MANAGEMENT OF COMPLICATED VESTIBULAR FRACTURE: A TRAUMATIC SOCCER INJURY CASE-REPORT

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Aim: to display the single-visit emergency care treatment of a full-surface complicated fracture of an upper central incisor.

Methods: a 22-year-old female patient suffered a maxillary central incisor fracture, preserved the fragment in saline solution and immediately came to department of dentistry and maxillo-facial surgery of University of Verona.

The intraoral examination showed the loss of the whole vestibular portion of the crown with pulp exposure, radiographical examination revealed no alveolar or radicular fractures.

Under local anesthesia, single visit endodontic treatment was performed, filling the root canal with endodontic cement and guttapercha.

Fitting of the fragment was checked and the sound margin proved to be slightly subgingival. Isolation with rubber dam was achieved and enamel on tooth and fragment was beveled with a fine grain diamond bur.

Tooth and fragment were etched with 37% orthophosphoric and one-bottle primer-bondig agent was applied on the free surfaces. The crown fragment was bonded with flow composite and the restorative margin was finished and polished with low grain bur and polishing system.

Results: two months follow-up showed no tooth discoloration, no symptoms of the treated tooth or of the adjacent teeth.

Conclusions: the single-visit endodontic treatment and the reattachment of the fractured fragment in this case allowed to no perform a late restoration. If this kind of emergency treatment was not made in this way, the prognosis would have drastically changed requiring a direct restoration, a veneer or a full crown.

FUNCTIONAL AESTHETIC TREATMENT OF DENTAL ANOMALIES IN SUBJECTS WITH ECTODERMAL DYSPLASIA

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Aim: the purpose of the study is to provide clinical dental guidance regarding the aesthetic and functional rehabilitative treatment of subjects with ectodermal dysplasia.

Methods: the patient was treated through a multidisciplinary therapy involving various branches of dentistry: orthodontics, conservative dentistry, and prosthodontics. This included the use of fixed vestibular appliances, shape modifications in the anterior sectors using composite material employing the direct veneering technique, and the placement of prosthetic devices.

Results: the teeth were aligned to maintain spaces for the prosthetic replacement of the agenetic elements. The composite restorations included esthetic and functional therapy of permanent elements with altered morphology and size and shape modifications for the management of agenesis with retention of deciduous elements. The agenesis was replaced with the cementation of Maryland bridges.

Conclusions: the dentist must be able to provide an early and individualized treatment plan that considers each patient's individual needs and allows for improved chewing function and quality of life. The versatility of conservative therapy interacts with the various branches of dentistry, providing a rapid and reversible solution while preserving the greatest amount of available dental tissue.

Doi: 10.19256/abstract.cduo.03.2024

CASE-BASED DENTISTRY: THE NEW WEB-APP TO HELP IN LEARNING AND TEACHING

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Aim: to evaluate the effectiveness of an innovative interactive tool developed by University of ** in enhancing university teaching and learning. Rooted in case-based medicine, this application allows students to integrate interdisciplinary knowledge acquired during their academic journey. The web-app format includes text, images, and radiographs across three sections: clinical cases, insights, and self-assessment tests. Content, validated by university teacher and supported by current literature, aims to foster critical and clinical thinking.
Methods: twenty-four fourth-year Dentistry students at the University of ** were randomly assigned to receive either digital or paper version of the tool. Clinical skills were assessed before and after a two-week usage period. A satisfaction questionnaire explored preferences regarding content and format.
Results: satisfaction responses between the two groups were statistically significant ($p < 0.05$), indicating a clear preference regarding the usability and usefulness of digital content. However, even in the group with paper-based content, satisfactory results in terms of knowledge acquisition were obtained after the observation period.
Conclusions: early integration of this tool could stimulate broader patient-centered clinical thinking. Its web-app format aligns with contemporary case-based medicine literature, enhancing attractiveness and efficacy in university education.

