IADR/CED 1997 MADRID (SPAIN)

34th ANNUAL MEETING OF THE CONTINENTAL DIVISION OF THE INTERNATIONAL ASSOCIATION FOR DENTAL RESEARCH

SEPTEMBER 18-20, 1997

FACULTAD DE ODONTOLOGIA

UNIVERSIDAD COMPLUTENSE

MADRID - SPAIN

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Dentin Bond Strength of polyacid-modified composite resins (compomers). J. ELLACURIA*, R. TRIANA, J. PRADO, N. MINGUEZ, F. GARCIA-GODOY, J.A. GIL. Universities of Basque Country (Spain) and San Antonio, Texas (USA).

The aim of this study was to evaluate the shear bond strength to dentin of polyacid-modified composite resins (compomers). Thirty human and noncarious extracted permanent molars stored in distilled water were used. Bonding flat surfaces (buccal and lingual) were prepared in dentin by wet-grinding to 600 grit. The teeth were distributed into three groups of ten teeth (20 surfaces) to test each material: Group 1: ***Hytac®*** *Applitip with OSB bonding system*; Group 2: ***Dyract®*** *with* Prime and Bond 2.1 system; Group 3: **Compoglass®** with Syntac Single-Component system. Cylindrical samples of each material were prepared in plastic molds (surface area of 6.56 mm^2) and bonded to the dentin surface according to the manufacturers' instructions. All samples were stored in distilled water at room temperature for 48 hours. The samples were then thermocycled in distilled water at 5º and 55º C for 500 cycles. The specimens were mounted in paper cups with plaster with the bonded ring-dentin surface area parallel to the shearing rod of the Instron testing machine. The samples were sheared at a crosshead speed of 0.5 mm/min. The results were recorded in megapascals (MPa): Group 1: 19.89±3.6; Group 2: 13.852±2.24; Group 3: 8.74±1.27. After shearing the specimens, each tooth and material-dentin interface was visually examined to record the failure mode. Selected samples were also evaluated with the scanning electron microscope (SEM). ANOVA and Student-Newman-Keuls tests were used to evaluate the results. Hytac® Applitip with OSB bonding system has a significantly higher bond strength ($p<0.001$) than the other materials. Compoglass® with Syntac Single-Component system shows a significantly lower bond strength. Fracture patterns examined by SEM were cohesive in appearance.

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EVALUATION OF A PHOTO-ACTIVATION TECHNIQUE IN INDIRECT COMPOSITE INLAYS USING A TRANSPARENT SILICON MODEL.
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The purpose of this study was to determinate the usefulness of a new transparent silicon bite registration material (Memosil extra hard Hereus), as model instead of the plaster in indirect composite inlays technique, in the way of using positively the composite photo-tropism when the material is trans-light cured. Thirty standard second class cavities for composite inlays were prepared on as many extracted human molars; afterwards they were randomly divided into two groups of fifteen each. After silicon impression (Optosil, Xantopren, Bayer) of the teeth, fifteen models were performed by transparent silicon (TS) and the other fifteen by plaster (T2,Techim). Incremental placement techniques of the composite (Brillant Coltene) was performed in each cavity but in the TS-models the composite was cured through the silicon. After light-curing the inlays were completely polymerized in 10 minutes at 170°C and 8 bar of pressure (BCG1, Brega). The inlays were silanized (Monobond-S,Vivadent) and then luted to the cavities according to the standard technique by: Syntac and Variolink high-viscosity (Vivadent). After adhesive cementation and finishing, the teeth were stored in water for 24 hours and then included in epoxy resin before cutting in twice in the mesiodistal direction by means of a diamond saw (Sagemikrotom 1600, Leitz). The dimension of the luting space was measured by means of a micrometer assembled on a light polarized microscope (Axiopot, Zeiss) at a magnification of 125X (20 measurements for each section). Statistical analysis using Student's t-test showed a significant difference regarding the width of the luting space ($p<0,001$) between inlays performed on TS-models (mean:57,6 µm) and inlays performed on plaster models (mean:88,5 µm). Hence it is concluded that is possible to reduce the width of luting cement in indirect composite inlays by means of the trans-silicon light-curing technique.

