullah UCTASLI |
| 11.45-12.00 | BS10 | Evaluation of Postoperative Sensitivity In Posterior Composite Resin Restoration: A Randomized Clinical Study | Ayşenur ÇAKIR, Ertan ERTAŞ |
| 12.00-12.15 | BS8 | Clinical effectiveness of the mono-block direct composite crownrestoration for severely destroyed endodontically treated teeth | Hitoshi MIKI, Hirofumi TASHIRO, Junji TAGAMI, Tomohiro TAKAGAKI, Keiichi HOSAKA, Takaaki SATO, Takashi HATAYAMA, Yasushi SHIMADA |
| 12.15-12.30 | BS3 | Clinical Evaluation of Implant Supported Adhesive Cemented Ti-Base Zirconia Single Crowns and FDP's: Up To 3 Years Follow Up | Betül Esra GÜLER, Gamze BÜYÜKTURHAN, Mehmet Esad GÜVEN |

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|---|---|---|---|
| 12.30-13.30 - Break | | | |
| 13.30-14.45 | **Surface Treatment of Dental Materials**<br>Moderator: Dr. Mine Betul UCTASLİ - Dr. Fei CHEN | | |
| 13.30-13.45 | DS16 | Surface morphology of hybrid ceramic material after different etching protocol | Merve UCTASLI, Kanae WADA, Junichiro WADA, Lippo LASSILA, Mine Betul UCTASLI |
| 13.45-14.00 | DS38 | Comparison of the resistance of the surfaces of CAD /CAM materials to aging: translucency, gloss, and roughness. | Elif İlgi SANCAK, Neslihan TEKÇE |
| 14.00-14.15 | DS22 | Influence of conditioning time of a one-step self-etching primer on bonding strength to a lithium disilicate glass-ceramic | Fei CHEN, Peng YU, Di WU, Monica YAMAUTI, Hidehiko SANO, Jiang LIN |
| 14.15-14.30 | DS53 | Evaluation of the effects of different surface treatments on the repair of fiber-reinforced dentin composite with posterior composite | Nilay BAYRAKTAR, Osman Tolga HARORLI |
| 14.30-14.45 | DS30 | Optimum surface treatment for CAD-CAM resin composite materials | Wenya BI, Min ZONG, Guanghui REN, Chengwei HAN |
| 14.45-15.00 - Break | | | |
| 15.00-16.00 | **Adhesion IV: Influence of Pulpal Pressure/Application Mode/Contamination, Disinfection on Bonding**<br>Moderator: Dr. Yoichiro NARA - Dr. Gülbike DEMİREL | | |
| 15.00-15.15 | DS45 | Intra-cavity dentin bonding of class 1 resin-composite-restoration with/without simulated-pulpal-pressure | Yoichiro NARA, Noriko MORI, Kensuke FURUKI, Masahiko MAENO |
| 15.15-15.30 | DS63 | Effect of Sonic Application Mode on the Microtensile Bond Strength of Two Different Adhesive Systems | Alpaslan Can ÇELIK, Nimet ÜNLÜ, Sultan Gizem ÜLKÜ |
| 15.30-15.45 | DS28 | Effect of Different Wetting Agents Applied Between the Layers of Composıte on the Mıcroshear Bond Strength | Ezgi SONKAYA, Zehra SÜSGÜN YILDIRIM, Z. Gonca BEK KÜRKLÜ |
| 15.45-16.00 | DS54 | Effect of chlorhexidine and boric acid on dentin shear-bond strength | Mehmet Semih VELİOĞLU, Büşra ABKA, E.elif MUTAFCILAR VELİOĞLU, Sema S. HAKKI, Sema BELLİ |
| 16.00-16.30 - Break | | | |
| 16.30-17.30 | **Repair of Resin Composites and Resin Based CAD/CAM Materials**<br>Moderator: Dr. Akimasa TSUJİMOTO - Dr. Burcu DİKİCİ | | |
| 16.30-16.45 | DS25 | Effect of Different Surface Treatments on Repair Bond Strength of RBCs | Ayşenur ALTUĞ YILDIRIM, Mine Betül ÜÇTAŞLI |
| 16.45-17.00 | DS13 | Repair Bond Strength to Aged CAD/CAM Materials after Various Pretreatments | Burcu DIKICI, Elif TÜRKEŞ BAŞARAN, Esra CAN |
| 17.00-17.15 | DS48 | Effect of preheating on the repair bond strength of aged composites | Tuğba MİSİLLİ, Özge Gizem YENİDÜNYA, Nasibe Aycan YILMAZ |
| 17.15-17.30 | DS43 | Repair Bond Strength of Universal Adhesives on Nanoceramic CAD/CAM Blocks | İbrahim DOĞAN, Emel KARAMAN |

