

Introduction

The purpose of this in vitro study is to evaluate the effects of at-home and in-office bleaching on the shear bond strength of metal, ceramic and composite orthodontic brackets; and to compare the shear bond strengths of metal, ceramic and composite brackets after at-home and in-office bleaching.

Methods

96 human lower premolar teeth were used for this study. 6 teeth were used for SEM study while the remaining 90 were divided into 3 equal groups. Each group was further subdivided into 3 sub groups with 10 samples each. Three protocols were used. In the at-home bleaching group (n = 30), Opalescence non PF bleaching agent (Ultradent, South Jordan, Utah), which contains 10% carbamide peroxide, was applied onto the teeth daily for 14 days and left for 8 hours each day. Teeth in the in-office group (n = 30) were treated with Opalescence boost PF (Ultradent, South Jordan, Utah), which contains 40% hydrogen peroxide gel. These teeth were treated twice in consecutive days. After bleaching, the specimens were stored in distilled water for one day before bonding. Shear bond strength testing was performed on all teeth using universal testing machine, Instron.

Results

Analysis of variance indicated a significant difference ($P < 0.005$) among the groups. The mean shear bond strength of metal brackets in control group (Ia) was found to be 16.03 ± 0.87 MPa. It decreased to 14.68 ± 1.67 MPa in the at-home bleached (IIa) group and reduced further to 10.95 ± 2.61 MPa in the in-office bleached group

(IIIa). The mean shear bond strength of ceramic brackets in control group (Ib) was found to be 20.21 ± 0.94 MPa. It decreased to 18.31 ± 1.23 MPa in the at-home bleached (IIb) group and reduced further to 16.13 ± 2.67 MPa in the in-office bleached group (IIIb). The mean shear bond strength of composite brackets in control group (Ic) was found to be 9.81 ± 0.61 MPa. It decreased to 8.06 ± 1.88 MPa in the at-home bleached (IIc) group and reduced further to 7.22 ± 2.15 MPa in the in-office bleached group (IIIc).

Conclusions

The results showed that at-home bleaching did not affect the shear bond strength significantly whereas in-office bleaching reduced shear bond strength of metal, ceramic and composite brackets significantly. It is preferable to use metal or ceramic brackets than composite brackets for bonding 24 hours after bleaching.

Keywords

Bleaching, metal brackets, ceramic brackets, composite brackets, shear bond strength.