

## **1669 Comparison of Friction Forces of Self-ligating Orthodontic Brackets**

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Frictional force at the interface between the bracket and arch wire has been shown to adversely affect tooth movement using sliding mechanics. Purpose: To evaluate kinetic frictional forces of self-ligating orthodontic brackets using mechanical testing. Methods: Five self-ligating brackets (SP, SPEED, Strite Industries; IO, IN-OVATION, GAC; TI, Time, American Orthodontics; D2, Damon II, Ormco; OY, Oyster, Gestenco) were tested along with a conventionally ligated bracket (MT, Mini-twin, Ormco). An in-vitro model was fabricated consisting of an acrylic cylinder. All brackets had a slot size of 0.022 in. The 6 brackets were tested with 2 sizes of stainless steel wire (0.018, 0.018 x 0.025 in). The wires (n=10) were pulled through the brackets on a testing machine (Instron) at a crosshead speed of 5 mm/min for a distance of 10 mm. Results: Friction forces (g) for round and rectangular wires were: MT, 94, 145; D2, 1.1, 1.5; OY, 1.3, 3.1; SP, 4.6, 142; IO, 1.7, 47; and TI, 1.1, 44. Friction forces for all self-ligating brackets were significantly lower than the conventional bracket when tested with the round wire. When tested with rectangular wire, D2 and OY had friction forces significantly less than IO and TI, which were significantly less than SP and MT. Fisher's PLSD intervals were used to evaluate the means at the 0.05 level of significance. Conclusions: D2 and OY produced low levels of friction force regardless of which wire was used. TI and IO had intermediate levels with rectangular wire, while SP was similar to the MT control. Despite being made of glass fiber-reinforced composite polymer, OY had low levels of friction. Bracket design affected frictional resistance.

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