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**Selçuk University Faculty of Dentistry Conference Hall**

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|---|---|---|---|
| 9.45-10.45 | **Bonding to Zirconia/Titanium**<br>Moderator: Dr. Özgür İNAN - Dr. Tuba YILMAZ SAVAŞ | | |
| 9.45-10.00 | DS4 | The Use of Femtosecond Laser, Silica Coating or Combined, Which is Better for Monolithic Zirconia? | Elif YILMAZ, Meral ARSLAN MALKOÇ, Yasemin GÜNDOĞDU, Hamdi Şükür KILIÇ |
| 10.00-10.15 | DS7 | Effect of sintering and surface treatment on resin bond strength to monolithic zirconia | Tuba YILMAZ SAVAŞ, Abdulhaluk SAVAŞ, Ali Rıza TUNÇDEMIR |
| 10.15-10.30 | DS12 | Effect of the application of surface treatments before and after sintering on phase transformation of zirconia | Ozlem USTUN |
| 10.30-10.45 | DS41 | Effect of Fluoride in the Resin Cement on the Titanium Abutment | Server MUTLUAY ÜNAL |
| 10.45-11.00 - Break | | | |

JUNE 02, 2023

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| 11.00-12.15 | **Surface Properties of Dental Materials; Microhardness/Roughness**<br>Moderator: Dr. Takako YOSHİKAWA - Dr. Mağrur KAZAK | | |
| 11.00-11.15 | DS1 | Polymerization Behavior of Various-Composites at Top/Bottom of Cavity using Different-Irradiance-Light | Takako YOSHIKAWA, Alireza SADR, Yasushi SHIMADA |
| 11.15-11.30 | DS47 | Evaluation of Microhardness of Four Bulk-Fill Composite Resins with Different Polymerization Techniques | Sinem ÖZDEMIR, Nimet ÜNLÜ, Merve GÜRSES |
| 11.30-11.45 | DS2 | Effect of Press-on Force-Guided Brushing Machine on 3D-printed Restorative Materials | Elif ALKAN, İbrahim OĞRAK, Bora KORKUT, Dilek TAĞTEKIN, Tuna ÜNAL, Gülçin BILGIN GÖÇMEN, Funda YANIKOĞLU |
| 11.45-12.00 | DS5 | Effect of Re-Polishing on The Physical Properties of Artificially Aged Composites | Günçe OZAN, İrem Naz ÇALIŞKAN, Hannaneh MEFTAHPOUR, Büşra TEKIN, Esma Vesile ÇELIK, Müberra ÖZ, Hatice TEPE, Batu Can YAMAN, Hande ŞAR SANCAKLI |
| 12.00-12.15 | DS59 | Effect of Charcoal-based Dentifrices on Surface Roughness of a Composite Resin | Pınar NAIBOĞLU, Zeynep Pınar KELEŞ YÜCEL |
| 12.15-13.30 - Break | | | |
| 13.30-14.45 | **Color II**<br>Moderator: Dr. İsmail Hakki BALTACIOĞLU - Dr. Zuhal YILDIRIM BİLMEZ | | |
| 13.30-13.45 | DS42 | Effect of Soft-Drinks and Bleaching-Agent on Composite Resins' Optical Properties | Hasibe Sevilay BAHADIR, Selin POLATOĞLU, Neslihan Büşra KESKIN |
| 13.45-14.00 | DS44 | The Effects of Preheating and Curing Depth of Bulk-fill Materials | Engin IŞIK, Çağla YELOĞLU, Ayşenur TUNÇ DICLE, Evrim ELIGÜZELOĞLU DALKILIÇ |
| 14.00-14.15 | DS37 | Shade-Matching Ability of Novel Color-Adjusting Resin-Based Dental Composites | Leyla KERIMOVA KÖSE, Ruhsan MÜDÜROĞLU ADIGÜZEL, Neslihan ARHUN |
| 14.15-14.30 | DS46 | Examination of Color Stability of CAD / CAM Materials Applied With Different Polishing System | Selen BOZKAYA BILGIN, Neslihan TEKÇE |
| 14.30-14.45 | DS11 | Evaluation of the Effect on Surface Roughness and Color Stability of Composite Resins with Different Toothpastes by Aging Effect | Begüm TAVAS, Sanem ÖZASLAN, Hatice TEPE, Özge ÇELIKSÖZ, Batu Can YAMAN |
| 14.45-15.45 - Break | | | |
| 15.45-16.45 | **Influence of Restorative Materials on Stress Distribution**<br>Moderator: Dr. Esra YILDIZ - Dr. Oğuz ERASLAN | | |
| 15.45-16.00 | DS58 | The Effect of Different Adhesive Cements and Restoration Materials on Tooth Stress: Fea | Ayyüce Nur TEZCAN, Reza MOHAMMADI, Mehmet Esad GÜVEN |
| 16.00-16.15 | BS7 | Splint design and materials are important for stress distribution of mandibular molar tooth with vertical bone defect: The FEA study | Erkin GÜLBEY, D. Eda YAPICI GÜLBEY, Gürcan ESKITAŞÇIOĞLU, Sema BELLI, Sema S. HAKKI |
| 16.15-16.30 | DS9 | The Effect of Different Restorative Materials Application on Stress Distribution in Different PPIR Bridge Designs: A Finite Element Method Study | Mehmet Gökberkkaan DEMIREL, Mustafa DEMIRTAŞ, Reza MOHAMMADI |
| 16.30-16.45 | DS17 | The Effect of Restoration Type and Different Materials on Stress Distribution : A Finite Element Method Study | Mehmet Gokberkkaan DEMIREL, Huseyin NAR, Reza MOHAMMADI, Neslihan GUNTEKIN |

