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Effects of thermal cycling and surface roughness on the Weibull distribution of porcelain strength

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Abstract:
The objective of this study was to test the hypothesis that thermal cycling weakens the flexural strength of porcelain. Specimens of Deguceram Gold and Vita Omega 900 were tested in four groups of 30 specimens each: in the original glazed condition *versus* being ground with 1000-grit, 600-grit, and 100-grit silicon carbide abrasives. Corresponding to these four types of surface treatments, four groups of 30 specimens per group received 5,000 times of thermal cycling. Flexural strength was measured using a four-point flexural test, and Weibull modulus was calculated. Within each type of surface treatment, the thermal cycling treatment did not result in any decrease in flexural strength although it caused the Weibull modulus to become smaller — except for the control and thermal-cycled groups of 600-grit surface treatment.

Key words:
Thermal cycling, Weibull modulus, Dental porcelain

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