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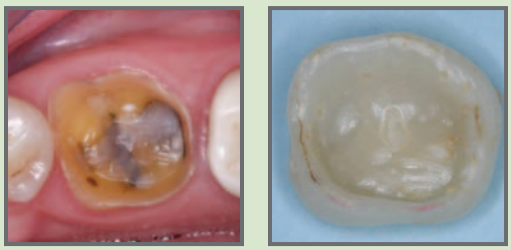
What Bonds to What? Long-Term Proven Products and Techniques

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.

Class V lesion with cord in place showing resin restoration has debonded from tooth

- **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).*



Debonding of self-etch cemented crown after 4 years *(note resin in crown and NONE on the tooth)*

- **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 loupe 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.***