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### **Tooth Color Changes After Debonding of Clear Aligner Attachment**

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**Objectives** The aim of this in-vitro study was to evaluate the effects of different burs used in the debonding phase of clear aligner attachment on tooth color.

**Methods** 4 mm conventional rectangular resin attachment was bonded to the center of the buccal surfaces of 36 extracted bovine teeth, and were randomly divided into three groups according to different bur types used for removal resin (n=12); Group 1: 12-bladed tungsten carbide bur (Komet, Germany); Group 2: 24-bladed tungsten carbide bur (Komet, Germany); Group 3: 12-bladed titanium nitrate-coated attachment resin removal carbide bur (Komet, Germany). Burs were used with low-speed handpiece. Color measurements were taken from the middle surfaces of the teeth before bonding (T0) and after removing the attachments (T1) with VITA Easyshade V (VITA Zahnfabrik, Germany). Attachment debonding duration was also measured. Dependent sample t-test and Wilcoxon test were used for evaluation of L\*, a\*, b\* changes. ANOVA test and Bonferroni test were performed to compare  $\Delta E$  measurements and debonding duration between the groups.

**Results** Statistically significant differences were found in L\* values between all groups, and a\* values between group 1 and 2 ( $p < 0.05$ ). In all groups, L\* values were significantly decreased after attachment removal. In groups 1 and 2, a\* values increased significantly.  $\Delta E$  values were significantly different within the groups ( $p < 0.05$ ) with the most pronounced color change observed in group 2 ( $p = 0.017$ ). The attachment removal duration was significantly higher in group 2 than group 1 ( $p < 0.001$ ) and group 3 ( $p < 0.001$ ).

**Conclusions** Resin removal with 12-bladed titanium nitrate-coated attachment resin removal carbide bur led to least color alteration. The 24-bladed tungsten carbide bur caused the most color alteration and the longest resin removal phase. Visible and clinically unacceptable tooth color alterations were observed after resin removal of clear aligner attachments regardless of the usage of different burs.