

Shear bond strength of New and Recycled Ceramic Brackets (An in vitro study)

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By

Auday Adnan Sulaiman Al-Ali

B.D.S

Supervised by

Prof. Dr. Ausama A. Al-Mulla

B.D.S, Dr. D. Sc.(Ortho, France)

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ABSTRACT

In this study two type of ceramic brackets were used, They were different in their base design one of them with smooth base design and rely on chemical means of retention to the composite, the other type with grooved base design and rely on mechanical means of retention to the composite.

A silane coupling agent was added to the ceramic bracket base of the mechanical means of retention, so that three type of retention means between ceramic bracket and composite were tested in this study in both new and recycled ceramic brackets, they were mechanical, chemical, and mechanical and chemical.

Sixty sound human upper first premolar teeth were collected and divided into 2 groups to test the shear bond strength of new and recycled ceramic brackets bonded to them, Each group was subdivided into three groups according to the means of retention of the ceramic bracket to the composite (mechanical, chemical, and mechanical and chemical).

All brackets were bonded to the enamel surface by using only one type of composite, which was mix type Composite from alpha Dent Company.

After standardized bonding procedure done for the new ceramic brackets to the enamel surface they were subjected to shear bond test using a Zwick Universal testing machine. After the debonding procedure was done, each bracket base and tooth surface was examined under 10x magnifying lens, and the failure site was recorded according to Wang classification (1997).

Then the intact debonded brackets were recycled by Lew and Djeng's method (1990), and the same steps that used with new ceramic brackets were repeated with the recycled one.

The result of shear bond strength showed that the fascination ceramic brackets (chemical type) has the highest bond strength in both new and recycled ceramic brackets. Also this study showed that the recycling procedure significantly decreases the shear bond strength of new ceramic bracket but this bond strength was still clinically acceptable.

Enamel detachment only was found with the new ceramic bracket of the chemical type in 80% of the sample, other type of ceramic brackets showed adhesive and cohesive failure. Also this study showed that there was a strong relationship between shear bond strength and the failure site.