

## Light curing of dual cure resin cement

**Q** When using dual cure resin cements for cementing indirect restorations such as ceramic inlays or resin inlays, is the light curing procedure of dual cure resin cements necessary?

**A** Although dual cure resin cements (DCRCs) are formulated to polymerize without the light curing procedure, the degree of conversion of these cements without light curing varies a lot according to the manufacturers. Therefore, it is recommended that DCRCs should be light cured thoroughly through the indirect restoration and through the tooth structure if possible. There are many studies on the degree of conversion of DCRCs used for cementing indirect restorations.<sup>1-4</sup> They reported lower microhardness of DCRCs if the light curing procedure was omitted. Therefore, to obtain higher degree of conversion of DCRCs when cementing ceramic or resin inlays, prolonged light curing time is necessary with the highest amount of power density of the light curing unit (LCU).<sup>5</sup>

In addition, the power density of the LCU for photopolymerization of the DCRC beneath the resin inlays is affected by the thickness and opacity of the resin inlays.<sup>6,7</sup> According to our previous studies, the power density of the LCU was highly attenuated by the dentin shade followed by enamel and translucent shades with significant differences among them. Therefore, the power density of the LCU measured through the resin inlays could be increased when the resin inlay was fabricated with three layers (translucent, enamel, and dentin shades) compared to those fabricated with two layers (enamel and dentin shades) followed by those fabricated with one layer (dentin shade), and there were significant differences among them. This was the result of decreasing the dentin layer thickness, which is more opaque, and incorporating enamel and translucent shades, which are more translucent.<sup>6</sup> The power density of LCUs measured through three-layered resin inlays could be further increased when the dentin layer thickness was decreased and the translucent layer thickness was increased concomitantly without decreasing the resin inlay thickness,<sup>7</sup> since decreasing the total thickness of resin inlays can increase the risk of fracture of resin inlays. To support these findings, DCRC was light cured through resin inlays with various dentin-enamel-translucent layer combinations and the microhardness of the DCRC was tested to measure the degree of conversion of the DCRC. And to simulate clinical situations of resin inlay cementation, DCRC was light cured through the resin inlays with various layer combinations which were cemented to bovine dentin, and the shear bond strength was tested. The results showed that the microhardness of DCRC and the shear bond strength of DCRC to bovine dentin were higher with resin inlays of decreased dentin layer thickness and increased translucent layer thickness.<sup>4</sup>

Therefore, in terms of the degree of conversion of DCRCs, resin inlays fabricated with dentin, enamel, and translucent layers seem to be advantageous and for further increase of degree of conversion of the DCRCs, the dentin layer thickness should be minimized with concomitant increase of the translucent layer.

From **Hoon-Sang Chang**  
(Chonnam University)

### Acknowledgement

Readers' forum is edited by Professor Kyung-Mo Cho (Gangneung-Wonju National University).

### References

1. el-Badrawy WA, el-Mowafy OM. Chemical versus dual curing of resin inlay cements. *J Prosthet Dent* 1995;73:515-524.

2. Hasegawa EA, Boyer DB, Chan DC. Hardening of dual-cured cements under composite resin inlays. *J Prosthet Dent* 1991;66:187-192.
3. Kilinc E, Antonson SA, Hardigan PC, Kesercioglu A. The effect of ceramic restoration shade and thickness on the polymerization of light- and dual-cure resin cements. *Oper Dent* 2011;36:661-669.
4. Chang HS, Kim JW. Early hardness and shear bond strength of dual cure resin cement light cured through resin overlays with different dentin layer thicknesses. *Oper Dent* 2013.[Epub ahead of print].
5. Park SH, Kim SS, Cho YS, Lee CK, Noh BD. Curing units' ability to cure restorative composites and dual-cured composite cements under composite overlay. *Oper Dent* 2004;29:627-635.
6. Chang HS, Lim YJ, Kim JM, Hong SO. Power density of light curing units through resin inlays fabricated with direct and indirect composites. *J Korean Acad Conserv Dent* 2010;35:353-358.
7. Hong SO, Oh Y, Min JB, Kim JW, Lee BN, Hwang YC, Hwang IN, Oh WM, Chang HS. Power density of various light curing units through resin inlays with modified layer thickness. *Restor Dent Endod* 2012;37:130-135.