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Clinical Case Report

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Streamlining Indirect Restorations with a Solventum Indirect Workflow

(Solventum)

Introduction

Dentistry has always been driven by the pursuit of predictable, long-term restorative success. Historically, indirect restorations relied heavily on resistance and retention form, allowing traditional luting cements to perform reliably. In modern dentistry, however, adhesion has become one of the fundamental cornerstones of restorative success.

We rely on adhesion in both direct and indirect restorations to provide durable, long-lasting solutions for our patients. Poor adhesion negatively affects not only clinical outcomes and patient satisfaction but also the reputation and profitability of a practice.

Early in my career, clinicians often managed large and complex bonding armamentariums to accommodate different restorative materials and bonding protocols. This complexity became even more challenging as adhesive generations rapidly evolved alongside emerging scientific evidence. The ideal for many clinicians was simple: one adhesive and one cement that could reliably address nearly every clinical challenge.

Complicating matters further, today's most common indirect restorative materials such as zirconia and lithium disilicate require fundamentally different bonding strategies. Although these materials may appear similar clinically, they must be treated differently to achieve optimal adhesion and long-term success.

Description

3M™ Scotchbond™ Universal Plus Adhesive and ***3M™ RelyX™ Universal Resin Cement*** are the perfect combination that allows for simplicity in the complex world of indirect restorative adhesion. ***Scotchbond Universal Plus Adhesive*** is a versatile adhesive that meets the bonding demands of direct dentistry while also providing the chemistry necessary for predictable bonding to modern indirect materials. ***Scotchbond Universal Plus Adhesive*** can be used in self-etch, total-etch, and selective enamel etch strategies. It has been studied to be moisture-tolerant and capable of bonding to sclerotic dentin. It contains MDP, Silane, HEMA, and a dual-cure activator, eliminating the need for a separate activator when using self-cure materials. In addition, it shows up well radiographically and has an established high bond strength. Collectively, these properties make it a true one-bottle dental adhesion solution.

RelyX Universal Resin Cement brings simplicity and durability to indirect restoration cementation. The auto mix syringe has a micro mixing tip that opens the product when applied and closes when removed. Additionally, there are elongation tips for post cementation. The micro mixing tip reduces excess waste with an easy extrusion force. You can use ***RelyX Universal Resin Cement*** in self-etch mode as well as combined with ***Scotchbond Universal Plus Adhesive*** in selective or total-etch mode. These decisions are often determined by the resistance and retention form of the preparation. If you prefer efficiency, you can tack cure for 2 seconds, clean up, then polymerize for 10 seconds for occlusal surfaces, and 10 additional seconds for any other surfaces.. Another option is utilizing the 2-minute working time to clean up prior to the 6-minute full self-polymerization. The viscosity of ***RelyX Universal Resin Cement*** makes it easy to clean up and provides established superior results.

The combination of ***Scotchbond Universal Plus Adhesive*** and ***RelyX Universal Resin Cement*** allows for simplified armamentarium without sacrificing results. I have been using both products since their inception, and I have established successful protocols for their use to simplify the team's workflow and reduce unwanted stress levels. Personally, I combine ***Scotchbond Universal Plus Adhesive*** with ***RelyX Universal Resin Cement*** to provide optimal adhesion and simplify our workflows with consistency across all cementation.

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Clinical Protocols

Zirconia Crown

1. Try in restoration
2. Clean the tooth
3. Air abrade intaglio of crown
4. Clean with ethyl alcohol
5. Apply ***Scotchbond Universal Plus Adhesive*** to crown and tooth
6. Thin adhesive
7. Cement with ***RelyX Universal Resin Cement***
8. Clean up cement/check occlusion

Lithium Disilicate Crown

1. Try in restoration
2. Clean the tooth
3. HF etch
4. Rinse/dry
5. Clean with Ethyl Alcohol
6. Apply ***Scotchbond Universal Plus Adhesive*** to crown and tooth
7. Thin adhesive
8. Cement with ***RelyX Universal Resin Cement***

Case Presentation 1:

This patient is a 72-year-old male. 17 years ago, I restored his maxillary teeth with lithium disilicate restorations. Recently he reported with the crown on tooth #13 having a fractured lingual cusp. We decided to replace the crown with zirconia, primarily because of its superior strength and fracture resistance.

