

Scientific Update

RelyX™ Unicem Self-Adhesive Universal Resin Cement

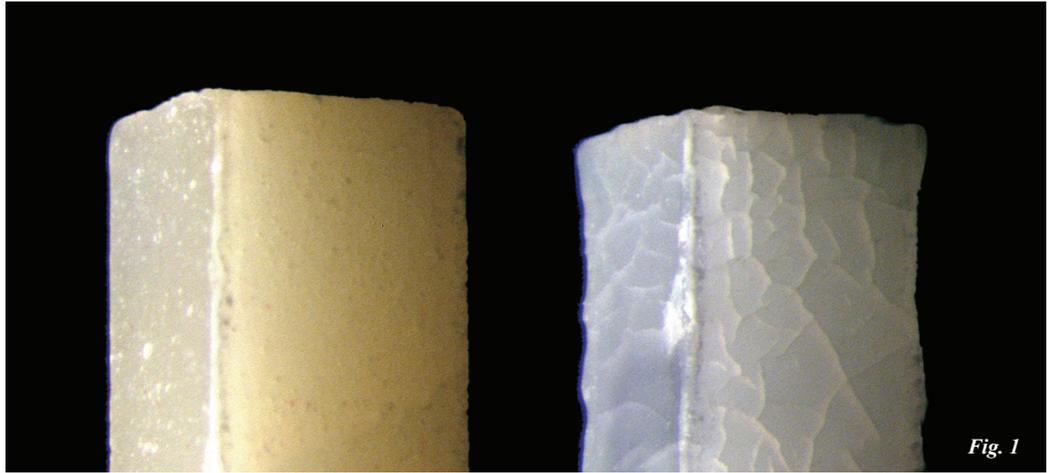


Fig. 1

Figure 1 Results of a water immersion test (36° C for 1 year) comparing RelyX™ Unicem Cement (left) with Maxcem™ (right). While RelyX Unicem cement remains intact after a lengthy exposure to water, the competing material exhibits cracking.

Source: 3M ESPE internal data.

Which would you choose?

Tests can show great potential for a product's long-term stability, or they can expose the cracks in its armor. In this case, those cracks signify potential failure for a competing cement (Fig. 1, Maxcem™, right), while RelyX Unicem cement (Fig. 1, left) continues to demonstrate its outstanding potential for long-term stability. Both materials shown have been subjected to water immersion testing, designed to mimic the moist conditions of the oral environment. Both cements were mixed according to manufacturer's instructions and placed in water. The cement on the right shows obvious cracking, while the cement on the left, RelyX Unicem, is intact. Unlike other luting agents, RelyX Unicem cement has a unique chemical structure that raises its pH to a neutral level of 7 quickly after application. Neutralization contributes to the material becoming hydrophobic, meaning it is better able to resist water uptake. Which material would you trust?

Figure 2 Testing shows that RelyX™ Unicem Cement is unique in its rapid rise in initial pH and subsequent neutralization.

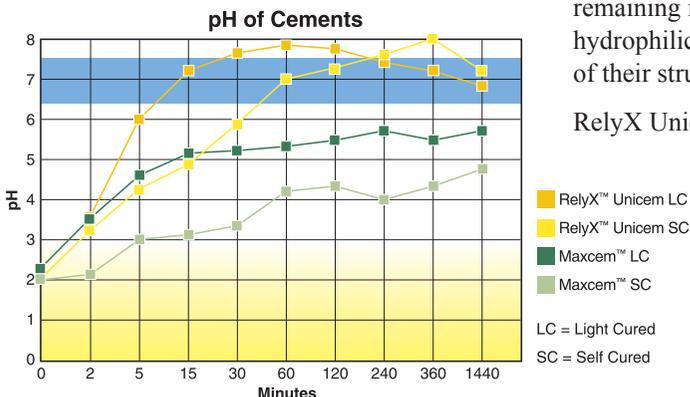
Source: Physical Characteristics of New Universal Self-etching Resin Luting Cements, E. SAKALAUŠKAITE, L. TAM, and D. McCOMB; Restorative Department, Faculty of Dentistry, University of Toronto, Toronto, Ont. Canada.

The power of seven

New resin luting agents with self-adhesive capability are being introduced with technology that eliminates the need for separate etching, priming and bonding steps. To achieve this, these materials are formulated to dispense in an acidic state, with a pH well below the neutral level of 7 (approximately pH 2). This allows them to demineralize and penetrate into the tooth. Chemical reactions in the oral environment cause the pH levels to increase as these materials cure. In most cases, however, these cements do not reach pH 7 – the critical mark of neutralization.

Neutralization is a key factor in allowing the cement to become hydrophobic, a prerequisite to remaining intact in a moist environment. Acidic materials maintain some degree of hydrophilicity, leaving them vulnerable to water uptake, expansion and degradation of their structural matrices.

