



Effect of Aging on Translucency Stability of Amine-free Resin Cements

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INTRODUCTION

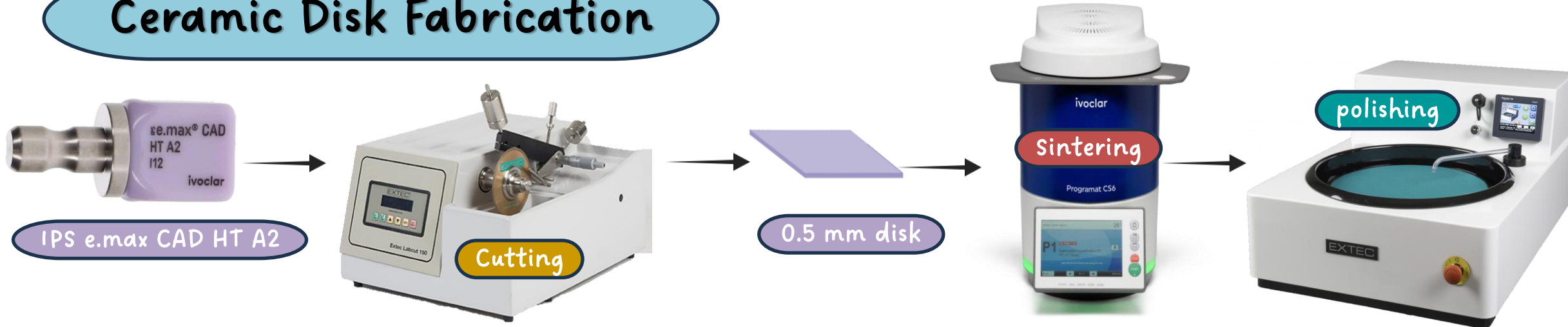
- ❑ Resin cements (RCs) are commonly used to bond indirect restorations but are susceptible to discoloration due to oxidation of amines.
- ❑ Amine-free RCs were developed to address this limitation. However, their long-term color and translucency stability remain uncertain.
- ❑ **This study aimed to compare the translucency stability of commercial amine-free dual-cure (DC) and light-cure (LC) RCs after aging.**

METHODS & MATERIAL

- Ten amine-free RCs (table) were prepared as disks (diameter=12 mm, thickness=1 mm, n=10) using a plastic mold. The most translucent shade available was used.

