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Pengaruh teknik dan suhu post-curing pada pembuatan gigi tiruan cekat sementara menggunakan 3D-Printed terhadap modulus elastisitas
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INTISARI

Penggunaan teknologi *3D-printed* dalam pembuatan gigi tiruan cekat sementara berkembang pesat karena memberikan hasil presisi tinggi serta efisiensi kerja. Proses *post-curing* awal umumnya belum mencapai derajat konversi polimerisasi yang maksimal sehingga memerlukan tahapan *post-curing* tambahan. Perlakuan *post-curing* tambahan dengan parameter teknik dan suhu tertentu dapat mengoptimalkan ikatan silang polimer guna meningkatkan sifat mekanis material dalam menahan beban oklusal. Penelitian ini bertujuan untuk mengkaji teknik dan suhu *post-curing* pada pembuatan gigi tiruan cekat sementara menggunakan *3D–Printed* terhadap modulus elastisitas.

Sampel gigi tiruan cekat sementara yang disimulasikan berupa lempeng berukuran 20 mm x 5,5 mm x 4,5 mm sebanyak 100 buah dibagi menjadi 5 kelompok penelitian (n=20) yaitu kelompok kontrol (tanpa perlakuan *post-curing* tambahan), kelompok *post-curing* oven suhu 60^{o}C, kelompok *post-curing* oven suhu 80^{o}C, kelompok *post-curing water immersion* suhu 60^{o}C, dan kelompok *post-curing water immersion* suhu 80^{o}C. *Post-curing* dilakukan sesuai kriteria tiap kelompok selama 60 menit. *Universal testing machine* digunakan untuk mengukur nilai modulus elastisitas sampel. Data hasil penelitian dianalisis menggunakan uji ANAVA dua jalur dan *Post Hoc LSD*.

Hasil penelitian menunjukkan nilai rerata teknik *post-curing* oven suhu 60°C menghasilkan modulus elastisitas tertinggi (360,40 ± 12,51), sedangkan teknik *post-curing water immersion* suhu 80°C menghasilkan nilai rerata modulus elastisitas terendah (283,53 ± 10,76). Teknik *post-curing* berpengaruh signifikan terhadap modulus elastisitas ($p<0,05$), sedangkan perbedaan suhu 60°C dan 80°C tidak signifikan ($p>0,05$). Kesimpulan hasil penelitian yaitu teknik *post-curing* pada pembuatan gigi tiruan cekat sementara menggunakan *3D–printed* dengan oven *curing* pada suhu 60^{o}C dan 80^{o}C dapat digunakan untuk menyempurnakan polimerisasi sehingga meningkatkan modulus elastisitas.

Kata kunci: gigi tiruan cekat sementara, *3D–Printed*, oven *curing*, *water immersion*, modulus elastisitas

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ABSTRACT

The application of 3D-printing technology in fabricating provisional fixed partial dentures (FPDs) has rapidly expanded due to its high precision and operational efficiency. However, the initial post-curing process generally does not achieve a maximum degree of polymerization conversion, necessitating a secondary post-curing stage. Applying secondary post-curing with specific technique and temperature parameters can optimize polymer cross-linking to enhance the mechanical properties of the material in withstanding occlusal loads. This study to evaluate the effect of post-curing techniques and temperatures on the elastic modulus of 3D-printed provisional fixed partial dentures.

A total of 100 simulated provisional fixed dental prosthesis specimens, measuring 20 mm × 5.5 mm × 4.5 mm, were prepared and randomly divided into five groups (n = 20) a control group (without secondary post-curing), dry-heat oven groups at 60°C and 80°C , and water immersion groups at 60°C and 80°C. Secondary post-curing was performed according to the specified criteria for 60 minutes. A universal testing machine was utilized to measure the elastic modulus of the specimens. Data were analyzed using Two-Way ANOVA followed by the *Post-Hoc* LSD test.

The results showed that post-curing using an oven at 60°C produced the highest elastic modulus (360,40 ± 12,51), whereas post-curing using water immersion at 80°C produced the lowest elastic modulus (283,53 ± 10,76). Post-curing technique had a significant effect on the elastic modulus ($p<0.05$), while the difference between temperatures of 60°C and 80°C was not significant ($p>0.05$). In conclusion, post-curing in the fabrication of provisional fixed dental prostheses using 3D-printed materials with oven curing at 60°C and 80°C can be used to enhance polymerization, thereby increasing the elastic modulus.

Keywords: provisional fixed dental prosthesis, 3D-printed, oven curing, water immersion, elastic modulus.