

Advantages of Total-Etch

- Higher bond strengths to cut and uncut enamel
- Better bond to sclerotic dentin
- Less risk of microleakage
- More compatible with self-cure/dual-cure composites and resin cements

Disadvantages of Total-Etch

- Strict protocols must be followed
- Isolation and dry field are critical
- Dentin etched with phosphoric acid must not be over-dried
- Open dentin tubules may lead to post-op sensitivity

Advantages of Self-Etch

- Simple to use
- Variables associated with acid etching are eliminated
- Depth of etch is self-limiting
- Likely to be less post-op sensitivity

Disadvantages of Self-Etch

- Bond strengths to enamel are typically lower
- Bond strengths to self-cure/dual-cure composites and cements are poor
- Long term bond to dentin may be susceptible to hydrolysis

Advantages of Selective-Etch

- High bond strengths to cut and uncut enamel
- High bond strengths to sclerotic dentin
- High bond strengths to dentin
- Less technique sensitive
- Less risk of post-op sensitivity

Classification of Bonding Agents

Total-Etch vs. Self-Etch vs. No. of Steps

- Total-Etch 3 Steps (4th generation)
- Total-Etch 2 Steps (5th generation)
- Self-Etch 2 Steps (6th generation)
- Self-Etch 1 Step (7th generation)

Bonding Agents

- Total-Etch 3 Steps (4th generation)
 - OptiBond Fl (Kerr)
 - All Bond 3 (Bisco)
 - Scotchbond Multi-Purpose Plus (3M ESPE)
- Total-Etch 2 Steps (5th generation)
 - Prime and Bond NT / XP Bond (Dentsply/Caulk)
 - One Step Plus (Bisco)
 - OptiBond Solo Plus (Kerr)
 - Excite / Excite-F DSC (Ivoclar Vivadent)
 - Single Bond Plus (3M ESPE)

Ideal Bonding Agent

- Ease of use
- Fewer steps (one bottle)
- Versatile
- Would be compatible with all SC, DC, and LC resin cements and composites
- High bond strengths to cut and uncut enamel and to dentin and sclerotic dentin
- Low film thickness
- No post-op sensitivity
- No micro-leakage

Universal Adhesives

- All Bond Universal (Bisco)
- ScotchBond Universal (3M ESPE)
- Prime and Bond Elect (Dentsply/Caulk)

Universal Adhesives

- Combine etching, priming, and bonding in one bottle
- Can be used with total-etch, self-etch, or selective-etch techniques
- Can be used for direct and indirect restorations
- They have a low film thickness
- They are compatible with light-cure, dual-cure, and self-cure composites and resin cements (SBU and PBE require a DCA)

Cements

- Zinc Phosphate
Hy-Bond (Shofu Dental)
- Zinc Polycarboxylate
Durelon (3M ESPE)
- Glass Ionomer
Ketac Cem (3M ESPE)
- Resin-Modified Glass Ionomer
RelyX Luting Plus (3M ESPE)
FugicEM Automix (GC America)
- Bioceramic Luting Cement
Ceramir Crown and Bridge (Doxa Dental)
- Resin Cements

Resin Cements

- Self Adhesive
 - RelyX Unicem 2 Automix (3M ESPE)
 - Clearfil SA Cement (Kuraray)
- Dual Cure with Paired Self Etching Primers
 - Multilink Automix (Ivoclar Vivadent)
 - Panavia F 2.0 (Kuraray)
- Dual Cure with Total Etch or Self Etch Capability
 - Duo-Link Universal (Bisco)
 - RelyX Ultimate ARC (3M ESPE)
- Light Cure with Dual Cure Capability
 - Variolink II (Ivoclar Vivadent)
 - NX3 (Kerr)
- Light Cure Only
 - Variolink Veneer (Ivoclar Vivadent)
 - RelyX Veneer Cement (3M ESPE)

Cements – Clinical Uses

- Zinc Phosphate
 - Metal, Metal-ceramics, Zirconia
- Zinc Polycarboxylate
 - Metal, Metal-ceramics, Zirconia
- Glass Ionomer
 - Metal, Metal-ceramics, Zirconia
- Resin-Modified Glass Ionomer
 - Metal, Metal-ceramics, Zirconia
- Bioceramic Luting Cement
 - Metal, Metal-ceramics, Zirconia, Lithium Disilicate
- Resin Cements

Resin Cements – Clinical Uses

- Self Adhesive
 - Zirconia (when retention is good), endo posts
- Dual Cure with Paired Self Etching Primers
 - Zirconia (when retention is not good), All posterior glass ceramics except veneers
- Dual Cure with Total Etch or Self Etch Capability
 - Zirconia (when retention is not good), All posterior glass ceramics except veneers
- Light Cure with Dual Cure Capability
 - Zirconia (when retention is not good), All posterior glass ceramics except veneers
- Light Cure Only
 - All anterior glass ceramic restorations

