LuxaCore® Z-Dual – Study on cuttability

Cuttability of different core build-up materials – an in-vitro comparison

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Background: Due to their dentine-like cuttability, composite-based core build-up materials are the material of choice for core build-ups today. The objective of this in vitro study was the evaluation of the cuttability of various different core build-up materials in comparison to human dentine.

Material and methods: From the materials FluoroCore 2 (Dentsply), CompCore AF (Premier), Rebilda DC (Voco), MultiCore Flow (Ivoclar), CorePaste (DenMat), Clearfil PhotoCore (Kuraray), LuxeCore Z-Dual (DMG), Ketac Fil Plus (3M Espe), and Harvard Zement (Harvard) 10 identical cube-shaped sepcimen each (with a 10 x 5 mm surface to be cut) were produced. As reference 10 test objects were made from the dentine of extracted third human molars. These were examined in an experimental set-up to quantify their cuttability. Under standardized conditions with the constants grit size of the abrasive device (0.1 mm), section (10 mm), and contact pressure (100 g) the required time (t in s) was determined. Results: The cutting time of the standardized test objects was 9.6 ± 1.5 s for the human dentine. In comparison to this reference value the examined core build-up materials exhibited a wide range of results from 3.00 ± 0.4 (Harvard) to 11.8 ±2.8 s (Clearfil PhotoCore). The lowest value for composite-based materials was 5.6 ± 0.7 s. The materials LuxaCore Z-Dual (9.4 ± 1.1 s) and Multicore Flow (10.3 ± 1.0 s) exhibited the most dentine-like cuttability characteristics.

Conclusion: For clinical applications core build-up materials with cuttability characteristics equal to dentine are available.