Trends, Innovations, Controversies, and Clinical Tips

Presenter: Dr. Damon Adams

6 PACE/CERP CEUs

In this information-packed scientific program, Dr. Adams, from his unique perspective as editor-in-chief of one of North America's leading clinical and news journals, will present an engaging presentation focused on current trends, controversies and innovations. He will be placing a special emphasis on a variety of clinical and treatment planning tips designed to assist the dentist and team in choosing and successfully implementing the latest lab-fabricated all-ceramic dental materials and treatment protocols.

This science-based presentation is recommended for doctors and dental laboratory technicians.

Learning Objectives (as time allows):

- Identify classifications/indications for the latest lab-fabricated dental materials
- Advantages and disadvantages of each class of modern all-ceramic materials
- Learn diagnosis and treatment planning principles to assist in selection of all-ceramic materials
- 100% zirconium restorations: Evidence-based data versus future challenges?
- Latest preparation and core build-up requirements for lithium disilicate and monolithic zirconia restorations
- New translucent anterior zirconia options: indications, special cautions, and future challenges
- Update on surface treatment protocols and cements for all-ceramic materials
- Are all-ceramics always the best choice? What are some of the current alternatives?
- An evidence-based prophylaxis protocol for maintaining composite, all-ceramic and ceramic-based restorations

Classification of All-Ceramic Systems

Glass-Based Ceramics (mainly silica [silicone dioxide/quartz] with or w/o crystalline fillers)

Aluminosilicates, known as feldspars in nature, are modified in various ways to create glass and other synthetic ceramics.

1) Leucite-Reinforced (Low-to-moderate leucite-containing porcelains=feldspathic porcelain.)

2) Leucite-Reinforced (High leucite-containing porcelains)

- ✓ **Leucite reinforced copings (such as IPS Empress Esthetic [Ivoclar Vivadent], Cerpress SL (American Dental Supply), Finesse Pressable [Dentsply Sirona])**
  Indications: **Crowns, veneers, inlays, onlays**
  Cementation: **Bonded only (silane or a universal primer required); DC or LC (veneer) resin cements**

3) Lithium Disilicate (Aluminosilicate glass, with lithium oxide.)

This class of materials was introduced in the late 1990's as conventionally pressed lithium disilicate copings layered with compatible (lithium oxide containing) porcelains (IPS Eris [Ivoclar Vivadent]; and OPC 3G [Pentron). *Layered and monolithic restorations can be fabricated using this class of all-ceramic.*
Indications: **Crowns, inlays/onlays, veneers, and 3u anterior bridges**
Cementation: **Conventional cement, or adhesively bonded (preferred) with silane or universal primer and a DC resin cement. All veneers must be adhesively cemented using a LC resin cement. (Note: Preparations must have adequate retention/resistance form if conventional cement is used.)**

- ✓ **IPS e.max CAD (LT [low translucency] used for fabricating fully anatomical crowns/cutback and veneering, MO [medium opacity] used for frameworks with final veneering)**
  Indications: **Ant./Post. Crowns, partial crowns, inlays/onlays, veneers (0.4mm) and occlusal veneers, and 3u anterior bridges**
  Conventional cement, or adhesively bonded (preferred) with silane or universal primer and a DC resin cement. All veneers must be adhesively cemented using a LC resin cement. (Note: Preparations must have adequate retention/resistance form if conventional cement is used.)

- ✓ **IPS e.max Press (LT, MO, HT (high translucency) lithium disilicate material.**
  Indications: **Anterior and posterior full and partial coverage crowns; bridges for the anterior and premolar region and implant superstructures; minimally invasive inlays and onlays (1.0 mm min.) and thin esthetic veneers (0.3 mm)**
  Conventional cement, or adhesively bonded (preferred) with silane or universal primer and a DC resin cement. All veneers must be adhesively cemented using a LC resin cement. (Note: Preparations must have adequate retention/resistance form if conventional cement is used.)
  IPS e.max Press HT is an example of one system that allows laboratory technicians to create minimally invasive veneers pressed (at 0.3mm-.5mm), expanding the indications to include inlays/onlays.

