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Composite veneering of metal based fixed partial dentures.

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The aim of this in vitro study was to determine the thermal mechanical properties of veneering composites after polymerization with the appropriate polymerization device. Fracture tests were performed to investigate the effect on fixed partial dentures (FPDs). Dynamic mechanical thermal analysis was used to determine the temperature-dependent mechanical properties. To approximate the clinical situation, the fracture resistance of three-unit metal-based FPDs with different composite veneering was investigated after a simulated 5-year oral wearing period. The restorations were made of a high gold alloy and veneered with three different composites. To determine the influence of fabrication, one composite was used in a light-polymerizing and a heat/pressure-curing version and, in addition, a newly developed heat protection paste was used. After a 5-year simulation period, the fracture resistance was determined. The storage modulus varied between 14268 N mm(-2) (Belleglass) and 6616 N mm(-2) (Sinfony). Adoro showed no significant differences between light curing (9155 N mm(-2)) and heat curing (8184 N mm(-2)) variations. The Adoro-veneering with the heat protection paste showed the highest median fracture strength (1700 N), followed by Adoro LC (1555 N), Belleglass (1051 N), Adoro HP (1150 N) and Sinfony (909 N). The most common failure type occurring in all FPDs was a cracking of the composite, exposing the metal framework. All FPDs showed stress cracking of the composite. The heat protection paste seemed to reduce the crack formation after fabrication and increased the fracture resistance of the composite veneering. Stress cracking after thermal cycling and mechanical loading affected all composites, but all veneered three-unit alloy FPDs showed a fracture resistance sufficient for posterior application.

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