

Zirconia surface treatment for successful bonding

Q I often use zirconia such as LAVA or Cercon for crown restoration. However, they tend to fall off more easily compared to other materials. What should I do for better adhesion?

A Due to its high strength and biocompatibility, the use of zirconia is recently on the rise, but there are difficulties in bonding compared to other conventional ceramic materials. Since it doesn't contain glass, it cannot be etched by hydrofluoric acid and tribochemical silica coating is not effective.^{1,2} Therefore, unlike conventional materials, the adhesion with luting cement is weak and the restoration easily falls off.¹ Therefore, the tooth surface should be treated with conventional methods, but the inner zirconia surface needs special treatment.¹⁻⁴

Currently, the most effective method for zirconia bonding is to apply sandblasting, rinse ultrasonically, and then coat zirconia primer (Z-PRIME Plus, Bisco Inc., Schaumburg, IL, USA)^{1,2} or universal adhesive (Scotchbond Universal Adhesive, 3M ESPE, St. Paul, MN, USA; All-Bond Universal, Bisco Inc.), which includes functional monomers such as 10-methacryloyloxydecyl dihydrogen phosphate (MDP), etc.^{3,4} Unlike conventional restorative materials, when used with zirconia, conventional multistep cements do not have significantly higher bonding strength.² Therefore, self-adhesive resin cement (SmartCem2, Dentsply, York, PA, USA; Rely X U200, 3M ESPE; BisCem, Bisco Inc.; PermaCem 2.0, DMG, Hamburg, Germany; Multilink Speed, Ivoclar Vivadent, Schaan, Liechtenstein) may be conveniently used for cementation as saving time and reducing errors of multistep processing. The manufacturers do not recommend the use of additional surface treatment on restorations as the self-adhesive resin cement contains functional monomers, but the use of aforementioned primers significantly increase the bond strength.^{1,2} Zirconia adhesion needs improvement through further research and development.

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References

1. Yi YA, Ahn JS, Park YJ, Jun SH, Lee IB, Cho BH, Son HH, Seo DG. The effect of sandblasting and different primers on shear bond strength between yttria-tetragonal zirconia polycrystal ceramic and a self-adhesive resin cement. *Oper Dent* 2014 Aug 1. doi: <http://dx.doi.org/10.2341/13-149-L>. [Epub ahead of print]
2. Shin YJ, Shin Y, Yi YA, Kim J, Lee IB, Cho BH, Son HH, Seo DG. Evaluation of the shear bond strength of resin cement to Y-TZP ceramic after different surface treatments. *Scanning* 2014 Mar 27. doi: 10.1002/sca.21142. [Epub ahead of print]
3. Amaral M, Belli R, Cesar PF, Valandro LF, Petschelt A, Lohbauer U. The potential of novel primers and universal adhesives to bond to zirconia. *J Dent* 2014;42:90-98.
4. Seabra B, Arantes-Oliveira S, Portugal J. Influence of multimode universal adhesives and zirconia primer application techniques on zirconia repair. *J Prosthet Dent* 2014;112:182-187.