  (**A special note on *fluorapatite glass ceramic.* Only one option in this category called IPS d.Sign (Ivoclar Vivadent) This highly esthetic layering porcelain for PFMs features low wear of opposing natural dentition.)**

Polycrystalline Ceramics (Metal Oxide Ceramics)

1) Aluminum oxide

- ✓ **Hand painted slip that is sintered and glass infiltrated Vita In-Ceram Alumina [Vident])**
- ✓ **Electrolayered, sintered, glass infiltrated (WolCeram Alumina [Vident])**
- ✓ **CAD/CAM (Procera Alumina [Nobel Biocare])**
  Indications: **Crowns, 3u anterior bridges (watch manufacturer minimum dimension requirements)**
  Cementation: **No silane; universal primer OK. Conventional or DC resin cements.**
  (An additional and now *rarely used* subcategory: alumina magnesia (Vita Inceram Spinell [Vident] and Wolceram [EP] Spinell [Vident])

2) **Zirconium oxide (often referred to as zirconia)** *Layered and monolithic restorations available.*

- ✓ **Hand-painted slip that is sintered and glass-infiltrated (In-Ceram Zirconia [Vident])**
- ✓ **Electrolayered, sintered, glass-infiltrated (WolCeram Zirconia [Vident])**
- ✓ **CAD/CAM Yttrium-stabilized (Y-TZP) (Examples include: Lava and Lava Plus [3M]; IPS e.max ZirCAD [Ivoclar Vivadent] ; Cercon (Dentsply Sirona); Zenostar [Ivoclar Vivadent])**

Indications: **Clinical indications vary by material/brand/manufacturer.**
Cementation: Conventional or adhesive cementation. No silane required. With resin cements, internal surface application of a zirconia primer (Z-Prime Plus [Bisco]) or a universal primer (such as Monobond Plus [Ivoclar Vivadent]); or can use universal adhesives as a primer.

Hybrid Ceramics (zirconia-reinforced lithium silicate [ZLS])

Celtra Duo and Celtra Press (Dentsply Sirona); Obsidian (Glidewell Labs); Suprinity PC (Vita)

Polymer Ceramics (or Ceramic/Polymers or also referred to as Nano Ceramics)

Lava Ultimate (3M) block introduced in 2012. Enamic (Vident) introduced in 2013; Cerasmart (GC America) in 2014. (*Caution!* Indications vary between these brands within this category of materials

Relative Strengths of Non-Metal Coping/Monolithic Systems

(Listed in order of lowest to highest relative strength)

Pressed leucite-reinforced coping systems (150+ MPa) **(IPS Empress, IPS Empress Esthetic, Authentic, OPC, Cerpress, Finesse Pressable)**

Polymer ceramics (Ceramic/Polymer) (230+ MPa) **(Lava Ultimate (3M), Enamic (Vita), CeraSmart (GC)**

Alumina-magnesia coping systems (350 MPa) **(In-Ceram Spinell, WolCeram Spinell. Note: WolCeram is reportedly stronger due the electrolayering process and a longer sintering time.**

Monolithic lithium disilicate systems (500+ MPa) **(IPS e.max [Ivoclar Vivadent]**

Aluminum oxide hand-painted slip coping system (500+ MPa) (In-Ceram Alumina, WolCeram Alumina) Note: WolCeram is reportedly stronger due the electrolayering process and a longer sintering time.

