Comparative characteristics of the adhesive strength of self-etching adhesives

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AIM or PURPOSE: Comparison of adhesive strength of self-etching adhesives and photocomposites with hard dental tissues based on microstructural analysis and determination of microhardness.

MATERIALS and METHOD: Human premolars removed for orthodontic indications were used in the work. The cavities were prepared with diamond bores and air abrasion with

sand of 27 mkm. Before applying the adhesive, 37% H3PO4 enamel was selectively etched for 15 seconds. Next, a single –component self-etching adhesive was applied to the test samples 1-8 (group 1), and a two-component adhesive was applied to samples 9-16 (group 2), and the prepared tooth cavities were sealed with a fluid composite material (layer thickness - 2 mm). Traditional composite material was layered and polymerized, the thickness of each layer did not exceed 2 mm. Tooth sections were made and adhesive strength was determined at the enamel-seal and dentin-seal boundaries using a light microscope at magnification ×200 and measuring microhardness on a Micromet-II with a load of 200 g to induce a crack at the boundary of studied elements.

RESULTS: When conducting microstructural analysis and determining microhardness, it was found that the adhesive strength to enamel in groups 1 and 2 did not differ ($U = 29$; $p = 0.78$) and amounted to 29.2 MPa and 29.5 MPa. The adhesion strength to dentin in group 1 was equal to 29.8 MPa, which was 21.6% statistically significant ($U=7$; $p<0.01$) greater than in group 2 (24.5 MPa).

CONCLUSION(S): The results of the study justify the greater feasibility of using one-component self-etching systems (compared to two-component ones) in clinical dental practice

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