The Effect Of Applying Different Topical Fluoride Gels On The Tensile Bond Strength Of Stainless Steel Brackets and Enamel (In Vitro Study)

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Abstract

Enamel decalcification is a well recognized problem associated with orthodontic treatment with fixed multibanded appliance. The introduction of directly bonded orthodontic attachments gave some optimism with regard to the reduction of white spot decalcification.

The use of bonding rather than banding has reduced the incidence of enamel decalcification, yet the “whitespot” is still seen around the bonded attachments

The present study is concerned with the evaluation of the effect of different topical fluoride gels, applied before and after etching:-

1. On the tensile bond strength of directly bonded orthodontic brackets edgewise.
2. On failure site locations of no – mix adhesive composite.

The sample consisted of 70 human upper first premolar distributed to 7 groups :- Group A served as a control ; groups B1,C1 and D1reseved, for 4 minuets prior to acid etching, a topical application of neutral sodium fluoride gel (1.1%) , Acidulated phosphate fluoride gel (1.23 %) and 10% freshly prepared stannous fluoride respectively. Groups B2, C2 and D2, on the other hand, were treated, for 4 minutes after acid etching with topical application of neutral sodium fluoride gel (1.1%), Acidulated phosphate fluoride gel (1.23%) and 10 % freshly prepared stannous fluoride respectively. The tensile strength were recorded in Megapascals.

The brackets were loaded under tensile to failure using insteron apparatus. The results of the present study showed that the application of fluoride gels for 4 minutes before and after etching did not alter the tensile bond strengths of directly bonded orthodontic brackets, when compared with control groups, for all groups excepts for groups C2 in

which the topical application of acidulated phosphate fluoride gel for 4 minutes after etching has resulted in a significant reduction in tensile bond strength. It was also concluded from the study that the application of fluoride gels did not alter the mode of fracture sites of adhesive in 4 groups (B1, C1, D1, D2) when compared to the control group in which the fracture mode was bracket / adhesive. While in group C2 and Group B2. the fluoride application has caused a shift in failure site from bracket / adhesive interface to enamel / adhesive interface.