GENDER DENTISTRY, CORRELATION BETWEEN DMFT, ORAL HEALTH AND PREGNANCY: A MULTICENTER STUDY

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Aim: this study assesses the impact on the oral health of physiological and behavioral changes in pregnant women. The research explores the interactions between pre-existing oral conditions and gestational developments.
Methods: a multicenter cohort study was conducted involving patients from two university hospitals, utilizing anonymous questionnaires to collect anamnestic and clinical data related to oral habits and oral health. Indicators such as the DMFT (Decayed, Missing, Filled Teeth) index and a synthetic oral hygiene index, based on brushing frequency, type of toothbrush, use of dental floss and mouthwash were analyzed.
Results: the sample included 72 pregnant women with an average DMFT of 7.94±1.85. A moderately positive correlation ($p < 0.05$) was observed between brushing frequency and the synthetic oral health index. Over 72,2% of participants exhibited gingival bleeding and plaque accumulation, with only 33,3% regularly using dental floss. Further statistical analysis revealed a significant correlation between increased carbohydrate intake and higher DMFT scores ($p < 0.01$).
The study also highlighted that poor oral hygiene practices were significantly associated with adverse pregnancy outcomes, including preterm birth ($p < 0.05$) and increased susceptibility to gestational diabetes ($p < 0.05$).
Conclusions: the outcomes underscore the necessity of personalized dental management during pregnancy to prevent oral and perinatal complications. Implementing targeted oral health interventions could significantly enhance maternal and neonatal health outcomes.

THE USE OF MACHINE LEARNING ALGORITHMS IN DETECTING AND CLASSIFYING CARIES

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Aim: develop an algorithm to detect and classify caries in occlusal images.

Methods: intraoral occlusal pictures were acquired using a reflex camera. Caries were segmented with LabelMe after preprocessing, labeled according to the ICDAS scale, and assessed for lesion depth using the E- D classification from endoral periapical radiography. From each segmented Region of Interest, radiomic features capturing quantitative shape information, pixel-level statistical information, and texture were extracted from each color channel of the image (RGB). Machine Learning algorithms classified healthy and decayed teeth using radiomic features. A robust pipeline included an 80:20 dataset split for training and testing, along with 5-fold cross-validation to optimize classifiers and select features before evaluating performance on an independent test set.

Results: various Machine Learning algorithms were assessed with feature sets extracted from individual color channels. The top-performing classification metrics varied depending on the channel and features chosen. Accuracy ranged from 85% to 97%, sensitivity from 84% to 100%, and specificity from 87% to 100%. The accuracy appears to be significantly different compared to that which would be obtained randomly (p-value <0.05) and furthermore, carrying out a McNemar's Test shows that there is no significant difference (p-value >0.05) between the number of false positives and false negatives, validating the results of the classification carried out.

Conclusions: combining data from pictures and radiographs offers a promising diagnostic approach.

COMPOSITE, GLASS-CERAMIC AND GIC COMBINATIONS IN CLASS II RESTORATIONS. A 3D-FEA STUDY

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Aim: to investigate the mechanical behavior of resin composite, glass ceramic and glass ionomer cement material combinations in a *multilayer* technique to replace enamel and dentin in class II by means of 3D-FEA.

Methods: four 3D-FE models of teeth were created and analyzed in comparison with a sound lower molar one. Models A, B and C had *multilayer* constructions. Model *A*: Flowable (8 GPa) replacing dentin and filling composite (12 GPa) replacing enamel. Model *B:* GIC replacing dentin and filling composite (12 GPa) replacing enamel. Model *C:* flowable (8 GPa) replacing dentin and high modulus filling composite (70 GPa) inlay replacing enamel. Model *D:* lithium disilicate inlay replacing both dentin and enamel with a luting cement base-layer. Polymerization shrinkage effects were simulated and a load of 600 N was applied.

Results: model A showed the highest stress distribution along all the adhesive interfaces with failure risk marginally and internally. Model D showed the best favorable behavior like sound tooth model. The use of GIC simulating dentine clearly affected the stress at the cavity floor in Model B, while the filling composite (12 GPa) and linear polymerization shrinkage of 1% strongly influenced the biomechanical response.

Conclusions: direct filling composite (12 GPa) applied in a *multilayer* technique to class II cavities, with or without shrinking dentin layers, produced adverse and graduated FEA stress distributions and displacements. The use of a cemented ceramic material (70 GPa) behaved as well as sound tooth.

MULTILAYER FILLING TECHNIQUES IN RESIN COMPOSITE POSTERIOR RESTORATIONS. A 3D-FEA STUDY

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Aim: to investigate the influence of different resin composite (BF) and Glass Ionomer Cement (GIC) material combinations in a "bi-layer" *versus* a *single-layer* adhesive technique posterior restorations by 3D-FEA.

Methods: three restored class I cavities 4 mm deep were created in a sound molar CAD and later FE-model: adhesive and flowable composite with bulk fill composite (model A), GIC with bulk fill composite (model B), adhesive with bulk fill composite (model C). Physiological masticatory combined with shrinkage stress were applied to these systems. Static linear analyses were carried out. The maximum normal stress criterion was adopted as a measure of potential damage.