CAD/CAM Aluminum oxide coping systems (600+ MPa) **(Procera AllCeram, CEREC inLab Alumina)**

Zirconium dioxide hand-painted slip coping systems (700 MPa) **(In-Ceram Zirconia, WolCeram Zirconia) Note: WolCeram is reportedly stronger due the electrolayering process and a longer sintering time.**

CAD/CAM Zirconium dioxide coping and monolithic/monolithic HT systems (550-1400+ MPa) **(Cercon, Procera Zirconia, e.max ZirCAD, Lava,; CEREC inLab Zirconia: Monolithic ZR (such as Lava Plus, Lava Esthetic, Zenotech, Pearl, BruxZir, Opalite, Crystal, etc.).**

Ability of Various Materials to Block-Out Undesirable Stump Shades/Metal

(Listed in order from most translucent to most opaque, with some examples. Note; Varying thicknesses of the materials listed below will have an impact on relative translucency/opacity and thus the ability to transmit/block-out underlying desirable/undesirable shades/materials.)

High translucency (These should never be used over dark stumps or metal.)

- **Pressed leucite-reinforced ceramic coping systems (IPS Empress Esthetic [Ivoclar Vivadent], Authentic [American Dental Supply], Cerpress SL [Leach and Dillon], Finesse Pressable [Dentsply Sirona])**
  (Caution: Highly opaque ingots, when available, can decrease overall vitality)
- **Alumina-magnesia coping systems (In-Ceram Spinell [VITA], WolCeram Spinell)**
- **IPS e.max HT (high translucency) lithium disilicate material (for thin veneers)**

  (Although more opaque than the above copings, use caution if attempting to cover darker or adjacent and inconsistently dark stump shades.)
- **Pressed lithium disilicate coping systems (IPS e.max Press [Ivoclar Vivadent])**

Moderate Translucency- Moderate Opacity (Black stumps and metal core/implant abutments may be blocked-out significantly, but lower value may still result.)

- **Polymer Ceramic (Lava Ultimate [3M])**
- **Pressed leucite-reinforced coping systems that include higher opacity ingots (e.max Press MO [Ivoclar Vivadent], Authentic [American Dental Supply])**
- **CAD/CAM lithium disilicate (IPS e.max CAD MO [Ivoclar Vivadent])**
- **HT anterior zirconia dioxide (differing degrees of translucency/various formulations)**
- **CAD/CAM aluminum oxide systems (Procera [Nobel Biocare], Alumina [VITA], WolCeram Alumina)**

Minimal Translucency-High Opacity (These materials can cover selected dark stump shades/metal.)

- **CAD/CAM zirconium oxide and yttrium stabilized zirconium oxide coping systems (Lava [3M], Procera Zirconia [Nobel Biocare], Cercon [Dentsply Sirona], Zirconia [VITA], WolCeram Zirconia, e.max ZirCAD)**
- **Hand-painted aluminum oxide coping systems (In-Ceram Alumina [Vident])**
- **Hand-painted zirconium oxide coping systems (In-Ceram Zirconia [Vident])**
- **Selected CAD lithium disilicate (e.max CAD LT [Low Translucency], IPS e.max Press LT)**
- **Monolithic zirconium oxide (depending on thickness, can be complete opacity)**

Complete opacity (Complete block-out if metal copings extend to cover the entire margin)

- **Pressed-To-Metal (PTM) systems (Authentic pressed-to-metal (American Dental Supply)**
- **PFM systems (HNOB, NOB, BM, Titanium, Platinum-palladium/high gold hybrid: Captek)**

When in doubt, it is best to consult with your dental laboratory team before you begin any preparations to see which system is best suited for the specific aesthetic/functional parameters at hand. Photos are *always* valuable for use in any team decisions. If you are prescribing an all-ceramic restoration, consider taking a stump shade and stump shade photo in addition to your regular shade and shade photo.

