AIOP Poster Awards

The following are the three best scientific posters that were presented at the 31st International Congress of the Italian Academy of Prosthetic Dentistry held in Bologna on November 22–24, 2012.

First Prize

Effect of Plasma Cleaning on Peri-implant Bone Level Changes: RCT, Preliminary Results

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Objectives: Plasma of Argon cleaning treatment was demonstrated to have a double effect on titanium abutments: removal of pollutions following customization and increase of cell adhesion. This prospective, match-paired, triple-blinded randomized controlled trial aimed to test if plasma treatment of customized abutments can longitudinally affect radiographic peri-implant marginal bone level changes. ***Methods:*** Twenty consecutive patients requiring single implant–supported restorations in the anterior maxilla were selected. All procedures were approved by the local ethical committee. At the time of abutment connection, 2 months after implant insertion, customized abutments were divided into control (subjected only to usually adopted steam cleaning, CG) and test (subjected to plasma treatment, TG) group. Patients included in the study were randomly assigned to one of the two treatments. After customization and cleaning procedures and before connection, abutments were subjected to SEM and EDAX analysis in order to count and characterize pollution microparticles on the abutment surface and implant-abutment connection. Additionally, microbiologic analysis was performed to detect bacterial contamination on the abutment surface. Eighteen months after abutment connection and final restoration, periapical standardized digital radiographs using a customized digital film holder were taken. To assess microparticles on the abutments and marginal bone level alterations, SEM images and radiographs were processed using image software by two independent analyzers. Comparisons between groups were performed by independent sample *t* tests ($P \leq .05$). ***Results:*** In the CG group, microparticles on average were 117.5 and 14.1 respectively on the abutment surface and connection. In the TG group, no pollution was revealed (mean of 1.09 and 1.41 spots, respectively, on the abutment and connection). EDAX microanalysis identified the pollutant as a residual of lubricant mixed with traces of titanium and other metals. Microbiologic analysis demonstrated the presence of bacterial growth on the abutment surface in the CG group (111.5 ± 11.43 CFU/mL/abutment as mean value). The TG group showed no bacterial growth. After 18 months, radiographic analysis revealed a mean interproximal bone loss of 0.53 mm (± 0.12 mm) and 0.08 mm (± 0.69 mm) in the CG and TG, respectively. Comparisons between CG and TG were statistically significant at all levels. ***Conclusions:*** Pollution and bacteria removal from titanium abutments using Plasma of Argon allows for better bone level maintenance.

Second Prize

Influence of Chewing Simulation on the Bond-Strengths of Self-Etch/ Self-Adhesive Cements

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Objectives: The purpose of this study was to evaluate the influence of simulated chewing forces on bond strength of composite disks (Lava Ultimate, 3M ESPE) luted to dentin with a simplified self-etch system (Scotchbond Universal & RelyX Ultimate, 3M ESPE) or a self-adhesive cement (RelyX Unicem II, 3M ESPE). ***Methods:*** Forty noncarious human molars were cut with a low speed diamond saw under cooling water and equally and randomly assigned to two main groups: CS (chewing simulation) and control (static condition).

Specimens were then divided into two different luting groups (N = 10): Group 1, composite disks and Scotchbond Universal & RelyX Ultimate; group 2, composite disks and RelyX Unicem II. Specimens were then either subjected to chewing simulation or stored in water and subsequently cut for microtensile bond strength analysis in accordance with the nontrimming technique. Sticks were stressed until failure with a simplified universal testing machine. Data were statistically analyzed with the *t* test ($P = .05$). ***Results:*** Same lower case letters represent no statistically significance difference within each row ($P > .05$). Same upper case letters represent no statistically significance difference within each column ($P > .05$) (see Table 1). ***Conclusions:*** The simplified self-etch system (Scotchbond Universal & RelyX Ultimate) exhibited higher bond strength values than the self-adhesive cement (RelyX Unicem II) in both conditions (CS and static). The CS RelyX Unicem II showed a significant reduction in μTBS compared with the control. Further clinical research is necessary to evaluate the long-term bond strength of simplified adhesive systems.

Table 1 Microtensile Bond Strength (MPa) Obtained at the Luted Material/Dentin Interface

Luted material	Cement	Storage	CS	Control (mean ± SD)
Lava Ultimate	Scotchbond Universal & RelyX Ultimate			15.7 (7.5)a, A 18.6 (7.8)a, A
	RelyX Unicem II			10.7 (5.5)b, B 16.8 (6.8)a, B

SD = standard deviation.

Third Prize

Tear Strength of Elastomeric Impression Materials: An In Vitro Comparison

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Objectives: The aims of this study were to investigate two mechanical properties of elastomeric impression materials: ultimate tensile strength (TS) and yield strength (YS). ***Methods:*** A new hybrid impression material, a polyether and four polyvinyl siloxanes were tested: Aquasil Dentsply (AD), Hydrorise Zhermack (HZ), Affinis Coltene (AC), Flexitime Heraeus (FH), Impregum 3M (IM) and Exa'lence GC (EG). For each material, three different viscosities were evaluated: heavy body (HB), medium body (MB), light body (LB). A total of 170 samples was divided into 17 groups, each one composed of 10 dumbbell shaped specimens with different viscosities and manufacturers. Samples, prepared with an automatic mixing technique, were manufactured through an aluminum mold according to the specifications of DIM, ISO 37, and ASTM D412. Specimens were allowed to set for complete polymerization. Tensile strength tests were performed after 1 hour using a universal machine (Instron) at a crosshead speed of 250 mm/min until failure. Data were processed and analyzed with one-way analysis of variance (ANOVA). ($P \leq .05$). ***Results:*** TS: HB: AD 5.1(a), AC 4.93(a), FH 4.91(a), HZ 3.19(b), IM 1.49(c), EG 1.42(c); MB: AD 4.18(a), EG 3.16(b), AC 2.6(bc), FH 2.11(cd), HZ 1.8(d), LB: AD 4.98(a), EG 4.03(b), FH 3.02(c), HZ 2.3(d), AC 2.03(de), IM 1.47(e). YS: HB: AC 2.85(a), AD 2.35(ab), FH 2.11(abc), HZ 1.59(b), IM 1.11(c), EG 0.95(c); MB: AD 2.7(a), AC 1.77(ab), FH 1.46(b), HZ 1.37(b), EG 1.34(b), LB: EG 2.69(a) AD 1.97(ab), FH 1.78(abc), HZ 1.35(bc), AC 1.12(bc), IM 0.93(c). All values are expressed in MPa. Those with the same letter do not correspond with statistically significant results. ***Conclusions:*** With regard to the mechanical properties (TS and YS) tested and considering all different viscosities, PVS and hybrid materials showed higher in vitro results than polyether material. Heavy–light or heavy–medium combinations returned comparable mechanical performances. Regardless of materials, a permanent deformation occurred from 53% to 77% of their tensile strength.