



Success is in the Details:  
**CEMENTATION  
FROM PREP TO  
POST-OP**



# WEIGHING ALL THE FACTORS

**As new dental materials come onto the market,** it's important to keep up to date with information so that every cementation procedure is successful. Cements, primers, adhesives, and etchants, along with substrate types, all have a role to play in the final outcome.

Dental cements come in a variety of formulas and have a wide range of applications. There are many factors to consider when choosing a cement, which include restoration type, substrate, procedure, esthetics, and the retentiveness of the prepared tooth.

*Figures courtesy of Dr. Tyler Lasseigne.*

# TREATING AND PRIMING INDIRECT RESTORATIONS

Treating the surfaces of your restorations is the first step to obtaining lasting results in the cementation process. Decontaminating and priming with the appropriate primer ensures a stronger bond between the restoration and the tooth and reduces bond failure.

After try-in, it is important to decontaminate the crowns. Phosphate contaminants from saliva can weaken bond strengths, and removing these will result in a better long-term restoration. If the crown has been sandblasted, clean the internal surface with a nonabrasive cleaning gel, then proceed with priming to the bonded surface with a suitable primer. If the surface isn't sandblasted, the intaglio surface should be sandblasted, and a primer can then be applied.

The correct priming procedure is dependent upon the substrate to be cemented. For glass ceramics such as porcelain or lithium disilicate, first clean the restoration, then etch with hydrofluoric acid. To prime the surface, use a silane solution, such as Bis-Silane™ (a two-part silane coupling agent) or Porcelain Primer (a single-component, pre-hydrolyzed, no-mix silane primer). Silane solutions are designed to improve bonding between porcelain substrates and resin cements.

If the indirect restoration is zirconia-based, metal, or alumina, then an MDP-containing primer should be used, such as Z-PRIME™ Plus.



*Figure courtesy of Dr. Joseph Kim.*



# PREPARING THE TOOTH SURFACE

AFTER REMOVING THE TEMPORARIES, PREPARE THE TEETH FOR CEMENTATION.

1. Ensure all subgingival bleeding has stopped.
2. If the subgingival area of the preparation continues to bleed after applying an astringent, consider packing retraction cord in the area, placing a wedge to compress the bleeding tissues, or cauterizing the area prior to proceeding with cementation.
3. Certain cements may also require an adhesive to be used on the tooth. If the surface is non-retentive, it is recommended that adhesive be used to ensure a strong bond between the tooth and the restoration. Follow manufacturer instructions for applying adhesive to the tooth.
4. If you are using a self-etch adhesive and need to etch enamel, please note that mildly acidic SE adhesives (pH > 2.0) do not effectively etch cut or uncut enamel, and, therefore, the enamel should be etched using the selective etch technique.

*Figure courtesy of Dr. Joseph Kim.*

# PRODUCT RECOMMENDATIONS FOR ZIRCONIA AND LITHIUM DISILICATE

## 1. ZIRCONIA

For retentive preparations, a self-adhesive, dual-cured resin cement should be used (for example, TheraCem®) that does not require the use of a primer or adhesive. For a less retentive surface, a cement that is more hydrophobic (such as DUO-LINK UNIVERSAL™) is recommended and requires the use of a primer on the restoration and adhesive on the tooth structure.

## 2. LITHIUM DISILICATE

A luting cement (such as eCEMENT® Dual-Cured) that is specifically formulated to meet the requirements for bonding to lithium disilicate should be employed for crown & bridge, inlays/onlays, and veneers. This product is available in varying thicknesses and opacities to mask defects and restore esthetics.

### ZIRCONIA CASE EXAMPLE:

## Optimizing Implant Esthetics With Resin Cements

Joseph S. Kim, DDS, JD

To achieve maximum bond strengths, the abutment and crown were treated, rinsed, and dried. DUO-LINK UNIVERSAL™ was used to maximize translucency between the crown and the abutment. Limiting cement placement to the deepest third of the crown intaglio minimized excess subgingival cement.

MY FINEST CASE - IMPLANTS Joseph S. Kim, DDS, JD

### Optimizing Implant Esthetics With Resin Cements

Joseph S. Kim, DDS, JD

Implants have become a routine part of many dental practices, yet the single maxillary central incisor continues to challenge clinicians of all experience levels. Unlike most posterior sites, esthetic demand is high in this area due to its prominent visibility—from the moment the central incisor is removed up to the delivery of the final prosthesis. Symmetry between the implant-supported restoration and the contralateral central incisor is difficult to achieve due to the numerous esthetic factors that must be addressed. A commonly overlooked factor is the cement that joins the custom hybrid zirconia abutment/mesostucture to the titanium base, as well as the cement that connects the final crown to the abutment. The following case addresses these issues using resin cements from Bisco, Inc. (bisco.com).

**KEY TAKEAWAYS**

- Optimal gingival contours are achieved through proper 3-dimensional implant placement and preparation.
- Cements can play a key role in implant esthetics, and the choice resin cement (TheraCem®/Bisco) was used in this case helped prevent darkness from showing through zirconia.
- Using Z-Prime® Plus primer (Bisco) and a resin cement such as Duo-Link Universal® (Bisco) allows optimal retention of zirconia materials.
- Subgingival cement can be minimized by an air gun in the subgingival, minimal amount of cement, and a gingival seal agent on the crown abutment.