At the cementation appointment, the zirconia crown was tried in the mouth to verify interproximal contacts and marginal adaptation. Once the fit was confirmed, the crown was removed. The tooth preparation was air-abraded chairside using 50-micron aluminum oxide to clean and condition the bonding surface.

In my laboratory, I inspected the intaglio surface of the crown and air-abraded it for 10 seconds using 50-micron aluminum oxide at 2 bar (30 psi). I then applied sodium hypochlorite to the intaglio for 30 seconds, followed by a 30-second rinse.

Back in the operatory, I cleaned the intaglio with alcohol and thoroughly dried it before applying ***Scotchbond Universal Plus Adhesive*** to the internal surface of the crown. I air-thinned the adhesive to volatilize any remaining solvent and covered the restoration to prevent inadvertent polymerization. The adhesive was left uncured, as ***RelyX Universal Resin Cement*** activates self-curing of the adhesive during cementation.

At the tooth surface, I selectively etched any exposed enamel margins with phosphoric acid for 15 seconds. After rinsing, I applied ***Scotchbond Universal Plus Adhesive*** to all prepared surfaces that would be covered by the crown. Again, I ensured complete solvent evaporation by drying with moisture-free air until the adhesive no longer moved.

Fig. 1: The tissue should be healthy and residual provisional cement removed.

Fig.2: Zirconia crown is tried in to verify interproximal contacts and marginal fit.

Fig. 3: The tooth is air abraded with 50 micron aluminum oxide to decontaminate and clean the tooth.

Fig. 4: Glaze is often seen on the intaglio of crowns. Air abrasion easily removes this.

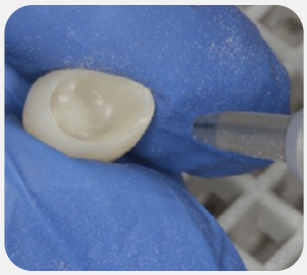

Fig. 5: 50 micron aluminum oxide at 2 bar (30psi) is used to decontaminate the crown from intraoral try-in as well as remove glaze.

Fig. 6: The crown now is optimally prepared for proper bonding. An optional step is the application of a zirconia primer but care must be taken to follow the recommendation for wash time.

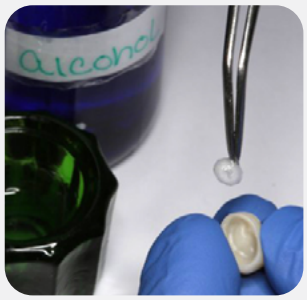

Fig. 7: In the operatory the crown is cleaned with Ethyl alcohol.

Fig. 8: The intaglio is painted with ***Scotchbond Universal Plus Adhesive*** and air thinned. Polymerization is not necessary as ***RelyX Universal Resin Cement*** can self-cure the adhesive. The crown should be shielded from ambient light until insertion.

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My dental assistant then loaded the crown with ***RelyX Universal Resin Cement***, and I seated it on the preparation, using a cotton roll to maintain firm pressure. I tack-cured the facial surface for two seconds, followed by curing in the same fashion on the lingual surface. This provided adequate working time to remove accessible excess cement and clean the interproximal surfaces before complete polymerization.

I use floss tied with a knot to effectively dislodge interproximal cement. Once all excess cement was removed, I fully polymerized the facial, occlusal, and lingual surfaces. An alternative approach is to allow complete self-cure, which requires approximately six minutes.

After polymerization, occlusion was checked, and interproximal contacts were verified.

Fig. 9: If enamel is exposed at the margin, phosphoric acid can be used and washed to etch enamel. If no enamel is exposed, or after etching, ***Scotchbond Universal Plus Adhesive*** is applied to the tooth for 15 seconds and air thinned to volatilize the solvent. Curing not necessary.

Fig. 10: ***RelyX Universal Resin Cement*** is loaded into the crown circumferentially around the periphery. The micro tip creates less waste and easy access.

Fig. 11: The crown is put into place, initially manually, but then under compression with a cotton roll. Excess cement should be seen around the margins. A 2-second tack cure allows for easier cleanup.