Results: all models exhibited high stresses principally located along the tooth tissues-restoration interfaces. All Along enamel-restoration interface stresses were up to 22 MPa and 19 MPa in the enamel and restoration. A and C models showed a similar stress trend along the dentin-restoration interface with a lower stress level in model A, where stresses up to 11.5 MPa and 7.5 MPa were recorded in the dentin and restoration, respectively, whereas stresses of 17 MPa and 9 MPa were detected for model C. In contrast to A and C models, the model B showed a reduced stress level in dentin, in the lower restoration layer and no stress on the cavity floor.

Conclusions: FE analysis supported the positive effect of a *bi-layer* restorative technique based on GIC + BF in a 4 mm deep class I cavity in lower molars *versus* a *single-layer* based on BF technique.

POLYMERIZATION STRESS DISTRIBUTION IN ANTERIOR COMPOSITE RESTORATIONS BY FEA ANALYSIS

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Aim: this study evaluated the internal and marginal polymerization shrinkage stress distribution in class III dental restorations differently restored by means of (3D-FEA).

Methods: a class III cavity in a central incisor was obtained and firstly transferred in a CAD 3D modeling software and later exported to FEA where a structural mechanical static analysis was carried out. Four groups were considered. Group C (three increments of a conventional composite); group B (two increments of a bulk-fill composite resin); group FC (flowable and a conventional composite); group FB (flowable bulk-fill composite resin and two increments of conventional composite). Polymerization shrinkage was simulated according to a restorative strategy applying thermal analogy. The Maximum Principal Stress criterion was used to analyze the stress distribution marginally and internally.

Results: group FC showed the highest stress peak at the beveled enamel interfaces (9.05 MPa), while group FB showed the lowest peak in the same region (4.48 MPa). In the cavo-surface incisal angle region, the mean peak value for all groups was 3.76 MPa. As for the cervical cavo-surface angle, it was 3.3 MPa for group C, around 3.36 MPa for group B, 3.41 MPa in the FC group, and 3.27 MPa for FB.

Conclusions: the restorative technique did not generate substantial differences in the stress marginal distribution in class III resin composite restorations. The enamel bevel side at the cervical area was the region that resulted in the highest concentration of shrinkage stresses.

CLASS II RESTORATIONS INTERPROXIMAL CONTACT AREA ASSESSMENT USING 3D IMAGE RECONSTRUCTION

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Aim: evaluate different matrix systems used in Class II restorations. In particular, by means of a 3D image analysis, it is possible to compare the restorations obtained through nine different matrix systems with the natural tooth. The comparison with the reference tooth is performed by evaluating two parameters: contact area and vacuum area between the contact point.

Methods: the study used different composites and nine different matrix systems, three circumferential matrices, and six sectional matrix were studied. A patient's lower arch was examined, from which a resin model was obtained using the 3D printer Formlab 2. This model, at the element 4.6, has a removable stump with a Class II cavity; this cavity has been reproduced on 27 identical extractable abutments. The abutments were divided into nine groups of three abutments; for each group of abutments a different matrix system was used. Each abutment mounted on the model was subsequently scanned with the Dental Wings 7 Series 3D scanner, then each scan was analyzed with Rhinoceros and Grasshopper software. Statistical analysis was performed with statistical software SAS 9.4.

Results: the 3D analysis allowed a detailed and objective evaluation of the reconstruction carried out by allowing to compare the various matrix systems with each other and compare them with natural tooth situation.

Conclusions: this process highlighted the difference between the circumferential and sectional matrix systems, according to the literature.

EFFECTS OF SMOKE ON SURFACE AND COLOR PROPERTIES OF NANO-HYBRID RESIN-BASED COMPOSITES

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Aim: to evaluate and compare the effects of conventional cigarette smoke and tobacco heating system on the roughness, gloss, color stability and translucency of three nano-hybrid Resin-Based Composite materials (RBC).

Methods: 45 disc-shaped samples were prepared for each type of RBC for a total of 135 samples (n = 15). The exposure was performed with the use of a custom-made acrylic chamber exposure device, in which the smoke of a cigarette/THS stick set on one side of the box was conveyed to the opposite side through the use of a negative pressure device. In the middle of the chamber, the samples were placed on a spinning circular holder. The exposure lasted 15 days with 20 cigarettes/THS sticks per day and the brushing protocol was carried out every 5 days. Before (t_0) and after the exposure period (tf), surface and color properties values were recorded. A 2-way analysis of variance was applied ($p = 0.05$) to evaluate differences among groups.