| POSTER HALL | | | |
|---|---|---|---|
| 10.30-11.30 | **Dental Materials II**<br>Moderator: Dr. Bilinç BULUCU - Dr. Nimet ÜNLÜ | | |
| - | DP29 | Effectiveness of Er:YAG Laser-irradiation on CAD/CAM Resin Blocks for Repair | Taku HORIE, Yukari ODAGIRI, Kazuho INOUE, Morioki FUJITANI, Akimasa TSUJIMOTO |
| - | DP30 | Fatigue Bond Strength of a 2-step Universal Adhesive | Akimasa TSUJIMOTO, Nicholas G. FISCHER, Wayne W. BARKMEIER, Mark A. LATTA |
| - | DP1 | Influence of Aging on Nanohybrid Composite's Surface Roughness Polished with Different Systems | Nazlı ŞIRINSÜKAN, Mahsa GHASEMZADEH, Gözde SARAK, Esra CAN |
| - | DP2 | Effect of cavity liner materials application on cuspal deflection | Nazmiye DÖNMEZ, Bazarbay TAJIBAYEV |
| - | DP3 | Dentin Bond Strength of Two Adhesive Resin Systems with Experimental Mussel-Biomimetic Primer Under Wet Conditions | Akhil RAMANI, Samuel DOLAN, Dr. Fusun OZER |
| - | DP6 | Effect of mouthwashes on color stability of direct and indirect composites | Meltem TEKBAŞ-ATAY, Mediha BÜYÜKGÖZE-DINDAR |
| - | DP33 | The Effect of Toothpastes on Aesthetic Composites | Ecehan KAPLAN, Ayşe DÜNDAR |
| - | DP34 | The Effect of Ceramic Thickness on Polymerization of Resin Cement | Didem ESEN ÇIFTÇIBAŞI, Ayşe DÜNDAR |
| - | DP26 | Evaluation of Bonding Property of Self-Adhesive Resin-Cement with Universal Bonding-Agent | Hiroto MINAMISAWA, Kyousuke HIRANO, Yutaka SHINOZAKI |
| - | DP27 | Effects of Antibacterial Disinfectants and Adhesive Application Modes on Microleakage | Yeliz Hayriye YAZICIOĞLU PIRPIR, Nurgül ÇETIN TUNCER, Çağatay BARUTÇUGIL |
| - | DP38 | Boding efficacy of immediate-dentin-sealing applied to CAD/CAM ceramic crown restoration | Masahiko MAENO, Miwa NAKAZAWA, Yoichiro NARA |
| 11.30-12.30 | **Dental Materials III**<br>Moderator: Dr. Akshayraj LANGALIYA - Dr. İsa YÖNDEM | | |
| - | DP7 | Repair Strength of CAD/CAM vs 3D-Printed Materials with Bulk-fill Composites | Ezgi ALTUNTAŞ, Selinsu ÖZTÜRK, Ayşe Aslı ŞENOL, Pınar YILMAZ ATALI , Erkut KAHRAMANOĞLU, Bilge TARÇIN, Cafer TÜRKMEN |
| - | DP32 | Effect of Finishing Techniques on The Color Stability of Composites | Fikri ÖCAL, Tuba SARICI, Enis ŞİMŞEK, Burak DAYI |
| - | DP8 | The Effect of Thickness on the Optical Properties of Milled Zirconia Ceramics | Marius KANOPA, Giedrė ŪZĖ, Deira ŠIMKUTĖ, Prof. Gediminas ŽEKONIS |
| - | DP10 | Evaluation of Radiopacity of Bulkfill Composites Using Digital Radiography | Nina FARSHIDIAN, Ezgi ACAR, Elif Nur KAYA, Pınar YILMAZ ATALI, Bilge TARÇIN, Birsay GÜMRÜ TARÇIN |
| - | DP11 | Radiopacity of Single Shade Universal Composites Using Digital Radiography | Ezgi ACAR, Nina FARSHIDIAN, Elif Nur KAYA, Pınar YILMAZ ATALI, Birsay GÜMRÜ TARÇIN, Bilge TARÇIN |
| - | DP31 | Marginal Fit and Clinical Performance of 3D-Printed vs CAD/CAM Overlays | Selinsu ÖZTÜRK, Ezgi ALTUNTAŞ, Ayşe Aslı ŞENOL, Erkut KAHRAMANOĞLU, Pınar YILMAZ ATALI, Bilge TARÇIN |
| - | DP12 | Degree of Conversion of Luting Materials Under CAD/CAM Blocks | Bengü DOĞU KAYA, Selinsu ÖZTÜRK, Pınar YILMAZ ATALI, Ayşe Aslı ŞENOL, Bilge TARÇIN, Erkut KAHRAMANOĞLU |
| - | DP24 | Surface hardness and Depth of cure of novel bulk-fill composites | Sergen ÖZDEMIR, Çağatay BARUTÇUGIL |
| - | DP25 | The Effects of Different Finishing and Polishing Processes and Different Whitening Techniques on the Color and Surface Properties of CAD/CAM Materials | Hanife Şeyma AKMAN, Neslihan TEKÇE |

