apical portions of the root canals, elicited a greater number of inflammatory cells and thicker fibrous capsules than Vitapex and IRM.

♦P19

Shear bond strength between old composite and newly additioned composite.

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This study evaluated the effect of time before addition and surface treatment on the shear bond strength between new and old(direct and indirect) composites. One hundred specimens of Charisma(Heraeus Kulzer, Germany) and thirty-five of Artglass(Heraeus Kulzer, Germany) were prepared in cavities(10mm×5mm) in acrylic resin molds. Charisma specimens were stored for 5min., 1hr., 24hrs., and 1 week in 37℃ distilled water and Artglass specimens were stored for 1 week in 37℃ distilled water. Surface treatment methods included the following: grinding with sand paper; bonding agent application, phosphoric acid etching, hydrofluoric acid etching, and treatment with silane coupling agent. Data were analyzed using one-way ANOVA test and Student-Newman-Keuls test. The shear bond strength of Charisma specimens stored for 1hr. were significantly higher when applied with bonding agent after grinding and when applied with hydrofluoric acid, silane and bonding agent after grinding compared with grinding alone($p<0.05$). Application of phosphoric acid and bonding agent after grinding and application of hydrofluoric acid, silane and bonding agent after grinding produced significantly higher bond strength than grinding alone in Charisma specimens stored for 1week($p<0.05$). There was significant difference between the bond strengths of 24hr. and 1wk. specimens in Charisma specimens applied bonding agent after grinding($p<0.05$). The bond strength of specimens stored for 24hrs. was significantly higher than others in Charisma specimens applied phosphoric acid, silane and bonding agent after grinding($P<0.05$). Most of Charisma specimens showed cohesive fractures. There was no significant difference between the shear bond strength of Artglass specimens($p>0.05$).

♦P20

Infrared thermographic analysis of temperature rise on the surface of Buchanan plugger.

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This study was performed to evaluate the temperature rise on various position of the Buchanan plugger, the peak temperature of plugger's type and the temperature change by its touching time of heat control spring. The System B (Model 1005, Analytic Technologies, USA) and the Buchanan pluggers of F, FM, M and ML are used for this study. The temperature was set to 200℃. The power level on it was set to 10. The heat control spring was touched for 1, 2, 3, 4 and 5 seconds respectively. The temperature rise on the surface of the pluggers were measured at 0.5 mm intervals from tip to 20 mm length of shank using the infrared thermography (NEC San-ei Instruments, Ltd, Japan). The temperature peaked approximately at 1.0 mm to 1.5 mm far from the tip of Buchanan pluggers ($p<0.001$). The temperature was constantly decreased toward the shank from the tip of it ($p<0.001$). The peak temperature (the range from 253.33±10.51℃ to 192.05±3.31℃) was the highest in a quick touch for 1 sec, and decreased with an increase of touching time. A touch for 5 sec. revealed the lowest peak temperature (the range from 164.91±2.04℃ to 158.43±1.83℃) ($p<0.001$).). Data was analyzed using a one way ANOVA followed by Duncan' multiple range test and linear regression test. The results indicated that pluggers are designed to concentrate heat at around its tip and a quick touch of heat control spring for 1sec reveals the highest temperature rise.