Results: *roughness:* all groups didn't show statistically significant changes after CS/THS aerosol exposure. *Gloss:* all groups experienced a gloss decrease after exposure. *Color stability:* both cigarette smoke and THS aerosol can cause color change of resin-based composites to a similar extent. *Translucency:* all groups experienced a TP variation after exposure, with differences between different materials.

Conclusions: the results of this study underline the necessity for further investigation on the effects of THS aerosol on properties of RBC; evidence of the interaction of smoke and THS aerosol with different RBCs' properties is also needed.

NEW METHOD FOR EVALUATING HEAT TRANSFER IN PULP CHAMBER DURING CLASS I CAVITY PREPARATION

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Aim: the aim of this *in vitro* study was to analyse the pulpal temperature variation generated by the use of multi-blade burs on high-speed handpieces during the preparation of Class I deep cavities.

Methods: a standardized Class I cavity was prepared 0.5 mm from the roof of the pulp chamber in 5 sound extracted molars. Spherical tungsten multi-blade burs were used for the test at different speeds (5000/10000/30000 rpm) at different pressures (50/100 g) with different application times (3/6/9 sec). T-type thermocouples were inserted into the pulp chamber to determine the intracameral temperature. In addition, infrared thermography was used to analyse the tooth surface temperature distribution. Significance level a = 0.05.

Results: an increase in temperature (min 0.05°- max 3.24°) within the pulp chamber was evident, with a trend proportional to the time of bur application ($p > 0.05$) and the number of revolutions used ($p < 0.05$), at the same pressure. The thermographic images showed a hemispherical propagation of the thermal bands starting from the contact area between the milling cutter and the tooth surface, where the maximum temperature is recorded. As the time of application of the milling cutter increases, the temperature trend curves do not undergo a change in slope but only the value reached by the curve is increased.

Conclusions: in Class I cavities with a residual dentine thickness of 0.5 mm, the tested bur, at low speed and short application times, causes temperature increases that are negligible, considering a tolerated temperature increase of up to 5.5 °C.

EFFECT OF ENERGY DRINKS ON GLOSS AND SURFACE ROUGHNESS OF RESIN-BASED COMPOSITE MATERIALS

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Aims: to evaluate the effect of two energy drinks on gloss and surface roughness of four resin-based composite materials.

Methods: four different composite materials were tested, each of them representing a different test group. Each group was further divided into three subgroups based on the immersion media: distilled water (control), Red Bull (Red Bull GmbH) and Burn (The Coca-Cola Co). 15 disk shaped specimens were prepared for each subgroup using a teflon mold. Subsequently they were polished and stored in distilled water for 24h. Surface roughness and gloss were measured respectively with a roughmeter (SJ-201; Mitutoyo) and a glossmeter (MG6-SA; KSJ) at baseline and after 30d of immersion (2 min per day). Simulated brushing was performed for 7s after each immersion. A Shapiro-Wilk test was used to test the normality of variables, a two-way ANOVA was used to test differences between the initial and the final gloss and surface roughness measurements for "energy drink" and "composite" factors. Ultimately a Turkey post-hoc was used to identify the differences between the groups.

Results: the four composites tested showed a significant variability in terms of gloss but not in terms of surface roughness. Moreover, both energy drinks had a comparable influence on surface roughness which was statistically significant. However, they led to different effects on gloss with Redbull showing the highest influence.

Conclusions: energy drinks seem to affect surface roughness and gloss of resin-based composites. Moreover, the composite material seems to have an influence on gloss but not in terms of surface roughness.

FATIGUE BEHAVIOR AND CRACK PROPAGATION OF CAD-CAM MATERIALS: EFFECT OF OCCLUSAL CORRECTION

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Aim: occlusal correction techniques play a critical role in determining the mechanical behavior and durability of metal-free materials. The aim of this study is to analyze the effect of different occlusal correction on crack initiation and crack propagation in different CAD/CAM chairside restorations. The purpose is to determine the crack growth pattern in ceramic material with different occlusal correction and the crack initiate in ceramic material under cyclic fatigue. The null hypothesis tested is that there is no difference between the CAD/CAM chairside material and different occlusal correction on crack initiation and crack propagation during fatigue.