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| - | DP35 | Surface Alterations of Resin Composites: Press-on-Force-Guided Brushing Simulator with Calcium-Active Whitening-Toothpastes | Deniz Meltem SEVER, Bengü Doğu KAYA, Aybike Manav ÖZEN, Selinsu ÖZTÜRK, Elif ALKAN, Pınar YILMAZ ATALI, Bora KORKUT, Dilek TAĞTEKİN |
| - | DP37 | Hypersensitivity laser treatment's effect on shear bond strength of brackets | Mahsa KARIMI, Sarvin SARMADI, Nasim CHINIFORUSH, Aria BEHFOROUZ |
| - | DP13 | Clinical performances of 3-different tooth-colored restorative materials in Class-II cavities | Kemal IŞIKLI, Uzay KOÇ VURAL, Sevil GÜRGAN ÇIFTÇI, Filiz YALÇIN ÇAKIR |
| - | DP40 | Bond Strength of Different Adhesive Systems After Er,Cr:YSGG Pretreatment | Meltem AKBABA, Nurgül ÇETIN TUNCER, Çağatay BARUTÇUGIL |
| 12.30-13.30 | - Break | | |
| 13.30-14.40 | **Case Report I**<br>Moderator: Dr. Haktan YURDAGÜVEN - Dr. Öznur ERASLAN | | |
| - | CP24 | Adhesive Reattachment of Traumatized Maxillary Permanent Central Incisor: Case Report | Rana YALÇINKAYA, Zeynep Aslı ÖZKAYA |
| - | CP1 | Aesthetic Rehabilitation of Canine Teeth in Congenital Lateral Tooth Deficiency | Ayşenur YAZIM, Cemile KEDICI ALP |
| - | CP2 | Digitally Guided Composite Restorations After Orthodontic Treatment: A Case Report | İbrahim Halil OĞRAK, Gülçin BILGIN GÖÇMEN, Bengü DOĞU KAYA |
| - | CP3 | A Combined Treatment Approach for Fluorosis: Case Report (1-year follow-up) | Sevde TOK KURSUN, Neslihan TEKCE |
| - | CP4 | Re-attachment protocol for an uncomplicated crown fracture: a conservative approach | Ezgi TÜTER BAYRAKTAR, Bora KORKUT |
| - | CP5 | Rehabilitation Of Anterior Polydiastema İn With Direct Composite Veneers | Hüseyin HATIRLI, Dorukcan YILDIRIM |
| - | CP6 | Conservative Rehabilitation of Crown Fractures: 2 Case Reports | Ahmet ÖZLÜ, Hüseyin HATIRLI |
| - | CP7 | Aesthetic Rehabilitation of Discolored Central Incisor Reinforced with Polyethylene-Fiber | Nazlı Zeynep KUZU, Ayşe Aslı ŞENOL, Pınar YILMAZ ATALI |
| - | CP8 | Treatment Of Enamel Defects With Minimally Invasive Resin Infiltration Method | Zeynep AYDIN , Beyza ARSLANDAŞ DINÇTÜRK, Cemile KEDICI ALP |
| - | CP9 | Direct Posterior Restorations Reinforced With Polyethylene Fiber: Case Series | Furkan KOZAKOĞLU, Merve GÜRSES, Ali Rıza ÇETIN |
| - | CP10 | Applications of Polyethylene fiber (Ribbond) and Resin Composite Bridge for Anterior Tooth Aesthetic and Periodontal Stabilization: Case Report, One Year Clinical Follow-up | Nurgül ÇETIN TUNCER, Çağatay BARUTÇUGIL |
| - | CP11 | Resolution of Aesthetic Concerns With Composıte Resin Restorations: 12-Months Follow-Up | Kübra BAHAR, Gülşah TONGA |
| - | CP27 | Restoration of Trauma-Related Oblique Fractures With Direct Composite Resin | Seda ÖZMEN, Pinar YILMAZ ATALI |
| - | CP30 | Complementary Restorative Therapy: Two-year follow-up of partial adhesive restorations after orthodontic treatment. A case series study | İsmail Serhat SADIKOĞLU, L. Şebnem TÜRKÜN |
| 14.40-15.50 | **Case Report II**<br>Moderator: Dr. Safa TUNCER - Dr. Batu Can YAMAN | | |
| - | CP26 | Rehabilitation of Various Anterior Aesthetic Problems | İpek ÖREN, Ege TÜRKMEN, Tijen PAMIR |
| - | CP13 | Full Mouth Rehabilitation of a Patient Having Maxillary Trauma | Ege TÜRKMEN, İpek ÖREN, Elif ERCAN DEVRIMCI, Hande KEMALOĞLU |
| - | CP14 | Smile makeover with composite veneers using injection moulding technique | Naz BAYAR, Suat ÖZCAN |