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The additional effect of fluoride-gel over the use of sealants in permanent-first-molars fissured caries. MP GONZÁLEZ-RODRÍGUEZ, M BRAVO, P BACA, JC LLODRA, P JUNCO. (Department of Preventive and Community Dentistry. School of Dentistry, University of Granada, Spain)

The purpose was to evaluate the additional effect of fluoride gel over the sealants in the prevention of caries in permanent first molars. In 1993, 391 children (age 6-7 yr) were selected from a random sample of schools (n = 11) in Granada (Spain) (with a 0.07 ppm concentration of fluoride in the drinking water) to receive sealants (Delton light cured) in permanent first molars. Sealants were applied by students at the School of Dentistry in the University of Granada. Schools were randomly allocated in three groups to receive or not weekly fluoride-gel school-based brushing program (APF gel with 12300 ppm F): the first group (3 schools) did not receive fluoride, the second (4 schools) during 15 months, and the third one (4 schools) during 33 months. In 1996, those children remaining in the schools (n = 281) were explored for caries, according to WHO criteria. Another sample of children (n = 270) from eight schools randomly selected from the same area and with similar age were chosen as controls. The effect of fluoride-gel was calculated by comparing caries in deciduos teeth in 1996 between the two groups. The additional effect of fluoride-gel over sealants was calculated by comparing fissure-caries in permanent first molars in 1996 between the subgroups within the sealants group. Overall, a significant caries reduction in deciduos teeth was found (17.5%) (dft ± standard deviation in controls = 1.75 ± 2.29, in sealed children = 1.44 ± 1.94). A mean of 2.6 molars/child received sealants. Overall, a significant caries reduction in fissured caries was found (37%) (fissured DMFS in controls = 1.39 ± 2.00, in sealed-children = 0.88 ± 1.55), but the number of months in the fluoride gel program did not modified this reduction ($p = 0.915$). It is concluded a weekly fluoride-gel school-based brushing program does not improved the caries protection in sealed molars. This study was supported by the # 029 Investigation Group at the University of Granada.

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SEM study on the effects of Er:YAG laser on root surface.
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Use of Er:YAG laser has been proposed for removing microbial deposits and calculus present on teeth. However, the influence of Er:YAG laser irradiation on root surface has not been fully investigated. The aim of this study was to evaluate the effects of Er:YAG laser irradiation on root cementum by scanning electron microscopy (SEM). Specimens (2 mm thick; size 6 x 7 mm) were obtained from extracted human periodontally-diseased teeth using a water-cooled high-speed bur. Er:YAG laser was then applied at various powers ranging from 25 to 100 mJ/pulse/sec. The laser irradiation was performed under water irrigation, holding the tip perpendicular to root surface in the contact mode. Following laser exposure, specimens were fixed, dehydrated, and dried at critical-point in liquid CO_2. They were mounted on SEM plates and sputter-coated with gold. The cementum surface of control sites and sites exposed to laser were examined by SEM. Specimens were then fractured with a sharp scalpel perpendicular to the surface of the lesion and examined by SEM. The Er:YAG laser beam created a circular crater-like defect on the root surface. The diameter of the crater was approximately the same for all tested powers. However the depth of the crater was dependent on the power used. At the bottom of the lesion, there was a layer 15µm thick within the cementum where tissue damage was observed: The tissue presented an amorphous appearance; the Sharpey's and matrix fiber bundles were also not clearly distinguishable. These observations indicate that cementum was damaged following Er:YAG laser irradiation. The alterations observed at the bottom of the craters, within the cementum, may ultimately affect connective tissue attachment during the healing process.