Product	Empress Esthetic	IPS e.max	Captek	PFM	Procera	Lava, Lava Plus, Lava Esthetic	Premise Indirect (belleGlassNG)
Ideal Applications	When aesthetics is the primary objective *Not indicated in cases with occlusal disease*	When aesthetics is the primary objective *Not indicated when occlusal disease* ***(monolithic LD?)***	An aesthetic (high gold) porcelain fused to 'composite' metal *Not indicated in cases with significant occlusal disease*	Traditional *PFM's* ***Gold and PFMs are indicated in cases with dynamic occlusal disease***	Aesthetically masks most (not all) dark underlying tooth shades *Not indicated in cases with occlusal disease*	When aesthetics *and* strength are necessary *(Indications vary by brand name. See manufacturer information.)*	When posterior aesthetics is the primary objective *Not indicated in cases with occlusal disease*
Primary Applications	Veneers, crowns, inlays and onlays	Single crowns & 3 unit bridges, most distal abutment 2nd bicuspid	*Single crowns *3 Unit bridges	Single crowns through long span bridges	Single crowns, bridges (ZO)	*(Applications vary by brand name. See manufacturer information)*	*Posterior inlays, onlays, veneers
Preparation Requirements	*Modified shoulder *(1.0mm min. at the margin); *1.5 (minimum)-2.0mm incisal/occlusal reduction; 1.0-1.5mm axial reduction *(Note: All products listed on this chart require rounded internal line angles.)*	Chamfer *(0.3 mm min. at the margin); *1.0 minimum incisal/occlusal .3 (min)-.5mm veneer;1.0 axial reduction	*Chamfer margin is preferred *(.8mm min. at the margin); 1.5-2.0mm incisal/occlusal reduction; 1.0-1.5mm axial wall reduction	*Any margin design *Traditional 1.5-1.7mm axial wall reduction; *1.5-2.0mm incisal/occlusal reduction	*Chamfer or modified shoulder design *(1.0mm min. at the margin) 1.5 minimum incisal/occlusal reduction 1.5-1.8mm axial reduction	Chamfer margin 0.5mm min Lava monolithic occlusal reduction *(See manufacturer prep guides for various brands)*	*Modified shoulder or chamfer *(1.0mm min. at the margin); *1.5 mm reduction incisal/occlusal .0.8-1.0mm Chamfer design when used with Captek or as laminates
Cementation Guidelines	Only adhesive cementation (Silane or universal primer)	Adhesive cementation (preferred) *or* conventional (Silane or universal primer)	Conventional cementation	Conventional cementation	Conventional or adhesive cementation (No silane)	Conventional or adhesive cementation (No silane)	Adhesive cementation only (Silane or universal primer)
Flexural Strength	150 Mpa *(All FS listed on this chart is before seating)*	500+ Mpa	1000+ Mpa	1200-1400 Mpa	600+ Mpa (AO) 1100Mpa (ZO)	700+-1400+ Mpa	150 Mpa (200+ Mpa Cristobal +)
Enamel Wear	Comparable to natural enamel	Comparable to natural enamel	Depends on layering porcelain	Depends on layering porcelain	Comparable to natural enamel	Comparable to natural enamel	Comparable to natural enamel
Restoration Composition	Leucite-reinforced core *pressed* (Stained *or* layered porcelain technique) CAD/CAM	Lithium disilicate *Pressed* and stained or layered porcelain; CAD/CAM	88% composite gold (22k) coping with layered fluorapatite porcelain	HNOB White or yellow gold with layered fluorapatite porcelain	Aluminum oxide or zirconium core with layered porcelain	Zirconium oxide CAD/CAM cores with layered porcelain	Barium Borosilicate (74%) Bis-GMA (26%) Layering techniques in-lab
Years of Clinical Use	28+ yrs.	22+ yrs. (LD) e.max 13 yrs.	27+ yrs.	57+ yrs.	27+ yrs. (AO) 18 yrs. (ZO)	L 17 yrs.; LP 5 yrs.; LE 1 yr.	17+ yrs. (NG) 22+ yrs. (bG)

Factors Affecting Restoration Selection

Dr. John C Cranham

(Note: This text is included in this handout with verbal permission from Dr. John Cranham. The original article can be found at sundentallabs.com/wolceram.aspx)

Choose the material that's right for your patient

Perhaps nothing is more confusing than sifting through the myriad of esthetic materials to choose the right product for any given situation. As practitioners, we tend to get comfortable with one or two materials, and then make our patients fit the material. But that is not the best way to practice dentistry.