Fig. 12: After initial cleanup, the crown is polymerized for 20 seconds on each of the facial, occlusal, and lingual surfaces.

Fig. 13: Occlusion is checked, contacts verified, and the finished result is an optimally adhered crown ready for years of service..

Case Presentation 2:

This patient is a 61-year-old female who has had an alloy restoration in her maxillary left second premolar since the early 1980's. Earlier in life, this patient underwent premolar extraction during orthodontic treatment to camouflage her Class II malocclusion. She now presented with a long-standing alloy restoration exhibiting cracking and marginal breakdown. We advised a proactive approach, as she was already missing a premolar in that quadrant.

After removal of the amalgam restoration, we determined that a lithium disilicate crown would provide the optimal restorative outcome. ***Scotchbond Universal Plus Adhesive*** and ***3M™ Filtek™ Supreme Flowable Restorative*** were used to rebuild the deficient tooth structure following coronal preparation. The lithium disilicate restoration was then bonded using ***Scotchbond Universal Plus Adhesive*** and ***RelyX Universal Resin Cement*** to provide structural reinforcement and improve the chances for long-term stability.

Standardizing our cementation protocol has allowed us to create an efficient workflow while maintaining optimal adhesion.

Fig. 1: Older amalgam filling and mesial fracture along with wear facets on the inner inclines of both cusps give cause for concern.

Fig.2: Restoration removed. Cracking evident down the mesial axial wall and evidence of microleakage along the amalgam. Extension into the mesial marginal ridge was needed to determine the extent of damage.

Fig. 3: After initial preparation, the tooth required a buildup to restore lost structure. Air particle abrasion was used to clean the surface.

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Fig. 4: ***Scotchbond Universal Plus Adhesive*** and ***Filtek Supreme Flowable Restorative*** were used to replace missing tooth structure. This allows me to use the same bonding agent I will use in cementation.

Fig. 5: Optimally fitting provisionals provide better tissue condition at cementation.

Fig. 6: Optimal tissue conditions simplify cementation protocols. Upon provisional removal we can see healthy tissue.

Fig. 7: The new crown is tried in to verify marginal and interproximal fit.

Fig. 8: Intraoral air abrasion is a great way to clean and decontaminate the surface of the tooth.

Fig. 9: Hydrofluoric Acid Etch is applied in my lab for 20 seconds then thoroughly washed.

Fig. 10: The etched surface should be clean and dull without the presence of a white precipitate.

Fig. 11: Ethyl alcohol is used to clean the intaglio of the crown before priming.

Fig. 12: ***Scotchbond Universal Plus Adhesive*** is applied to the intaglio of the crown and air thinned to volatilize all the solvent. Care is taken to shield it from light until cementation. The tooth is also primed with ***Scotchbond Universal Plus Adhesive***. Phosphoric acid can be used on exposed enamel. ***Scotchbond Universal Plus Adhesive*** doesn't need polymerization as ***RelyX Universal Resin Cement*** self-cures the adhesive.

Fig. 13: The crown is loaded with ***RelyX Universal Resin Cement*** around the periphery of the intaglio and seated first by hand and subsequently with cotton roll compression. Tack curing allows for easy clean up.

Fig. 14: The finished product is cleaned, polymerized, and occlusion checked. This protocol allows for optimal adhesion whether the preparation is retentive or not.

Conclusion

The promise of technological advancement in dentistry is to improve clinical outcomes while simplifying workflows. Throughout my career, I have experienced innovations that have meaningfully enhanced both efficiency and predictability, giving me confidence in achieving high-quality results using a single bonding agent and a single cement for nearly all indications in my practice. ***Scotchbond Universal Plus*** is a revolutionary adhesive that enables a wide range of applications in a single-bottle system without the need for dual-cure activators. It is formulated to address the diverse clinical situations encountered in daily practice. ***RelyX Universal*** is an ideal complementary cement that functions effectively as a standalone adhesive resin cement or in seamless combination with ***Scotchbond Universal Plus***. Its self-sealing microtip minimizes waste, thereby maximizing efficiency and value. I have used this combination in my practice for years with predictable success and enduring confidence.

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