What Bonds to What? Long-Term Proven Products and Techniques

CR Survey Results Summary: Long-Term Adhesion

The following summary of results from a recent CR survey answered by 907 practicing clinicians shows current trends in adhesive/cement use and long-term restoration adhesion. CR Notes are included as needed to give clinical direction and context.

- **Restorative materials** placed by clinicians (multiple responses possible): 99% Resin-based composite, 88% Lithium disilicate (e.g., IPS e.max CAD/Press), 87% Zirconia, 72% Metal, 52% Amalgam, 27% Hybrid ceramic (e.g., Lava Ultimate). CR Note: Despite health and esthetic concerns, amalgam continues to be used by more than half of all clinicians surveyed.

- **Type of restoration debonding** most frequent in service: 44% Class V, 14% Class IV, 14% Crowns, 13% Veneers, 7% Onlays, 3% Class VI, 2% Class II, 2% Inlays, 1% Class III. CR Note: Risk of restoration debonding can be greatly reduced with addition of mechanical retention in the tooth preparation and with indirect restoration pretreatment (see main article for Clinical Tip on mechanical retention).

- **Location of restoration debond**: Most clinicians are unclear on whether debonding is occurring more on the restoration side or the tooth side. CR Note: When debonding does occur, take a few moments to observe the tooth and restoration surfaces under basic loupé magnification to note on which side the cement debonded (for indirect restorations).

- **Mechanical retention** provided for restorations (indirect: interior pretreatment; direct: retentive tooth preparation) (multiple responses possible): 93% Amalgam, 57% Resin-based composite, 42% Metal, 35% Hybrid ceramic (e.g., Lava Ultimate), 29% Zirconia, 24% Lithium disilicate (e.g., IPS e.max CAD/Press).

- **Resin-based-composite-bonding agents** used: 21% Clearfil SE Bond (Kuraray; multiple versions), 17% Scotchbond Universal Adhesive (3M ESPE), 7% OptiBond Solo Plus (Kerr), 6% OptiBond XTR (Kerr).

- **Amalgam** restorations are not being bonded by 25% of clinicians who appear to be relying heavily on the mechanical retention of tooth preparations. Popular adhesives used: 25% Amalgambond (Parkell; multiple versions), 5% Scotchbond Universal Adhesive (3M ESPE), 4% Clearfil SE Bond (Kuraray), 3% OptiBond Solo Plus (Kerr).

- **Zirconia** restorations most commonly being luted with resin-modified glass ionomer (RMGI) cements. Popular cements used: 27% RelyX Luting (3M ESPE; multiple versions), 20% RelyX Unicem (3M ESPE; multiple versions), 19% Fuji (GC America; multiple versions).

- **Metal** restorations most commonly being luted with resin-modified glass ionomer (RMGI) cements. Popular cements used: 38% RelyX Luting (3M ESPE; multiple versions), 27% Fuji (GC America; multiple versions), 11% RelyX Unicem (3M ESPE; multiple versions).

- **Lithium disilicate** (e.g., IPS e.max CAD/Press) restorations most commonly being placed with resin cements (self-etch/self-adhesive). Popular cements used: 23% RelyX Unicem (3M ESPE; multiple versions), 16% RelyX Luting (3M ESPE; multiple versions), 12% Multilink Automix (Ivoclar Vivadent), 10% Fuji (GC America; multiple versions), 8% RelyX Ultimate (3M ESPE).

- **Hybrid ceramic** (e.g., Lava Ultimate) restorations being placed with cementation products similar to those for lithium disilicate.

- **Supplemental adhesive** being placed with cements for restorations (multiple responses possible): 60% Lithium disilicate (e.g., IPS e.max CAD/Press), 60% Hybrid ceramic (e.g., Lava Ultimate), 44% Zirconia, 24% Metal. Popular brands used: Scotchbond Universal Adhesive (3M ESPE), OptiBond XTR (Kerr), Clearfil SE Bond (Kuraray; multiple versions). CR Note: CR research reported in May 2015 showed addition of a supplemental adhesive can increase overall bond strength for most resin cements evaluated.