Methods: three types of monolithic CAD/CAM materials (Initial LiSi Block, Cerasmart270, Katana Zirconia Block STML) were selected to mill identical flat-surface single crown restorations that were cemented on the replicated acrylic preparations. The specimens of each material were randomly allocated into 3 groups: No intervention (control specimens), Fine football shaped diamond bur, Fine football shaped diamond bur + polishing. A chewing simulator (SD Mechatronik) was used for fatigue cycling mechanical aging of the specimens in wet condition. Fatigue damage was evaluated by using optical coherence tomography at the baseline and after every cycle to reveal the presence of cracks.

Obtained data were statistically analyzed with a two-way ANOVA test and post-hoc Tukey ($p < 0.05$).

Results: from the statistical analysis, it is evident that cracks form and propagate more in LiSi compared to other materials. Additionally, occlusal corrections have a greater impact on cracks in group 3 (correction with fine football shaped diamond bur + polishing) compared to the other groups.

Conclusions: occlusal corrections can lead to an increase in crack propagation in CAD-CAM materials.

EFFECT OF OCCLUSAL CORRECTION ON WEAR OF CAD CAM MATERIALS

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Aim: to analyze the effect of different surface treatments on wear rate under cyclic fatigue in lithium disilicate glass-ceramic, hybrid ceramic, and Zirconia material crowns. The null hypothesis tested is that there will be no difference between the different surface treatments on volume loss.

Methods: initial LiSi Block, Cerasmart, and Zirconia were selected for milling flat-surfaced identical single-crown restorations, which were then cemented onto replicated acrylic preparations. Thirty samples were randomly assigned to 3 different groups: No Intervention (group 1), Fine Grit Shaped Diamond Bur (group 2), and Fine Grit Shaped Diamond Bur + Polish (group 3). A chewing simulator (SD Mechatronik) was used for fatigue cycle mechanical aging of the specimens under wet conditions. After every fatigue cycle, the evolution of volume loss was analyzed with a 3D laser profilometer (LAS-20). SEM analysis of worn scars was conducted. Data obtained were statistically analyzed using a one-way ANOVA test and Bonferroni post-hoc test.

Results: statistical analysis showed that groups 2 and 3 had a significantly higher wear rate than group 1 ($p = 0.00001$).

Conclusions: the initial null hypothesis was rejected since any kind of occlusal correction increases the wear rate of CAD/CAM materials.

FATIGUE BEHAVIOR OF OCCLUSAL VENEER TO RESTORE CRACKED VITAL TEETH

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Aim: the purpose of this *in vitro* study was to investigate the fatigue behavior of vital posterior teeth as part of cracked tooth syndrome and restored with partial adhesive restoration. The null hypothesis is that there will be no significant difference between the various CAD/CAM materials on crack propagation during fatigue.

Methods: artificial specimens of vital teeth mechanically equivalent to those of natural dentin were created with a standardized crack in half of them.The samples were divided into three groups according to the different materials employed for a partial adhesive restorations: nanohybrid CAD composite, hybrid ceramic, lithium disilicate. In order to assess the biomechanical behavior, each sample was submitted to an initial micro-CT scan (SkyScan 1172 Micro-CT, Bruker). Then, all specimens were subjected to accelerated fatigue cycling protocol through a stainless-steel sphere with a 4.6-mm- diameter indenter centered with three-point contacts. The samples were scanned with micro-CT and OCT after each cyclic fatigue step after each set of cycles to evaluate the effect of cycling fatigue on crack propagation. The results of observations regarding the distribution of loads and the propagation of fracture lines in samples was compared through ANOVA test and Tukey post-hoc ($p < 0.05$).

Results: the different tested materials showed a similar ability to limit crack propagation during fatigue, even if fracture occurred more when hybrid ceramic was employed.

Conclusions: partial adhesive restorations seems effective in protecting teeth from fatigue, even if more tests should be performed.

FATIGUE BEHAVIOR OF ADHESIVE CROWNS TO RESTORE CRACKED NON-VITAL TEETH

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Aim: the purpose of this *in vitro* study is to investigate the fatigue behavior of endodontically treated teeth as part of cracked tooth syndrome and restored with adhesive full crown restorations. The null hypothesis is that there will be no significant difference between the various CAD/CAM materials on crack propagation during fatigue.

Methods: artificial specimens of endodontically treated teeth mechanically equivalent to those of natural dentin were created with a standardized crack on half of them. The samples are divided into two groups according to the different materials employed for a full-crown adhesive restoration: hybrid ceramic, lithium disilicate. Each sample was submitted to an initial micro-CT scan (SkyScan 1172 Micro-CT, Bruker). Then, all specimens were subjected to accelerated fatigue cycling protocol through a stainless-steel sphere with a 4.6-mm-diameter indenter centered with three-point contacts. The samples were scanned with micro-CTand OCT after each cyclic fatigue step after each set of cycles to evaluate the effect of cycling fatigue on crack propagation.