JUNE 02, 2023

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| - | CP15 | Minimal-Invasive Treatment of Missing Lateral Incisors with Fiber-Reinforced CompositeBridge | Özge DUMAN, Pınar KEMENT, Ahmed ALSHAWI, Rabia YILDRIM, Ugur ERDEMIR |
| - | CP16 | Treatment Approach to a Discolored Tooth Due to Trauma | Arda BİNGÜL, Oya BALA |
| - | CP17 | Polydiastema Treatment with Single-Shade Composite Resin: One Year Follow-up | Elif SOSLU BULUT, Merve AĞACCIOĞLU |
| - | CP18 | Restoring Peg Laterals: A clinical report | Şekibe Hüma SANIOĞLU, Osman Tolga HARORLI |
| - | CP23 | Closure of the lower anterior incisor diastema with fiber-splinted pontic and build-up: case report | Fatma Emine KAROL, Osman Tolga HARORLI |
| - | CP19 | Bleaching Treatment of Dark Colored Arrested Carious Lesions – A Case Series Report | Merve ALBAKIR YIĞIT, Nevin ÇOBANOĞLU |
| - | CP22 | Bio - Aesthetic Management of Varied Crown Fractures – A Clinical Technical Tıp. | Dr Ashwini SHIVAKUMAR, Dr Vinutha MANJUNATH |
| - | CP20 | No-post No-core approach to restore severely damaged premolars: Endocrowns case-report | Ahmed ALSHAWI |
| - | CP21 | Rehabilitation of Vertical Dimension of Occlusion in a Severely Clenching Patient: Case Report | Muhammet Caglar BURSA, Kadir CEREN, Ayşe Deniz GEMALMAZ |
| - | CP25 | A clinical case of resin-composite direct filling using 3D-printed plastic index | Shuhei HOSHIKA, Midori KAWAMURA, Kenta TSUCHIYA, Yu TOIDA, Hihehiko SANO |
| - | CP28 | The SEAL is the DEAL | Disha AGARWAL |
| - | CP29 | Trauma Treatment Options İn Young Permanent Teeth: Two Case Reports | Azize BEKİS, Semanur ÖZÜDOĞRU |