Know your options

A much wiser method is to spend time studying the advantages of as many materials as possible so you can consistently choose the right material to meet the demands of each individual patient. The purpose of this selection guide is to provide you with pertinent information necessary to assist you when considering the optimum treatment plan for your patients.

Material Selection Criteria

There are at least six factors to consider when choosing a restorative material. Let's look at each factor briefly.

1. Aesthetic Risk

Typically, 1.0-3.0 mm of maxillary incisal tooth structure shows at rest in a youthful smile. From this position, if the patient has a high esthetic demand and shows a great deal of tooth structure (more than 7 mm of lip hypermobility when smiling), choose a material that is as cosmetic as possible.1 If the patient is not as driven by esthetics and the teeth are not too visible, it is more sensible to choose a more durable material - even though there may be a slight esthetic compromise.

Another consideration is whether the underlying color of the anterior teeth needs to be blocked or if the color is to be visible through the restoration. A material should be used with enough translucency to allow the natural color to shine through, or enough opacity to block out unaesthetic underlying chroma.

2. Occlusal Risk

When working up the patient's case, make sure to note any evidence of intra-articulator TMJ signs or symptoms, occlusal-muscle disorders, masticatory muscle soreness or fatigue (tension headaches), tooth wear, tooth mobility without periodontal breakdown, or tooth migration. These issues should be considered indicative of a high occlusal risk patient.2 Aesthetic restorations may still be an option, but extra attention to detail is essential to develop an occlusal scheme that ensures a harmonious stomatognathic system - minimizing stress on the restoration.

3. Quantity of Remaining Enamel

One of the best reasons to preserve tooth structure during an adhesive procedure is to conserve a maximal amount of remaining enamel, since the crystalline structure of enamel is far less variable than dentin. Recent reviews of porcelain veneers during the past ten years suggest that, of the restorations that failed (4%), six of seven were only partially bonded to dentin.3 While the success rate shows the wonderful results of porcelain veneers, it also indicates a need to preserve as much enamel as possible.

4. Quantity and Quality of Remaining Dentin

Recent studies also look at how bonding to sclerotic and carious dentin can affect bond strength.4,5 While predictable bonding success is hard enough to obtain inside the mouth, it seems that bond strengths may also vary depending on the kind of dentin that exists. A good rule of thumb is to consider a traditional cemented restoration if areas of discolored dentin are present that lack sensitivity to cold water, air blast or to preparation without anesthesia. This evidence may indicate that the wet collagen network within the dentin has been significantly altered, affecting the necessary optimum bond strengths.

5. Ability to Maintain 100% Isolation

If 100% isolation cannot be obtained during an adhesive procedure, failure is imminent.6 Deep subgingival restorations, patients with limited openings (TMJ), or any area that is impossible to isolate are pure examples of clinical situations where traditionally cemented restorations may be indicated.

6. Desire for Maximum Tooth Conservation

Generally, it is recommended to only remove the amount of tooth structure necessary to maximize aesthetics, obtain the necessary retention and resistance form, and preserve remaining tooth structure.

