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Thesis Title	Load/Deflection Characteristics and Force Levels of Coated Nickel Titanium Orthodontic Archwires (An in Vitro Study)			
Year	2015			
Abstract	<p>Coated archwires have been introduced to improve esthetics during orthodontic treatment. Coating the surface of orthodontic metallic wires using various techniques and materials, as well as modifying the surface of wires and brackets, are among those strategies developed to improve both mechanical and biological properties of metals used in orthodontics. The aim of this study was to evaluate and compare the load deflection characteristics and force levels of 6 brands of coated nickel titanium orthodontic archwires using palatal and gingival deflection. Ten round wires (0.016 inch) and ten rectangular wires (0.019x0.025 inch) were obtained from each of 6 brands (G&H, Opal, Ortho Technology, Dany, Hubit and Astar Companies). Self-ligating brackets were bonded to a readymade dental arch model to test the wires under restrained condition. Universal testing machine was used to perform the modified bending test using a water bath at 37°C with 2mm deflection in both palatal and gingival directions. Forces generated at maximum loading and at unloading of 1.5mm and</p>			

1.0mm deflections, plateau gap and hysteresis were measured. The statistically differences between the different brands were analyzed using ANOVA and LSD tests.

All the wires showed hysteresis and significant differences in their load deflection curves, but these differences were more evident in round wires than in rectangular wires where G&H wires showed the widest loading- unloading deflection curves. The maximum loading force of round wires in gingival deflection were higher than by palatal deflection but it gave wider hysteresis curves resulting in lower unloading forces.

III

Abstract

The force decline during unloading (plateau gap) ranged between 18 to 34% for round wires and 17 to 37% for rectangular wires.

Generally, coated epoxy wires (G&H, Opal, Astar and Ortho Technology) produced lower forces compared to polymer (Dany) and Teflon (Hubit) coated round and rectangular archwire.