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|   | <b>Bonding Tests on Sure Ortho Light Bond® and<br/>some brackets</b>  | Apr. 17 '07<br><br>Tomy Inc,<br>Masami Sato<br>Masao Yasuda |
| <b>Objective:</b><br><br><b>Brackets:</b><br><br><b>Adhesives:</b><br><br><b>Test methods:</b><br><br><b>Bonding protocols:</b><br><br><b>Thermal shock test protocols:</b><br><br><b>Shear bond strength test protocols:</b> | Report on the results of Bonding Tests for Sure Ortho Light Bond and some brackets.<br><br>Mystique Roth (GAC), ceramics, anterior<br>Elation Roth (GAC), plastics, anterior *2<br>Microarch Roth (GAC), metal, super Mesh, anterior<br><br>Sure Ortho Light Bond (Sure Ortho)<br><br>1) Shearing test/dry, Shearing test/after thermal shock<br>(The number of brackets tested each time: 5)<br>2) In-Organic filler content<br>TG-DTA (Thermo Gravimetry – Differential Thermal Analyzer)<br>(TG/DTA6300, SII)<br>3) Average In-Organic filler content<br>Centrifugal Automatic Particle Analyzer (CAPA-300, Horiba)<br><br>Brackets were bonded directly to adherend made of silane coupled alumina without etching or priming. Each adhesive was applied on the bracket base and the bracket was pressure-bonded to the adherend. Excess adhesive was removed from around the bracket base and the light-cure adhesive was cured using a halogen light. The specimens were left at room temperature for 24 hours.<br><br>The specimens were left at room temperature for 24 hours. The thermal shock was applied up to 2000 cycles at 4deg/1min and 60deg/1min (Celsius).<br><br>Shear bond strengths were measured with a universal test machine (AS-IS, Shimadzu) using a 100Kg load cell connected to a metal ligature at a cross head speed of 10mm/min. The adherend was set at the machine so that the ligature was placed under the tie-wings of the bracket and exerted a force in an occlusal-gingival direction in parallel to the adherend surface. The debonding forces were recorded in N. |   |
| <b>Test results:</b>  | Table 1 records the average shear bond strength of Sure Ortho Light Bond and some other adhesives. From the results obtained from our study, we can conclude that: <ol style="list-style-type: none"> <li>1. “Sure Ortho Light Bond” on Microarch shows good bond strengths even if after thermal shock tests. We think this adhesive is quite competent to use for metal brackets.</li> <li>2. “Sure Ortho Light Bond” on Mystique shows good bond strengths even if after thermal shock tests. We think this adhesive is quite competent to use for Mystique ceramic brackets.</li> <li>3. “Sure Ortho Light Bond” on Elation shows weak bond strengths, furthermore brackets drop off from the adherend within thermal shock tests. Thereby, we think it can not be used for plastic bracket.</li> </ol> <p>In-Organic filler content is around 78% and average filler size is 1.5 micrometer. These are same as ordinary light-cure adhesives.</p>  |   |

[Table 1. Average Shear bond strength of Sure Ortho Light Bond and other adhesives]

| Adhesive Bracket | Sure Ortho Light Bond | Light Bond (Medium paste) | Transbond XT       |
|------------------|-----------------------|---------------------------|--------------------|
| Microarch Roth   | 221.5N<br>(178.4N)    | 183.3N<br>(238.1N)        | 153.9N<br>(117.6N) |
| Mystique Roth    | 255.8N<br>(246.0N)    | 194.0N<br>(127.4)         | 182.3N<br>(109.8N) |
| Elation Roth     | 63.7N<br>(0)          | 106.8N<br>(104.9N)        | 53.9N<br>(27.4N)   |

Note: S.D. means specific dispersion.

Values in parentheses mean shear bond strength after thermal shock tests.