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Shear bond strength of a new polycarbonate bracket - an in vitro study with 14 adhesives

N. Akin-Nergiz^{*}, I. Nergiz^{**}, K. Behlfelt^{*} and U. Platzer^{**}

Departments of ^{*}Orthodontics, and ^{**}Operative Dentistry and Periodontology, University of Hamburg, Germany

ABSTRACT

Shear bond strength and failure location were used to evaluate the effectiveness of plastic bracket primers for bonding diacrylate adhesives on a new fibre-reinforced poly-carbonate bracket. Maxillary incisor polycarbonate and mesh-based brackets as control were bonded to human incisors with 14 different adhesives (four filled diacrylate two-paste, six diacrylate one-step and four powder-liquid acrylic adhesives), and after thermo-cycling for 2000 cycles between 5° and 55°C, tested in shear. A non-parametric test (Mann-Whitney U test) was used to compare the shear bond strength of the polycarbonate brackets with the mesh based brackets and a one-way test (according to Scheffe) to compare the shear bond strength of different adhesives. The following conclusions can be made: 1. Seven of the 14 adhesives used in this study with both types of brackets demonstrated adequate shear bond strength values for the clinical application. The exceptions were: Achieve Mix, No-Mix:30 Silkon, Lee Insta-Bond, Ortho-Loc and Bond-Eze, all with too low a shear bond strength for one or both types of brackets, and finally Quasar, which used with the plastic brackets sometimes caused enamel fractures, due to a very high bond strength. 2. The adhesives with their own plastic primer demonstrated higher bond strength values than those without plastic primer, and two-paste adhesives used with plastic primer displayed a higher bond strength than the other adhesives. 3. Generally, the shear bond strength values of the one-step adhesives were lower compared with the two-paste adhesives. 4. The liquid-powder adhesives demonstrated very different values for bond strength.

Pages 295-301

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