

*Influence of Cross Sectional Surface Area
and Different Bonding Mechanisms on Shear
Bond Strength to Dentine
(In vitro study)*

A thesis

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Abstract

This in vitro study was conducted to evaluate the effect of cross-sectional surface area and different bonding mechanisms on the shear bond strength to dentin using one type of composite restorative material (Z100).

One-hundred twenty sound human premolar teeth recently extracted for orthodontic purpose were selected. These teeth polished and cleaned and the roots were sectioned and then embedded in acrylic block exposing 2mm from the buccal surface. After that the 2 mm from the buccal surface of the blocked tooth were ground to obtain flat superficial dentin surface with 600 grit silicon carbide paper. The teeth were randomly divided into four groups according to the different bonding agents used which is from first to fourth group: Scotch bond-multipurpose (fourth-generation), Scotch bond-1 (fifth generation), AdheSE bonding (sixth generation) and Adper Prompt L-Pop adhesive (sixth generation), each group was subdivided into 3 subgroups 2mm, 3mm and 4mm diameter surface area.

Shear bond strength was determined using Instron testing machine and the result showed that:

There is an inverse relationship between cross-sectional surface area and shear bond strength revealing that greater shear bond strength was associated with smaller surface area and vice versa.

The results also shown that there is a significant difference between the bonding agents, with the highest values with Scotch-bond multipurpose (three step total-etch) followed by AdheSE (two step system) and Prompt L-Pop (two step all-in-one system) who have no significant difference from Self-etch-primer, and the lowest values obtained with Scotch-bond 1 adhesive (two step total-etch).

Also the results revealed that the increase in S.B.S. in small surface area and the decrease in large surface area is a material and technique dependant in addition to the dependence on surface area.