References

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3. Dumfahrt H, Schaffer H: Porcelain laminate veneers, a retrospective evaluation after 1 to 10 years of service: Part II: Clinical results. Int J Prothodont 13(I):9-I 8, 2000.
4. Yoshiyama M, Urayama A, Kimoch T, et al: Comparison of conventional vs self-etching adhesive bonds to caries-affected dentin. Oper Dent 25 (3): 163-169, 2000.
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All-Ceramic Preparation Tips

Glass Ceramic and High-Stength Polycrystalline (metal oxide) Ceramic Full-Coverage Crowns

- ✓ **Create a uniform and distinct *360° chamfer margin* with a tapered round-ended 856-diamond bur of appropriate size for the tooth being prepared and the material chosen. The most commonly used sizes are: -014 for very small teeth, -016 for most anterior teeth, and -018 for most posterior teeth.**

Note: With certain materials and/or clinical situations, a uniform 360° modified shoulder (1-1.2mm) prepared using an 846KR-016 diamond bur may be indicated. Either chamfer or modified shoulders are appropriate for high-strength ceramics (a chamfer margin is more conservative). For example, modified (rounded internal line angle) shoulders are recommended when using pressed leucite-reinforced ceramics (such as Empress Esthetic). Before beginning your preparation(s), check with your dental lab team and/or secure an appropriate manufacturer preparation guide.

- ✓ ***Amount of circumferential axial reduction*** **(as a rule with a 7 (ideal) degree to 10 (max) degree taper) depending on material/clinical situation (*see manufacturer prep guides*). Supragingival margin; no more than 0.2- 0.3 mm below gingival crest, whenever possible.**

- ✓ **Remember to prepare all teeth utilizing *multi-plane anatomic reduction* design for the creation of a restoration with natural anatomic form and optimal aesthetics**

- ✓ **As with PFMs, 1.5 mm posterior (occlusal) reduction is ideal for aesthetics and function for most all-ceramic restorations, but there are certain exceptions to this general rule. Layered and monolithic lithium disilicate at 1.5 mm (min) and 1.0 mm (min) respectively; layered Zr at 1.5 mm posterior reduction. For monolithic (non-layered) ZR, occlusal reduction should be minimally invasive at 0.8 mm (to 1.25 mm maximum) in anterior teeth (*using a translucent Zr*) and 0.5 mm (min) (*to1.0mm maximum*) in posterior teeth (using a standard Zr). All occlusal and lingual reduction should be uniform and anatomic in design! *Please check the manufacturer prep guide and/or consult your dental laboratory team before preparing.***

- ✓ **Minimal axial-wall height (of the finished prep) should be 3-4mm (resistance form)**

- ✓ **Incisal reduction depends upon the material chosen and the clinical situation. If existing wear, minimal-to-no reduction, depending on the final restored length of the tooth desired.**

- ✓ **Use a 379 (in most cases a 021-023 size) football diamond bur to create a concave surface for optimal functional harmony**

- ✓ ***Rounded line angles*** **when preparing for any all-ceramic material**

- ✓ **Avoid the use of proximal boxes or grooves (no longer needed with most adhesive cementation techniques used now)**

- ✓ **Aesthetic and/or functional cores (as well as compomer, resin ionomer or composite resin block-out), should be placed chairside during the preparation appointment, prior to the final impression to idealize the thickness of the material chosen according to manufacturer recommendations**

1. All-ceramic modified shoulder burs for IPS Empress Esthetic (Ivoclar Vivadent): 846 KR, 847KR, M839-014, M839-016, 379-023. These burs are also appropriate to develop porcelain butt joint margins in aesthetic zones for PFM restorations.
2. All-ceramic chamfer burs for lithium disilicate (such as e.max Press and e.max CAD (Ivoclar Vivadent); aluminum oxide systems like Procera (Nobel Biocare) and zirconium oxide systems such as Lava or Lava Plus (3M ESPE), inVizion (Vita), e.max ZirCAD or Zenostar (Ivoclar Vivadent), monolithic zirconia or PFM show-no-metal restorations: 856 (-014, -016,-018),
3. Lingual reduction burs: 379 (-018, -023)
4. Axial Reduction Logic Set (0.6mm, 1.0mm, 1.5mm, 2.0mm) (LS-7544 Axis Dental Corp)

Note: Example bur numbers shown above are Axis brand, but all these (or similar) burs should be readily available from other quality bur manufacturers such as Premier, SS White, Komet, etc. Bur manufacturers often use different numbering systems so check with your own sales representative to translate the bur numbers listed above, if desired.