Characteristics of an Ideal Cement

- Easy to mix
- Low film thickness
- Low viscosity
- Extended working time
- Short setting time
- Insoluble in oral fluids
- High sheer strength
- High tensile strength
- High compressive strength
- Able to bond to tooth structure
- Biocompatible with pulp and soft tissue
- Translucent
- Radiopaque
- Easy to clean up

Conventional Cementation Options

Resin Modified Glass Ionomers (RMGI)
RelyX Luting Plus (3M ESPE)
FujiCEM Automix (GC America)

Self Adhesive Resin Cements
RelyX Unicem 2 (3M ESPE)
Maxcem Elite (Kerr)
SpeedCem (Ivoclar Vivadent)
SmartCem2 (Dentsply/Caulk)
PermaCem 2.0 (DMG America)
BisCem (Bisco)
G-Cem (GC)

Bioceramic Luting Cement
Ceramir Crown and Bridge (Doxa Dental)

Clinical Application

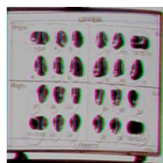
- Conventional cementation of a solid zirconia crown on a natural tooth
- Conventional cementation of 2 solid zirconia crowns on stock implant abutments

Protocol for Total Etch Adhesive Bonding of Glass Ceramics with Light Cure Resin Cement

- Isolate with rubber dam and disinfect prepared teeth
- Place phosphoric acid gel, rinse, leave teeth moist
- Apply bonding agent, evaporate solvent, and light cure
- Place resin cement on teeth and seat all the restorations
- Clean excess cement with gauze, cotton rolls, and brushes
- Tack restorations at gingival margins
- Floss interproximal contacts and light cure
- Remove cured cement on facial with scaler
- Polish interproximal contacts with finishing strips
- Adjust occlusion where necessary and polish with rubber points and polishing paste

Steps For Preparing Restorations

- Place phosphoric acid on internal surface
- Rinse, dry and apply silane coupler
- Allow to sit for 1 min. then dry
- Paint silanated surface with bonding agent
- Set aside in a safe place organized by tooth number

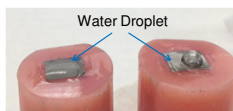


Unique Features/Benefits Of All Bond Universal

Flexibility of Technique: self etch, total-etch, or selective-etch procedures
 Used for both direct and indirect restorations
 High bond strengths to all indirect substrates, including metal, glass ceramics, zirconia, alumina, and lithium disilicate.
 Designed to be fully compatible with light-cured, self-cured and dual-cured composite and luting cements.
 Low film thickness (less than 10µm)
 No additional activator required



Self-etch Total-etch Selective-etch



Uncured ABU Hydrophilic Cured ABU Hydrophobic

Protocol for Adhesive Resin Bonding of Solid Zirconia and Resin Nano Ceramic

- Disinfect prepared teeth with chlorhexidine
- Rinse and lightly air or blot dry
- Apply self etching primer/primers
- Lightly air dry to evaporate solvent and light cure
- Inject dual cure resin cement in automix syringe directly into restorations
- Seat restorations and while applying finger pressure light cure excess resin for 1-2 seconds
- Remove gelled excess with scaler/explorer and floss contacts
- Light cure, adjust occlusion, and polish

Steps For Preparing Restorations

Solid Zirconia

- Apply Ivoclean (Ivoclar Vivadent) for 20 sec
- Rinse, dry and apply ceramic primer ie. Z Prime Plus (Bisco) or Monobond Plus (Ivoclar)
- Place dual-cure resin in crown

Steps For Preparing Restorations

Lava Ultimate

- Air abrade intaglio surface with aluminum oxide powder < 50um
- Clean with alcohol, rinse, dry and apply silane
- Place dual-cure resin in crown

Steps For Preparing Restorations

e.max Press or Cad

- Etch intaglio surface with hydrofluoric acid (usually done by lab)
- Rinse, dry and apply silane (wait 1 min. and air dry)
- Place dual-cure resin in crown

Theracal™ LC

Resin-Modified Calcium Silicate Pulp Protectant/Liner

Seals & Protects the Pulp:

- For Direct & Indirect Pulp Capping
- Light-curable, Radiopaque Liner based on improved MTA-technology.
- Significant Calcium Release:
 - Stimulates Hydroxy Apatite & Dentin Bridge Formation.



Steps for Direct and Indirect Pulp Capping

- Isolate with rubber dam
- Control bleeding
- Rinse and lightly dry
- Apply Theracal LC (Bisco) in Imm increments and light cure
- Etch, rinse, and leave tooth moist
- Apply bonding agent, evaporate solvent, and light cure
- Place restorative material
