Surface Treatment Protocols for Indirect Tooth-Colored Restorations (10/05)

Soares CJ, Soares PV, Pereira JC, Fonseca RB. Surface treatment protocols in the cementation process of ceramic and laboratory-processed composite restorations: a literature review. J Esthet Restor Dent 2005;17:224-235.

Tooth-colored metal-free indirect restorations vary considerably in composition and require different protocols for adhesive cementation. Composite cements present low solubility and good adhesion to tooth structure. The micromechanical retention to be created on the internal surface of the indirect restoration is critical to the process of bonding the composite cement. The purpose of this literature review was to define surface treatment protocols of different esthetic indirect restorative materials. A literature search was conducted on peer-reviewed, laboratory-research articles published between 1965 and 2004 that describe the surface-treatment procedure and its effect on adhesion, and its relationship with the materials composition, clinical aspects, and expected longevity. Hydrofluoric (HF) acid and silane provide an increase in adhesion when used with ceramics reinforced with feldspar, leucite, or lithium disilicate. The use of airborne particle abrasion and a phosphate-monomer-containing cement is recommended with aluminum-oxide ceramics.

Material	**Surface Treatment**
Feldspathic ceramic (e.g., Duceram, Degussa)	9.5% HF acid for 2-2.5 min, wash, silane application, resin cement
Leucite-reinforced ceramic (e.g., IPS Empress I, Ivoclar Vivadent)	9.5% HF acid for 60 secs, wash, silane application, resin cement
Lithium disilicate-reinforced ceramic (e.g., IPS Empress II, Ivoclar Vivadent)	9.5% HF acid for 20 secs, wash, silane application, resin cement
Glass-infiltrated Al-oxide ceramic (e.g., In-Ceram alumina, Vident)	Sandblasting with synthetic diamond or 50-um Al oxide, wash; or retentive preparation design. Cements: (first choice) phosphate-monomer-containing cement (e.g., Panavia F, Kuraray); conventional resin cement, glass ionomer, or zinc phosphate
Zirconium-reinforced Al-oxide ceramic (e.g., In-Ceram zirconium, Vident)	Retentive preparation design, or sandblasting with 50-um Al oxide, wash; Cements: (first choice) phosphate-monomer-containing cement (e.g., Panavia F, Kuraray); conventional resin cement, glass ionomer, or zinc phosphate
Densely sintered, Al-oxide ceramic (e.g., Procera AllCeram, Nobel Biocare)	Retentive preparation design, or sandblasting with 50-um Al oxide, wash; Cements: (first choice) phosphate-monomer-containing cement (e.g., Panavia F, Kuraray); conventional resin cement, glass ionomer, or zinc phosphate
Laboratory-processed composite (e.g., belleGlass, KerrLab)	Sandblasting with Al oxide for 10 secs, silane application, resin cement

An alternative is to use silica coating and silane application with the Rocatec System (3M ESPE). Surface treatment using aluminum-oxide particles seems to be the treatment of choice for laboratory-processed composites. The presence of inorganic particles makes it possible to develop better adhesion with the application of silane. The table reviews surface treatments for various materials.

DECS Comment: The longevity of indirect, metal-free, ceramic and composite restorations depends on their successful cementation. This review article provides an overview of the various restorative systems and the rationale and guidelines for their cementation. Providers should always refer to the recommendations of the manufacturer of their specific restorative system.