**Republic of Iraq**
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# Evaluating the Effect of Air Abrasive Polishing on Friction and Surface Micromorphology of passive Stainless Steel self-ligated Brackets *(An in vitro study)*

A Thesis
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# Abstract

Fixed orthodontic appliances increase the risk of caries. Since many patients are unwilling or unable to conduct adequate teeth cleaning, professional cleaning is often essential.

Air abrasive polishing offer the advantage to remove in a short time deposits in hard to reach places.

The aim of the present study was to evaluate the in vitro state of air abrasive polishing on frictional resistance and surface micromorphology of passive stainless steel self-ligated brackets.

Four commercial brands of stainless steel brackets (Discovarys l2, Dantaurum Co.; Damon, Ormco Co.; Lotus plus,Orthotechnology Co.;and Leone, Leone Co.) were evaluated. The specimens were randomly divided into sixteen groups each group with five specimens who classified according to commercial brand of the brackets and air abrasive time (0, 5, 10 and 20 seconds).

The air abrasion was performed with airflow appliance using calcium carbonate powder. Universal testing machine was used to simulate the movement of retraction in sliding mechanics, measuring the traction force needed to slide 10 mm of 0.018 inches nickel titanium arch wire over the test specimen brackets. The surface micromorphology of one sample from each group was examined by Scanning electron microscope. The data were analyzed by ANOVA and HSD tests.

Calcium carbonate air abrasive polishing on the stainless steel brackets caused a statistically significant increase in friction for the four types of stainless steel self-ligated bracket (35.157% for Discovarysl2, 36.652% for Damon, 36.984% for lotus plus and38.036% for Leone bracket).

Scanning electron microscope showed that air abrasive polishing caused great alterations in the surface micromorphology of metal brackets due to the removal of the polished (glazed) surface area, leaving it rougher.

In conclusion, calcium carbonate air abrasive polishing should be used with caution on stainless steel brackets; it was preferable to leave the arch wire in place during polishing or closure the gate of self-ligated brackets after the arch wire removal but abundant washing with water must be performed to remove the residue of calcium carbonate particles retained on the surface of the slot.