Readers' forum
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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.[1-4] 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).[5]

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.[6,7] 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.[6] 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,[7] 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.[4]

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.

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