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JUNE 03, 2023

| 30 AGUSTOS CONGRESS MAIN HALL | | | |
|---|---|---|---|
| SESSION 8 - CHAIRS: Dr. Tijen Pamir | | | |
| 9.00-10.00 | | Dr. Zafer ÇEHRELİ<br>Reattachment of Fractured Crown Fragments: A Clinical Update | |
| 10.00-10.30 | | COMPANY PRESENTATIONS - Gold Sponsors (GC – Kuraray Noritake) | |
| 10.30-11.00 - COFFEE BREAK | | | |
| SESSION 9 - CHAIRS: Dr. Batu Can Yaman | | | |
| 11.00-12.00 | | Dr. Alireza SADR<br>Structural Adhesive Dental Restorations | |
| 12.00-12.15 - CLOSING REMARKS BY JAPAN SOCIETY FOR ADHESIVE DENTISTRY | | | |
| Dr. Hidehiko SANO - Chairman of The JSAD Foreign Relations Committee | | | |
| Dr. Toru Nikaido - Chairman of The JSAD Finance Committee | | | |
| 12.15-12.30 - CLOSING CEREMONY | | | |
| **MALAZGIRT HALL** | | | |
| 9.30-11.30 | **Clinical/ Laboratory Evaluation of Dental Materials**<br>Moderator: Dr. Elif MUTAFCILAR VELİOGLU – Dr. Öznur ERASLAN | | |
| 9.30-9.45 | BS6 | Three-year clinical evaluation and survival rate of splinted periodontally compromised anterior teeth - A retrospective pilot study | E. Elif MUTAFCILAR VELIOGLU, Sefa AYDINDOĞAN, Emre TAŞLI, Sema HAKKI |
| 9.45-10.00 | DS62 | Evaluation of Shear Bond Strength of Calcium Silicate Based Materials | Latife ALTINOK UYGUN |
| 10.00-10.15 | DS52 | Efficacy of Conventional and İmmediate Endodontic Sealing Protocols on Shear Bond Strength to Coronal Dentin | Öznur ERASLAN, Büşra ABKA, Sema BELLI |
| 10.15-10.30 | DS56 | Bond Strength and Stability of Universal Adhesives to Coronal and Root Dentin | Noor ALNAFTACHI, Nevin ÇOBANOĞLU |
| 10.30-10.45 | DS67 | Assessment of Toothpastes through Simulated-brushing for Surface-roughness and Reversing-back Composite-discoloration | Simge MEŞELI, Elif ALKAN, Bora KORKUT, Dilek TAĞTEKIN, Funda YANIKOĞLU |
| 10.45-11.00 | DS68 | Cytotoxicity of Composite Materials on Gingival Fibroblast Cells | Betül ERDAL, Ebru ERDAL, Zeynep Ezgi KESIKBAŞ, Baturalp AYHAN, Gökhan KARADAĞ |
| 11.00-11.15 | DS69 | Effect of Saliva and Ferric Sulfate Contamination on Immediate Dental Sealing | Rümeysa ÖNER TUNCER, Sena OKUT, Nevin ÇOBANOĞLU |
| 11:15 11:30 | DS70 | Adhesive Strategies'' Impact on Discoloration due to Regenerative Endodontics: A Pilot Study | Yesim SESEN USLU |

JUNE 04, 2023

| HALL 1 | | |
|---|---|---|
| 10.00-12.00 | PANEL: Being a researcher in a foreign country * | |
| | Moderator and Speaker: Ricardo Marins CARVALHO | |
| | Speaker: Dr. Monica YAMAUTI | |
| | * This session is optional and for the researchers who registered for Cappadoccia Tour. | |
| | This session will take place in Ürgüp Cappadoccia. The researchers who registered for post-congress Cappadoccia tour may join this panel. The panel venue will be announced later. | |




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# 7TH IAD2023
## INTERNATIONAL CONGRESS ON ADHESIVE DENTISTRY
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**JUNE 01-04,2023**

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