BONDDURABILITY OF TWORESINCEMENTSTOHUMANCORONAL DENTIN.

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OBJECTIVES
To investigate the durability of micro-tensile bond strength (µTBS) of two resin cements-Super-Bond C&B (SB; Sun Medical, Shiga, Japan) and Panavia F 2.0 (PF; Kuraray, Osaka, Japan) to human coronal dentin at different regions.

MATERIALS AND METHODS
Dentin disks (about 1.5 mm thick) from non-caries molars were prepared by cutting dentin perpendicular to the tooth axis 1 mm below the dento-enamel junction (DEJ) (s), 1 mm above the pulp (d), or parallel to the tooth axis 0.5 mm above the cemento-enamel junction (CEJ) and 0.5 mm below the DEJ (c) (Fig. 1A). The disks were wet polished with 600 # SiC papers. Dentin specimens with 0.785 mm bonding area were bonded to PMMA rods with SB or composite resin rods with PF in self-curing mode according to the manufacturers' instructions (Fig. 1B). µTBS was measured with a universal testing machine at 1 mm/min crosshead speed after storage in 37°C water for 1 d or 90 d (Fig. 1C). Data were analysed with ANOVA and Fisher's PLSD test at a confidence level of 95%. Electron microscopic observation were performed to analyze the resin-dentin bonding interface and fractographically evaluate the failure modes.

RESULTS
Table 1 Micro-tensile bond strength (µTBS) of tested groups to human dentin after different storage periods (N=8). Means (standard deviations) in MPa.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Super-Bond C&amp;B 1d</th>
<th>Super-Bond C&amp;B 90 d</th>
<th>Panavia F 2.0 1d</th>
<th>Panavia F 2.0 90 d</th>
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<tbody>
<tr>
<td>Superficial dentin</td>
<td>31.9 (7.2)*</td>
<td>25.8 (9.7)*</td>
<td>29.1 (8.4)*</td>
<td>25.8 (9.8)*</td>
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<tr>
<td>Deep dentin</td>
<td>18.6 (4.3)*</td>
<td>18.6 (5.1)*</td>
<td>10.4 (1.9)*</td>
<td>7.3 (1.1)*</td>
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<tr>
<td>Cervical dentin</td>
<td>24.2 (6.5)*</td>
<td>19.8 (5.0)*</td>
<td>10.2 (3.6)*</td>
<td>9.1 (2.2)*</td>
</tr>
</tbody>
</table>

Means and standard deviations of µTBS of two resin cements to various dentine regions after different storage periods are shown in Table 1. Three-way ANOVA revealed a significant interaction between the main factors resin cement and dentin regional location (p=0.001). Therefore, two-way ANOVAs were done for each resin cement and dentin regional location separately. It showed that regional dentin and the type of resin cement significantly influenced µTBS (p<0.05). For both resin cements, µTBS to superficial dentin was significantly higher than to deep dentin and to cervical dentin at different storage time. Storage in 37 °C water for 90 d did not statistically affect the µTBS of SB to regional dentin and that of PF to superficial dentin and to cervical dentin, while the decrease in µTBS of PF to deep dentin was significant (p<0.05). For both resin cements, SEM and TEM showed that cohesive failure in resin cement primarily occurred in group superficial dentin, with an increasing adhesive failure from dentin surface in groups deep dentin and cervical dentin (Figs. 2-4). And compared to group 1 d, the debonded dentin samples in group 90 d did not show obvious microstructural change in fractography analysis (Fig. 4).

CONCLUSION
Regional location in dentin and the type of resin cement significantly influenced the µTBS.