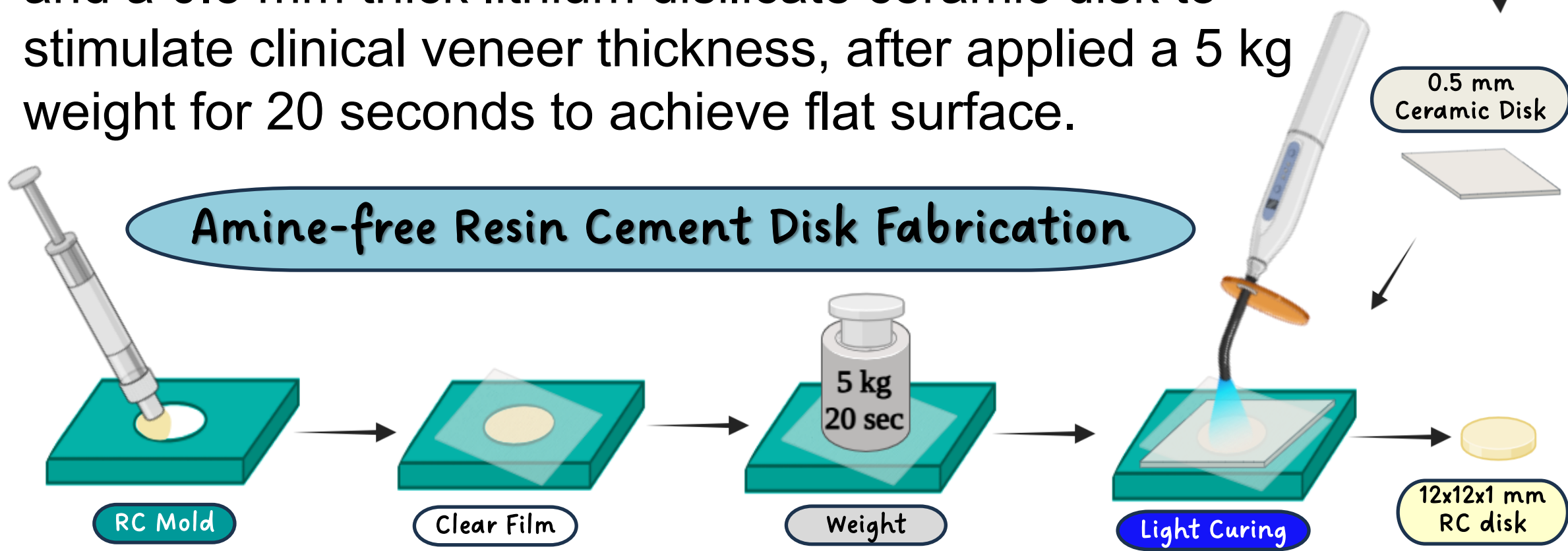
Product	Curing Mode	Shade	Manufacturer
Variolink Esthetics DC	DC	Neutral	Ivoclar
Variolink Esthetics LC	LC	Neutral	Ivoclar
NX3 Nexus DC	DC	Clear	Kerr
NX3 Nexus LC	LC	Clear	Kerr
Panavia V5	DC	Clear	Kuraray
Panavia Veneer LC	LC	Clear	Kuraray
RelyX Ultimate	DC	Translucent	3M
RelyX Veneer	LC	Translucent	3M
Choice 2 DC (premarket)	DC	Translucent	Bisco
Choice 2	LC	Translucent	Bisco

Ceramic Disk Fabrication



- Light curing was performed through a clear plastic film and a 0.5 mm thick lithium disilicate ceramic disk to stimulate clinical veneer thickness, after applied a 5 kg weight for 20 seconds to achieve flat surface.

Amine-free Resin Cement Disk Fabrication



- Artificial aging was conducted via 10,000 cycles between 5°C and 55°C in distilled water.
- Colors were measured before and after aging under white and black backgrounds.



- Translucency was calculated as the color difference between the two backgrounds (white and black) using CIELAB formular.
- Translucency stability was calculated as (translucency after aging / translucency before aging) x 100% and expressed as percentage translucency (of before aging).

$$\text{Translucency} = \Delta E_{ab}^* = \sqrt{(\Delta L_{\text{White-Black}})^2 + (\Delta a_{\text{White-Black}})^2 + (\Delta b_{\text{White-Black}})^2}$$

$$\text{Translucency Stability (\% Translucency)} = \frac{\text{Translucency After Aging}}{\text{Translucency Before Aging}} \times 100\%$$

