

Wear and hardness of different core build-up materials.

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Before crown preparation, teeth with extensive coronal destructions are built up with core materials. Sometimes, these build ups are exposed to the oral environment without the protection of crowns. Therefore, this in vitro investigation was aimed at evaluating the wear, surface roughness, Vickers hardness, and surface structure of 10 core composites, two glass ionomer cements (GICs), and four posterior restoration composites. The three-body wear was tested after water storage and 2,00,000 cycles. We measured both surface roughness and Vickers hardness (DIN 50133) and evaluated the surface structures by scanning electron microscopy. Results were statistically analyzed by use of the Mann-Whitney U test ($\alpha = 0.05$). Lowest wear was found for the restorative composites (20 μm Grandio; others about 40 μm). A comparison of the composites Build-It, Chroma Core, Rebilda LC, and Rebilda DC to Quixfil showed similar wear values for each material (43-50 μm). Wear values of GICs and all others core composites ranged between 58 and 75 μm . Only Ti-Core showed significantly higher wear than all other materials ($p < 0.05$). All core materials except Ti-Core (35 HV) showed Vickers hardness values between 42 and 61 HV. Most core composites, particularly Build-It, Multicore Flow, Rebilda LC, Ecusit, and Tetric Evo Ceram, showed more homogenous surface structures compared to GICs and restorative composites. Therefore, wear values of core build-up materials not only differed widely but were higher than those of conventional restorative materials; yet, core build-up materials showed advantageous surface structures. (c) 2009 Wiley Periodicals, Inc. *J Biomed Mater Res Part B: Appl Biomater* 2009.