Before preparing teeth for the use of any material that you are unfamiliar with, it is always recommended that you obtain the latest preparation guide(s) prepared by the manufacturer for the material(s) chosen.

Basic All-Ceramic Cementation Steps

A Brief Synopsis

Dr. Damon Adams

2-2-2 Technique using a "localized" rinse approach
A chlorhexidine solution (such as Peridex [3M ESPE] or alcohol-free Paroex [GUM]) is used 2x daily pre-op for 2 weeks (1week minimum) in the to-be-prepped area(s) to get the gingiva optimally healthy; then, the 2x daily rinses are continued through the provisional stage (usually about 2 weeks depending on lab/doctor) and continued for 2 weeks after the restoration is seated (or until the post-op restorative check visit with the hygienist and doctor). A post-op appointment is made to: re-examine the occlusion, check for any residual excess cement and remove it, and to evaluate there are any other post-op findings that might need immediate attention (sensitivity, etc.).

Basic steps for *resin* cementation (basic steps for zirconia and for all other all-ceramic materials):

1. Remove the provisional and clean the prep with plain flour pumice/distilled water "paste" *or* commercially prepared cleaning pastes such as Consepis Scrub (Ultradent Products); Preppies or Preppies Plus with CHX (Whipmix), Go-CHx Gel (Taub), etc.
2. Try-in the final restoration
3. Apply universal cleaner (Ivoclean [Ivoclar Vivadent]) is applied to the internal surfaces of restoration (*as directed*) and then rinsed and dried with oil-free air (Ivoclean is suitable for *all* dental materials.)
4. Universal surface primer (Monobond Plus [Ivoclar Vivadent]) is then applied (*as directed)* on the internal aspect of the restoration, then dried with oil-free air.
5. Bonding adhesive on tooth (if this is a required step for the brand of resin cement being used per the manufacturer); light cure or not, depending on system [see below] and type of restoration. (Do *not* light cure adhesive on the tooth at this step with veneers!)
6. Apply resin cement; seat and cure (*as directed*).

If *adequate resistance and retention form (as defined in this lecture and the literature)* exists, and a conventional/traditional (non-resin) cementation technique is desired *and* indicated: choices include glass ionomer or an RMGI cement for lithium disilicate (such as IPS e.max [Ivoclar Vivadent]); aluminum oxide (such as Procera [Nobel Biocare); full contour zirconia/layered zirconia restorations (such as Lava/Lava Plus [3M], BruxZir/BruxZir Anterior (Glidewell Labs], ZirLux [Henry Schein], etc.); following the basic steps as outlined below:

1. Remove the provisional and clean the prep with plain flour pumice/distilled water "paste" *or* Consepsis Scrub (Ultradent Products) *(preferred by the author)*
2. Try-in the final restoration
3. Universal cleaner (Ivoclean) applied *as directed* on internal surfaces of restoration and rinsed/dried (this universal cleaner is suitable for *all* dental materials) (*See note below if using an RMGI*)
4. Apply conventional cement into restoration and seat *as directed*.

Note: The same 4 steps above apply for metal-based restorations (gold and PFMs) as well. The recently introduced bioactive/biointegrating cements (such as Activa [Pulpdent] and Ceramir Crown and Bridge [Doxa]) (indicated for high-strength polycrystalline ceramics, PFM, and gold) would also follow these same 4 basic cementation steps.
Some recent studies have shown that sliane (and universal primers, such as Monobond Plus, that contain a silane group) enhance the strength of the cement bond with RMGI cements. Adding a universal primer when using an RMGI to lithium disilicate, aluminum oxide and zirconium oxide is, therefore, an optional step that can be done. (Note: Ivoclean is optional, and Monobond Plus [universal or other primers for LD or Zr] or silane is not indicated if using Active [Pulpdent] or Ceramir (Doxa).