

3D Slot Roughness of Seven Contemporary Orthodontic Plastic Brackets

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Introduction

The success of tooth movement during orthodontic treatment depends on the ability of orthodontic archwire to slide through brackets and tubes. The influence of friction in mechanics must be of major concern for the popular esthetic plastic brackets that produce higher friction values than metallic brackets. In order to eliminate friction values, metallic slots were incorporated within the contemporary esthetic plastic brackets.

Aim

The aim of the present study was to evaluate the 3-dimensional roughness of slots for seven orthodontic plastic brackets.

Materials and Methods

Seven plastic brackets were examined. Avalon, Elegance and Spirit MB have been reinforced with a metallic slot. The bottom of each slot of every bracket was evaluated by optical microscopy (Nikon-Eclipse MG-600, Kogaku, Japan) and 3D optical profilometry (Wyko NT 1100, Veeco, USA). Pictures were taken at magnification 20x for a general estimation of surface texture in the optical microscope. Then the roughness parameters Sa, Sq, Sz of every slot were defined in a higher magnification and images were received in the 3D optical profilometer .

Results

The 3D images for metallic slots revealed striations like machine tracking or some fissures and porosity. Plastic slots presented homogenous texture with some fissures and projection with different height and direction. In general metallic slots gave lower roughness parameters comparing to the plastic ones, with confined inclinations.

Conclusion

1. 3D images and roughness parameters of slots were significantly different among the tested brackets.
2. Plastic slots exhibited no statistically higher roughness values comparing to metallic slots.