

Shear bond strength of orthodontic adhesives on different tooth types: an in vitro study

Abstract

Introduction: Owing to the variety of materials and methods employed, comparison of the results and findings from bonding studies is difficult. Until recently, several types of teeth have been used in published research papers as a substrate in orthodontic bonding research including bovine incisors, fresh and rebonded human premolars.

Objectives: The purpose of this study was to compare the shear bond strength of an adhesive bonded to different tooth surfaces (human premolar, bovine incisor and rebonded human premolar).

Methods: Two groups of thirty premolar teeth and one group of bovine incisors had brackets attached in a standardized manner using Transbond XT (3M Unitek). The adhesive was cured using conventional halogen light and a specially designed tool to standardize the distance between the light curing tip and the adhesive. The debonding force was measured using Instron universal testing machine. ANOVA and Post Hoc Dunnett C test were performed to determine any significant difference among groups ($p < 0.05$).

Results: The results of Post Hoc Dunnett C test indicated no statistical differences between the human premolar group and rebonded group. However, the differences existed in bond strength between bovine group versus human premolar group and bovine group versus human rebonded premolar group. Bovine group had the highest bond strength with mean values of 8.5 (S.D \pm 4.2) MPa. Human premolar and rebonded groups had mean bond strengths of 6.1(S.D \pm 4.5) and 4.9 (S.D \pm 2.7) MPa, respectively.

Conclusions: This study revealed that bovine teeth produced higher bond strength compared to both fresh and rebonded human premolar. Therefore, findings in any bond strength studies using bovine teeth should be interpreted with caution.

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