**FIG 1:** The zirconia Maryland bridge was dislodged by gently prying at slots placed on the periphery of the wings. Residual composite was removed by gently using a 12-fluted carbide finishing bur with no irrigation to better identify the cement. FIG 2: Note the palatal position of the implant fixture. The cover screw was accessed by perforating the gingiva using a coarse diamond bur. The opening was minimally enlarged to remove the cover screw, remaining palatal to the platform. A healing abutment was used to push the soft tissues facially.

**FIG 3:** The zirconia Maryland bridge was dislodged by gently prying at slots placed on the periphery of the wings. Residual composite was removed by gently using a 12-fluted carbide finishing bur with no irrigation to better identify the cement. FIG 4: Note the palatal position of the implant fixture. The cover screw was accessed by perforating the gingiva using a coarse diamond bur. The opening was minimally enlarged to remove the cover screw, remaining palatal to the platform. A healing abutment was used to push the soft tissues facially.

**FIG 5:** The screen-retained provisional was tried in, and modifications were made to optimize the soft-tissue contour. A cone surface was created along the entire profile of the provisional, at and below the level of the gingiva, to maximize the volume of soft tissue. FIG 6: Gentle pressure was exerted on the facial gingiva to adequately support it until the final prosthesis was fabricated. Too much pressure may cause recession of the facial gingiva, and too little pressure may cause blurring of the papilla.

**FIG 6:** The CAD/CAM hybrid zirconia abutment was joined to the titanium base using Z-Prime Plus and TheraCem. Enough TheraCem was used to ensure complete contact between the titanium base and the zirconia abutment. The opacity of the TheraCem prevented darkness from showing through the zirconia.

# CEMENTATION: LITHIUM DISILICATE

Since lithium disilicate is a silica-based ceramic, hydrofluoric etching followed by silane is recommended.

- 1** Try in restoration.
- 2** Etch the internal surface of the restoration with 4-5% hydrofluoric etchant for 20-25 seconds. Rinse with water and dry.
- 3** Treat the internal surface of the restoration with silane primer: 1 coat, 1 minute, air dry. (Note: only pure silane primer should be used, such as BISCO Porcelain Primer or Bis-Silane. Silane-containing adhesives are not effective.)
- 4** If bonding to enamel, etch the enamel with phosphoric acid etchant, rinse with water.
- 5** Apply dental adhesive to the tooth, air dry, light cure for 10-20 seconds. (Note: always treat the restoration first, then treat the tooth structure.)
- 6** Apply dual-cure resin cement. If placing a veneer, apply a light-cured veneer cement to ensure shade shifting doesn't occur.
- 7** Remove excess cement.



# CEMENTATION: ZIRCONIA

As more dentists start to use zirconia, it's important that the correct procedure is followed to prevent bond failures.

1	2	3	4	5	6	7
Try in zirconia.	Decontaminate the restoration to remove saliva phosphates, which can cause the restoration to de-bond (ZirClean® restoration cleaner can be used on zirconia, ceramic, and metal restorations.)	If the lab hasn't done so ahead of time, sandblast the intaglio surface of the restoration.	Treat the internal surface of zirconia with an MDP-containing primer (such as Z-PRIME Plus).	Apply dental adhesive to the tooth, air dry, light cure for 10-20 seconds.	Apply a resin cement.	Clean-up the excess.



Figures courtesy of Dr. Ross Nash.

# 1.

## REMOVE RESIDUAL CEMENT

If you are having trouble removing the residual cement from open margins, use a finishing bur at the margin, careful not to create a new void. Please keep in mind that cements are not intended to fill significant marginal gaps. If you have closed margins and are having difficulty, use a scaler and push the cement towards the gingiva to break it away from the restoration. Interproximal cement can be removed with a similar technique, pushing the cement away from the margin. Remember to dislodge any loosened fragments.

# 2.

## MAKE SURE FLOSS CAN PASS THROUGH

If the contact between the restoration and the adjacent tooth has become bonded together, use an end-cutting saw and carefully break the thin cement filling the contact. You will want to avoid using a diamond strip, which may open up the contact. To avoid this in the future, be careful not to get etchant or self-etch adhesive onto adjacent tooth surfaces. If this is unavoidable, use PTFE-based tape to protect the surrounding surfaces.

# 3.

## PREVENT MARGINAL DISCOLORATION

If you've experienced marginal discoloration when using ceramic restorations, consider the soft-tissue astringent you are using. Iron-based chemical astringent can cause margins to turn dark or black. Instead, try an aluminum-based astringent and make sure there is no blood contamination prior to cementing.

# ENSURING LONG-TERM SUCCESS

FINISH THE PROCEDURE WITH  
A FEW ADDITIONAL STEPS  
FOR IMPROVED OUTCOMES:

# Cement Quick Start Guide

## Restoration

Restoration	Cement
Zirconia/Alumina (BruxZir, Lava)	TheraCem® Duo-Link Universal™
Leucite/Crystalline/Feldspathic/Pressed	TheraCem Duo-Link Universal Choice™ 2 eCEMENT® L/C
Lithium Disilicate (e.Max)	eCEMENT D/C Duo-Link Universal TheraCem eCEMENT L/C

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