The results of observations regarding the distribution of loads and the propagation of fracture lines in tested samples were compared through ANOVA test and Tukey post-hoc ($p < 0.05$).

Results: since the tested materials were equally able to prevent crack propagation during fatigue testing, the null hypothesis was accepted.

Conclusions: adhesive crowns could limit crack propagation, even if fatigue test should continue to better understand the biomechanical behavior of this challenging clinical scenario.

2-BODY WEAR OF MILLED *VS* 3D PRINTED RESIN BASED MATERIALS

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Aim: the purpose of this *in vitro* study was to evaluate the 2body wear behavior of 3D printed *vs* milled materials in 3 different acidic medium by using the ACTA machine.
The tested null hypothesis were that materials were able to equally resist to abrasive wear and there is no differences between the acidic medium**.**
Methods: tested materials consisted of 2 milled composites (GranDio block , VOCO; CERASMART, GC), a milled PICN (VITA enamic VITA), a printed composites (IRIX MAX, DWS) and a 3D printed PICN (IRIX PLUS,DWS). For every material specimen of 2 mm thickness were obtained, cutting blocks of milled materials in a cutting machine, or printing with a printer machine. Specimen was finished with 3 abrasive paper at different grit and then fixed in the testing wheel with a light cured tray material. Specimens was tested in different medium with different PH (water, RedBull and Gastric Acids). Wear test was performed with the ACTA machine for 200.000 cycles. Digitalization was obtained by using a laser scanner then volume loss and surface roughness evaluated. Specimen's surfaces were analyzed with SEM. Obtained data was analyzed with ANOVA and Post-hoc test.
Results: 3D printed materials seemed to have less volume loss than milled materials. Moreover, there is statistically difference between different acidic and neutral medium.
Conclusions: the null hypothesis was rejected since materials and medium tested induced different volume loss.

OPTICAL STABILITY OF 3D-PRINTED *VS* MILLED MATERIALS

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Aims: the purpose of this *in vitro* study was to evaluate the optical properties of different 3D printed composite materials in comparison to milled resin-based materials.
Methods: full-crowns, identical in anatomy, were designed with a CAD software and produced with different resin-based materials according to the milling-printing associated method (n = 5 each): Iris Plus Mono, Iris Max Mono, Initial Lisi HT, Initial Lisi LT, Cerasmart HT, Cerasmart LT, E-Max HT and Vita HT. Once finished and polished, samples were tested to evaluate:
1) spectro-colorimetric parameters: spectral factor of re-reflection and/or transmission, CIE Lab colorimetric coordinates, yellow index, translucency index measured as the variation of spectral factor of reflection and/or transmission with respect to the color of the substrate.
2) Optical finishing parameters: gloss index.
Then, after optical tests, samples were subjected to the following tests to evaluate surface and mechanical characteristics of the tested materials: profilometry (LAS-20) and nanoindentation of occlusal surfaces. Results were statistically analyzed with ANOVA test ($p < 0.05$).
Results: the results of this *in vitro* study showed that milled resins have comparable optical and mechanical properties than 3D printed ones.
Conclusions: based on the study findings 3d printed materials similarly behaves to milled ones, even if aging should be done to confirm their stability.

COLOR MATCH EVALUATION OF SINGLE-SHADE AND GROUP-SHADE COMPOSITE CLASS V RESTORATIONS

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Aim: to compare the color match between tooth and restoration of single-shade and group-shade composites, through instrumental and visual analyses.

Methods: the color of 60 sound extracted molars was instrumentally evaluated in order to divide teeth in 3 different groups: Light (VITA scale A1, B1, B2, C1, D2) (N = 20), Medium (VITA A2, A3, C2, D3, D4) (N = 20) and Dark (VITA A3.5, A4, B3, B4, C3, C4) (N = 20). Class V 5 x 5 x 2 mm cavities were created on the buccal surfaces of each tooth. For each group, 10 teeth were restored with the correspondent group-shade composite (SimpliShade, Kerr) and 10 with a single-shade (Omnichroma, Tokuyama) composite. A spectrophotometer (VITA Easyshade V) was used to evaluate the tooth/resin color match after 24 h (T_1). Color variations (ΔE_{00}) were calculated and statistically analyzed ($p < 0.05$). A visual analysis was performed at T_1, giving to each specimen a score in a range from 0 (excellent match) to 4 (significant mismatch).

