

**Influence of core material on fracture resistance and marginal adaptation of restored root filled teeth.**

[Reill MI](#), [Rosentritt M](#), [Naumann M](#), [Handel G](#).

Department of Prosthetic Dentistry, Regensburg University Medical Centre, Regensburg, Germany.  
margarete.reill@klinik.uni-regensburg.de

**AIM:** To investigate ex vivo the influence of direct placement core materials on the fracture strength and marginal adaptation of root filled maxillary central incisors restored with glass fibre-reinforced posts, various core materials and all-ceramic crowns.  
**METHODOLOGY:** Forty-eight human maxillary incisors were root filled. Posts were placed and teeth restored with composite cores and crowns (n = 8). Six core materials were examined after thermal cyclic and mechanical loading (TCML). Fracture force was determined under static loading. The marginal adaptation at the interfaces between cement-tooth and cement-crown were categorized as 'intact margin' or 'marginal gap' using scanning electron microscopy. Statistical analysis was undertaken with the Mann-Whitney U-test ( $\alpha = P < \text{or} = 0.05$ ). **RESULTS:** Median fracture strength varied between 204 N (low viscous experimental core) and 1094 N (Multicore). No difference in fracture resistance was found with varying viscosity of the core material. The layering technique improved the fracture performance ( $P = 0.059$ ) to a minor degree. Crowns with dedicated core materials (Rebilda 1063 N; Multicore 1094 N) had a significantly higher fracture resistance than crowns with a conventional restorative material (Tetric Ceram 509 N). Significantly poorer marginal adaptation before TCML was found for the layering technique at the tooth-cement interface and for all experimental cores after TCML. At the crown-cement interface significant differences in marginal adaptation could be determined between Multicore-layered core ( $P = 0.002$ ) and Multicore-Rebilda ( $P = 0.001$ ) after TCML. **CONCLUSIONS:** The fracture strength of post and core restorations was dependent on the core material and bonding system. Marginal adaptation was influenced by the method of application of the core material and by TCML.

PMID: 18355251 [PubMed - indexed for MEDLINE]