

## Pengaruh Suhu Penyimpanan dan Preheating terhadap Kekerasan Permukaan Resin Komposit Bulk-Fill = Effect of Storage Temperature and Preheating on Surface Hardness of Bulk-Fill Composite Resin

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### Abstrak

Latar Belakang: Resin komposit bulk-fill dapat merestorasi kavitas dengan kedalaman 4-5 mm dalam sekali penyinaran sehingga dapat mempersingkat prosedur restorasi, Polimerisasi resin komposit dapat dipengaruhi oleh suhu, termasuk suhu penyimpanan dan preheating resin komposit. Polimerisasi yang adekuat diperlukan untuk mendapatkan kekerasan permukaan yang optimal. Tujuan: Mengetahui pengaruh suhu penyimpanan dan preheating terhadap kekerasan permukaan resin komposit bulk-fill. Metode: Tiga puluh spesimen Tetric® N-Ceram Bulk-Fill shade IVA (diameter 6 mm dan tebal 3 mm) dibuat dari 3 kelompok perlakuan yaitu resin komposit yang disimpan pada suhu ruangan  $23\pm 1^\circ\text{C}$  selama 24 jam (kontrol), lemari pendingin  $4\pm 1^\circ\text{C}$  selama 24 jam, dan preheating  $39^\circ\text{C}$  selama 10 menit. Spesimen dipolimerisasi menggunakan light curing unit LED berintensitas  $1100\text{ mW/cm}^2$  selama 10 detik dan disimpan di inkubator pada suhu  $37^\circ\text{C}$  selama 24 jam. Uji kekerasan menggunakan Knoop Microhardness Tester. Analisis data dengan uji statistik One-Way ANOVA dan Post Hoc Bonferroni. Hasil: Kekerasan permukaan antara kelompok perlakuan suhu penyimpanan dan preheating menunjukkan terdapat perbedaan bermakna secara statistik ( $p < 0,05$ ). Kesimpulan: Kekerasan permukaan resin komposit bulk-fill pada suhu penyimpanan di lemari pendingin  $4\pm 1^\circ\text{C}$  lebih rendah dibandingkan di ruangan  $23\pm 1^\circ\text{C}$ , sedangkan kekerasan permukaan resin komposit bulk-fill dengan suhu preheating  $39^\circ\text{C}$  lebih tinggi dibandingkan penyimpanan di ruangan  $23\pm 1^\circ\text{C}$ .

.....Background: Bulk-fill composite resin could be used in 4-5 mm thickness for each photo-polymerization so that it can shorten the restoration procedure time. Polymerization of composite resin can be affected by temperature, including composite resin's storage temperature and preheating. Adequate polymerization needed to achieve optimal surface hardness or composite resin. Objective: To evaluate the influence of storage temperature and preheating on surface hardness of Bulk-fill Composite Resin. Methods: Thirty specimens of Tetric® N-Ceram Bulk-Fill shade IVA (6 mm of diameter and 3 mm of thickness) were made from 3 groups according to storage temperature and preheating of the composite: (1) room temperature  $23\pm 1^\circ\text{C}$  for 24 hours (control), (2) refrigerator temperature  $4\pm 1^\circ\text{C}$  for 24 hours, and (3) preheating  $39^\circ\text{C}$  for 10 minutes. Each specimen was polymerized using LED Curing Unit for 10 minutes with  $1100\text{ mW/cm}^2$  intensity, then immersed in 5 ml of aquadest and kept in  $37^\circ\text{C}$  incubator for 24 hours. urface hardness was measured using Knoop Microhardness Tester at the top surfaces. Data were statistically analyzed using One-Way ANOVA and Post Hoc Bonferroni test. Result: There was a statistically significant difference ( $p < 0,05$ ) of surface hardness value between all test groups. Conclusion: Surface hardness of bulk-fill composite resin at refrigerator temperature  $4\pm 1^\circ\text{C}$  are lower than room temperature  $23\pm 1^\circ\text{C}$ , while surface hardness of bulk-fill composite resin with preheating  $39^\circ\text{C}$  are higher than room temperature  $23\pm 1^\circ\text{C}$ .