Results: instrumental evaluations revealed significant differences between materials at T_1 ($p < 0.05$), with lower ΔE_{00} values for group-shades resins. Visual analysis reported significant differences between materials ($p < 0.05$).

Conclusions: data suggest that group-shade composites can achieve a good color match with the surrounding tooth structure and that choosing from fewer different shades increases the chance of achieving a perfect color match.

POST-SPACE TREATMENT EFFECTS ON BOND STRENGTH OF FIBER POSTS: A SYSTEMATIC REVIEW

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Aim: this study evaluated the scientific literature of last 10 years regarding the effect of Post-Space (PS) treatment on push-out Bond Strength (BS) of Fiber Posts (FP).

Methods: the study was conducted according to PRISMA Statement: 1) literature search strategy; 2) screening and selection; 3) data extraction and quality assessment; 4) summarize the findings. *In vitro* studies in English language were searched in MEDLINE and Scopus database.

Results: 479 studies (MEDLINE) and 375 (Scopus) were found, 854 were screened, 781 were excluded, 73 were included for full-text reading, 28 showed high risk of bias, 41 moderate and 4 showed low risk of bias. Differences among studies made it difficult to perform a reliable qualitative analysis. Despite the high methodological variability, it was found that EDTA could negatively affect BS when using Self-Adhesive (SA) cements. There is no study supporting NaOCl irrigation before luting with SA resin cement. Cross-linkers could significantly prevent BS decrease, regardless of the adhesive system used. Regarding CHX there was no consensus; some studies showed that CHX could improves the BS overtime due to its MMPs inhibitory action.

Conclusions: CHX showed BS decreasing after 1 year when using Etch-and-rinse and Self-etch adhesive with no effect on SA cement. When using the dual-cure SA cement the lowest BS was observed when PS was pretreated with NaOCl. NaOCl could decrease the micromechanical interaction between the resin material and NaOCl treated dentin and could jeopardize the resin polymerization reducing the BS.

ADHESIVES FOR SHAPING AND LAYERING OF COMPOSITE

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Aim: describe the characteristics of adhesive systems, explain their composition, describe the protocol of use and identify advantages and disadvantages of the use of adhesives for modeling/layering of composite resin.
Methods: the adhesives used includes all types of adhesives.
Results: the main characteristics analyzed are the cohesion force and color changes. Many have been effective, but the best effects have been seen in the bonding component of conventional total etch adhesives, this due to its hydrophobic character. The bonding allows the restoration to be protected.
The M.A.P. modeling technique introduces a composite modeling protocol only for adhesives.
Conclusions: the modeling adhesive maintains stable cohesion and coloration strength; decreases infiltration and the formation of irregularities in the restoration. They must be composed of hydrophobic resin and with a low concentration of solvents, these being more soluble in a humid environment. Not all types of adhesives can be used, and the main disadvantages are water absorption and solubility. However, more studies are needed, there is no consensus in the literature of its use as a technique, being based on a study.

DEEP MARGIN ELEVATION: A NARRATIVE REVIEW, CURRENT CONCEPTS AND FUTURE DIRECTIONS

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Aim: Deep Margin Elevation (DME) is a procedure used to raise or reposition sub-gingival margins into supra-gingival margins using several materials to increase marginal integrity and bonding strength. Even if DME seems a valuable technique, clinicians have not extensively applied it due to the insufficient scientific literature on this topic and on the reduced number of articles about the criteria for clinical applicability of this technique. Therefore, the aim of our study is to review the literature and clarify whether DME is a reliable technique to adopt in clinical practice.
Methods: a search in the literature was conducted for evidence-based research articles referring to DME published from January 2000 to January 2024 using PubMed, Scopus and Cochrane Library databases. *In vivo* clinical studies, *in vitro* studies, case reports, case series and reviews written in English referring to any type of DME technique were included in the search.
Results: this review included a total of 41 studies. The findings showed that this technique does not affect bond strength, fatigue behavior, fracture resistance, failure pattern or repairability. DME and subgingival restorations are compatible with periodontal health, given that they are well-polished and refined.
Conclusions: the DME technique seems to be a minimally invasive alternative to surgical crown lengthening and orthodontic extrusion however RCTs with extended follow-up periods are necessary to clarify all aspects of the technique and ascertain its validity in clinical practice.

CLINICAL STABILITY OF DEEP MARGIN RELOCATION TECHNIQUE: AN OBSERVATIONAL STUDY

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Aim: to evaluate the efficacy of different composite materials in Deep Margin Relocation (DMR) in class II cavities. The null hypothesis tested predicted that there were no differences between high viscosity flowable and non-flowable, heated and non-heated materials in DMR.