RelyX Unicem cement was formulated with a completely new monomer, filler and initiator technology in order to achieve both effective self-adhesion and neutralization. Unlike other self-adhesive resin cements, RelyX Unicem cement quickly neutralizes during the curing process, helping to switch from a hydrophilic to a hydrophobic state. This unique switch allows the material to adapt to the tooth structure while hydrophilic, yet provide for ongoing dimensional stability after converting to the hydrophobic matrix.



Unique technology offers superior performance

RelyX™ Unicem Self-Adhesive Universal Resin Cement's neutral and hydrophobic end state helps to contribute to the cement's integrity and durable high bond strength.

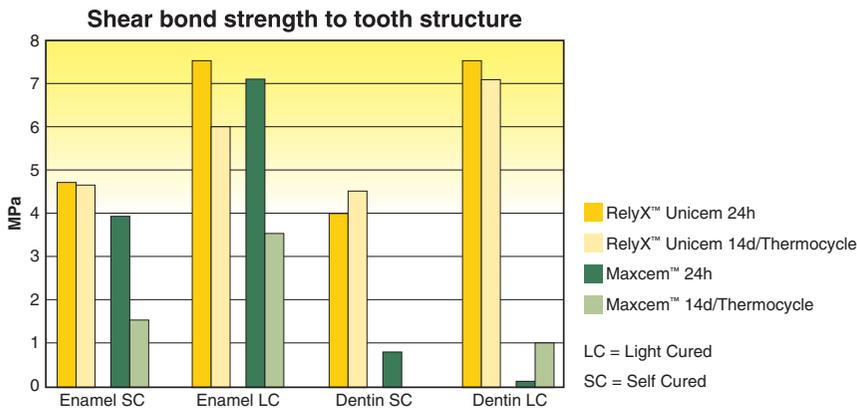


Figure 3 RelyX™ Unicem Cement's high bond strength to enamel and dentin is remarkably higher than the competition's.

RelyX Unicem cement in Clicker™ Dispenser used in testing. †

Source: Dr. A. Piwowarczyk, University of Frankfurt/Main, Germany [Submitted for Publication]

† RelyX Unicem cement in the Clicker dispenser has a bond strength equivalent to that of RelyX Unicem cement in Aplicap and Maxicap™ Capsule delivery.

The results of an independent study comparing multi-step versus self-adhesive universal resin cements, shown in figure 5, demonstrate the interfacial adaptation of partial ceramic crown restorations fabricated with a CEREC® 3 system and cemented on human teeth. Marginal adaptation was assessed by SEM before and after thermocycling/mechanical loading (TCML). This study found a markedly higher percentage of perfect margins in crowns seated with RelyX Unicem cement.

Neutralization is the key

RelyX Unicem cement's novel chemistry allows for an effective self-adhesion, while reaching a state of neutralization unmatched by the competition. The resulting resistance to moisture makes RelyX Unicem cement the ideal material for ensuring dimensional stability, high bond strengths and superior marginal quality.

Retentive strength of Lava™ Crowns on human dentin

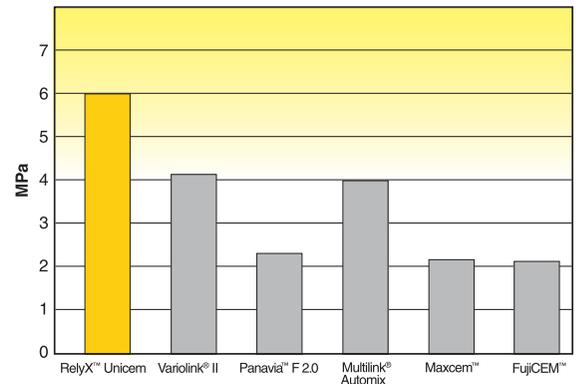


Figure 4 RelyX™ Unicem Cement holds crowns better than other competitive cements.

Aplicap™ Capsule used in testing. †

Source: Prof. Dr. C. P. Ernst, University of Mainz, Germany, AADR 2006, Orlando, #1875

Marginal integrity analysis

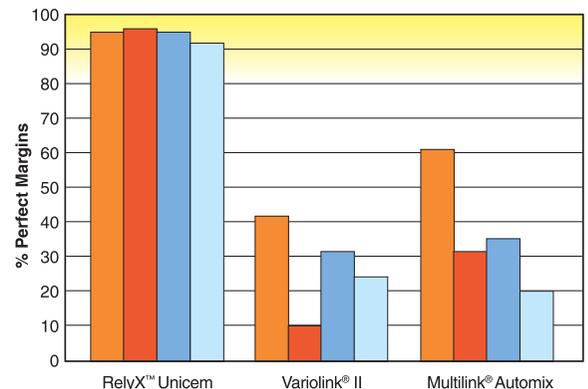


Figure 5 Achieve better marginal integrity with RelyX™ Unicem Cement.

Source: Proximal Adaptation of Partial Ceramic Crowns with Different Luting Techniques/Materials. M. FEDERLIN, K.-A. HILLER, H. REINHARD, D. FRITZSCH, and G. SCHMALZ, University of Regensburg, Germany, IADR PEF, 2006, Dublin, #0562

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