

Preparation time and surface roughness of core foundation resins and dentin.

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Source

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Abstract

STATEMENT OF PROBLEM:

It is unclear if the preparation of core foundation resins is similar to that of dentin.

PURPOSE:

The purpose of this in vitro study was to compare the preparation time and resulting roughness of 5 core foundation resins and dentin.

MATERIAL AND METHODS:

Standardized preparations (10 mm length, 5 mm height) were made of 5 specimens of 5 core materials with a device-mounted dental handpiece (150 000 rpm, water-cooling) with weight-controlled contact pressure (50 g). To assess the cutting time of 100 µm grit cylindrical diamond rotary cutting instruments, 2 mm and 4 mm depths were cut 3 times (n=15). Afterwards surface roughness Ra and Rz were measured. Blocks of dentin were used as a control. Both preparation time and surface roughness data were statistically analyzed (1-way ANOVA, Scheffé correction, $\alpha=.05$).

RESULTS:

The average preparation times for dentin were 7 seconds for a 2 mm preparation depth and 22 seconds for a 4 mm depth with an average Ra of 5.4 µm or Rz of 30 µm. For a 4 mm depth, preparation times for Build-It, Rebilda LC, and Ti-Core ranged from 24 to 27 seconds. The preparation times of these 3 core foundation materials did not differ significantly from dentin for a 4 mm depth. The results of Core Paste and Luxacore were significantly lower (10 and 11 seconds, $P<.001$). For a 2 mm cutting depth, Core Paste and Luxacore showed similar preparation times compared to dentin (7 seconds, $P>.05$). Build-It (12 seconds) and Rebilda LC (10 seconds) showed greater preparation times compared to dentin, whereas Ti-Core preparation (5 seconds) was less. ANOVA revealed significantly lower Ra (5.0 µm) and Rz values (23-26 µm) after preparation of Core Paste, Luxacore, and Ti-Core than those of dentin ($P<.05$).

CONCLUSIONS:

The preparation times of only some core foundation materials were comparable to dentin. Regarding the cutting depths, different materials provided a dentin-like preparation ability. The surface roughness values of core resins were comparable with or significantly lower than those of dentin.