Methods: patients with at least one deep interproximal caries in posterior teeth were selected. Periodontal parameters (Periodontal Probing Depth (PPD), Recession (REC), Plaque Index (PI) Bleeding on Probing (BoP)) and cavity parameters (cavity pattern, cavity width, pulpal status) were recorded. When placing a rubber dam was impossible, gingivectomy with or without osteoplasty was performed. Once the distance between the alveolar ridge and cervical margin was 2 mm, the rubber dam was placed. After enamel pre-etching, a two-step self-etch adhesive system was applied. Patients were randomly assigned to three groups based on the material used for the first 1 mm horizontal layer placed over the cervical margin: group 1 high-viscosity flowable composite; group 2 heated nanohybrid composite; group 3 nanohybrid composite. The remaining cavity was restored according to the centripetal build-up technique. Two independent, blinded operators assessed clinical outcomes based on periodontal measurements and FDI parameters at 3, 6, 12, 24, 48 months. Data were statistically analyzed using chi-square test and Kaplan-Meyer estimation ($p < 0.05$).

Results: statistically significant differences were found among the three groups, indicating that nanohybrid composite has better performance. No significant difference was observed in gingivectomy and/or osteoplasty execution.

Conclusions: the null hypothesis was rejected as the flowable composite showed a worse periodontal response than nanohybrid and pre-heated composites in DMR technique.

A SPLIT-MOUTH RANDOMIZED CONTROLLED CLINICAL STUDY OF SELF-ADHESIVE COMPOSITE FOR NCCLS

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Aim: self-adhesive composites are a convenient restorative option, although few data exist on their *in vivo* effectiveness. This study aimed to determine the clinical performances of a self-adhesive resin composite (Surefil One) compared to a traditional adhesive+composite system (iBond universal+Venus Pearl) for the restoration of Non-Carious Cervical Lesions (NCCLs).

Methods: patients presenting at least 2 NCCLs on canines and/or upper premolars on vital teeth were enrolled. The apico-coronal and mesio-distal depth of the cavities was recorded with a probe. Both treatments were randomized on 2 different elements per patient (split-mouth study), one with Surefil One and the other with traditional adhesive composite. An experienced operator performed the treatment, as follows: initial and intraoperative photos/digital scans, rubber dam isolation, cleaning and cavity preparation. After polishing, patients were dismissed and asked to fulfill the VAS questionnaire until the 7-days follow-up. At 7 days, and at 6 months, photos and scans were repeated, and restorations evaluated according to the modified USPHS criteria. Data were statistically analyzed ($p < 0.05$).

Results: a total of 17 patients were included in the study. No postop sensitivity was reported regardless of the restorative approach. At 6 months, color match, marginal discoloration and marginal adaptation were superior in patients restored with a traditional composite ($p < 0.05$).

Conclusions: traditional adhesive/composite system behave clinically better in terms of surface characteristics and margin adaptation when restoring NCCLs.

COMPARATIVE ANALYSIS OF BLEACHING APPROACHES AMONG DENTISTS AND DENTAL HYGIENISTS

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Aim: this study aimed to survey the approach of dental professionals (dentists and dental hygienists) towards teeth bleaching.
Methods: after approval of the Bioethical Committee, an electronic survey (Qualtrics) of 18 questions was sent to dentists and dental hygienists. Participation was voluntary and anonymous. The survey was divided into 3 main sections: 1) demography; 2) bleaching approaches; 3) post-treatment attitudes.
Results: participants from different Italian regions completed the survey (N = 268; 78% dental hygienists, 22% dentists). The majority perform <10 bleaching treatments/month (83%), with some in the same appointment as oral hygiene (4%), usually on patients between 30-50 years old (74%). Professional or home-bleaching is proposed according to the clinical case (42%). Different materials/brands are used for the treatment, while alginate (61%) or oral scans (26%) were the most used impression techniques for customized nightguard. Post/op teeth sensitivity was reported (84%) for which clinicians suggest the use of desensitizer toothpaste (89%) or interruption of the treatment (26%). After bleaching, photographs are usually taken (89%) and instructions provided either verbally (50%) or with a pamphlet (50%). Only 41% of clinicians plan post-bleaching control.
Conclusions: tooth bleaching is an increasingly trendy topic. There is a need to improve clinicians' knowledge on the materials used to enhance clinical practice and reduce post-op sensitivity, irrespective of the professionals interviewed.