Evaluation of Shear Bond Strength of Bonded Molar Tubes (In Vitro Comparative Study)

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Abstract

The present study was carried out to evaluate the shear bond strength of three types of bonded molar tubes with different retentive means on their bases (fine mesh, small beads, grooves with laser etching) using two no-mix orthodontic adhesives (Unite/3M, Composan ortho/Promedica), and to determine the predominant site of bond failure.

Seventy-two sound human lower third molars were collected and divided into three groups according to the type of retention means on the base of the molar tubes, then each group was divided into two subgroups (with 12 teeth in each subgroup) according to type of the adhesive used. Then the molar tubes were bonded to the molar teeth and they were subjected to shear bond test using an Instron testing machine and the results were recorded in Megapascal unit (MPa). After debonding, each molar tube base and tooth surface was examined under 10X magnifying lens, and the failure site was recorded.

The results of the study showed that:

♣ Molar tubes with fine mesh gave the highest value of shear bond strength followed by molar tubes with small beads and finally molar tubes with grooves and laser etching with both adhesives, and Unite adhesive gave higher shear bond strength than Composan ortho adhesive with all types of bonded molar tubes.

♣ The failure site was determined: *cohesive* failure was predominant for molar tubes with fine mesh and for molar tubes with small beads with both adhesives, while *adhesives-enamel* failure was predominant with molar tubes with grooves and laser etching with both adhesives used, finally *enamel detachment* was common for molar tubes with grooves and laser etching with both adhesive types.

♣ There was a strong positive correlation between shear bond strength and the site of bond failure.