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Shear Bond Strength, Tie-wing Fracture Resistance, and Frictional Resistance of a Custommade Ceramic Bracket Version 1

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Abstract

Objectives: Shear bond strength (SBS), tie-wing fracture resistance (Tie-wing FR), and frictional resistance of a custom-made ceramic orthodontic bracket version 1 (CC bracket v1) were evaluated.

Methods: CC bracket v1 and its mould were designed by incorporating average buccal surface-curvature of Thai premolars into its base and fabricated by injection-moulding technique. SBS, Tie-wing FR and static frictional resistance of CC bracket v1 were compared to those of a commercial ceramic bracket (N=10). Normally distributed data were compared between groups using t tests.

Results: SBS means were significantly different between CC bracket v1 and controls (17.25±5.63 MPa and 24.75±5.29 MPa, respectively, $p< 0.05$). Tie-wing FR was significantly lower for CC bracket v1 (41.74±5.34 MPa) than the controls (89.48±15.93). Frictional resistance was significantly greater for CC bracket v1 (141.93±35 gf) vs. controls (86.83±25.4 gf).

Conclusions: CC bracket v1 exhibited lower SBS and Tie-wing FR but clinically acceptable. However, its frictional resistance needs improvement.

Keywords: bracket base, ceramic bracket, fracture resistance, frictional resistance, shear bond strength