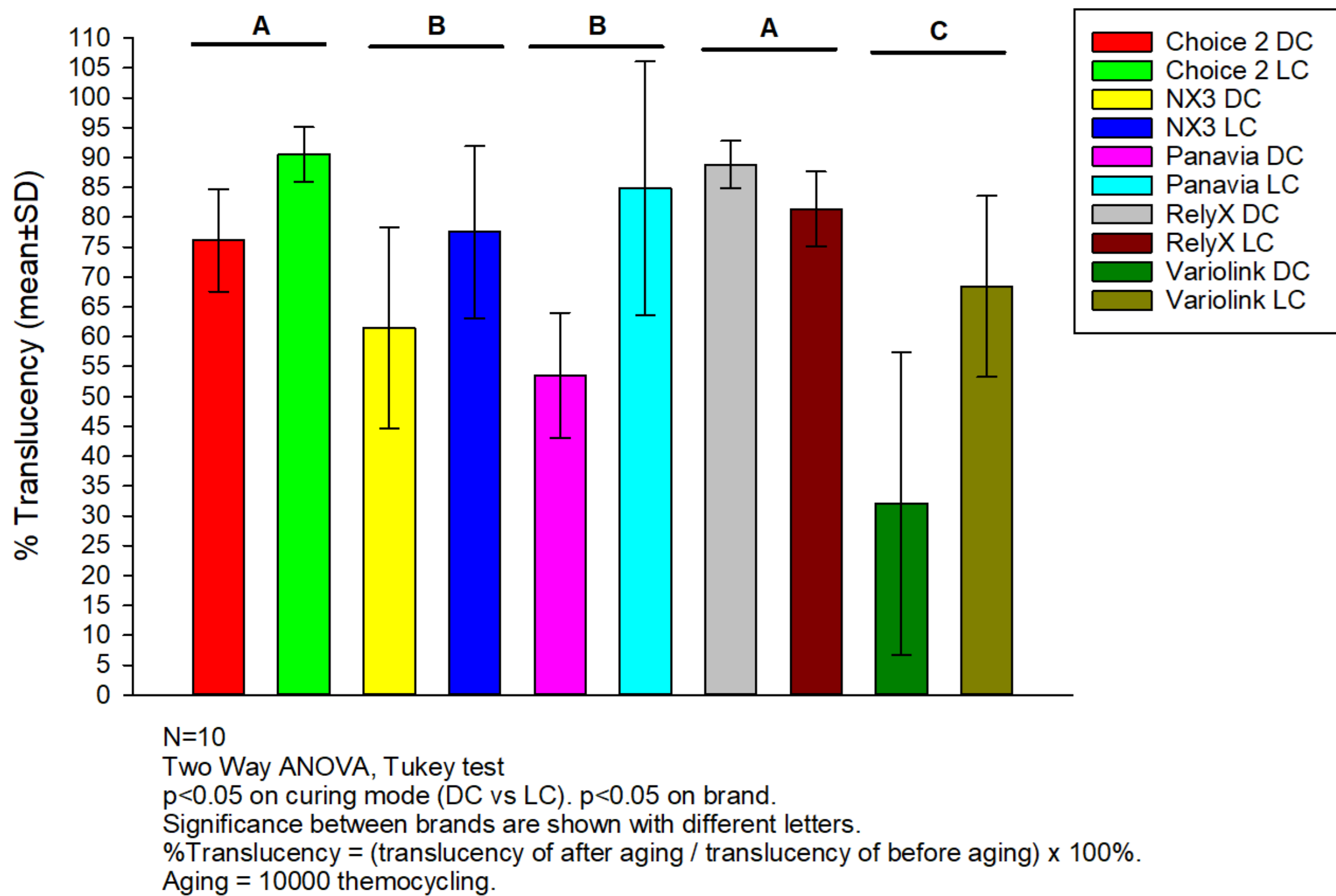
- Two-way ANOVA (curing mode and brand as factors) was used as statistical analysis with Tukey test as post hoc ($\alpha=0.05$).

Data Analysis



RESULTS

- Curing mode had a significant effect on percentage translucency.
- Choice 2 and Rely X showed the highest translucency stability.
- NX3 and Panavia exhibited moderate stability
- Variolink demonstrated the lowest stability among the tested materials.
- Within-brand comparison showed DC had lower translucency stability than LC except for RelyX, which DC and LC are not significant.



CONCLUSIONS

- ❖ The translucency stability of amine-free RCs after aging varies significantly depending on the brand and curing mode.
- ❖ DC and LC formulations often demonstrate different degrees of translucency change, with certain brands exhibiting greater stability than others. Therefore, careful selection of resin cement is essential, particularly in high esthetic zones where optical properties are critical.
- ❖ Clinicians should consider both the brand and curing protocol when choosing amine-free RCs to ensure optimal long-term esthetic outcomes after aging.

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- ❑ We sincerely appreciate BISCO for providing Choice 2 DC (premarket) and Choice 2 as research gifts and Dr. Qiang Ma from BISCO for his technical supports and advisories.
- ❑ **The authors declare that there is no conflict of interest.**

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