

Evaluation of Shear Bond Strength of Universal Adhesives

Abstract

Lead by Nathanial Lawson, DMD, PhD, Director of Bio-Materials at the University of Alabama at Birmingham, this study examines the shear bond strength of Clinician's Choice® MPa Universal[™] adhesive and other market leading competitors. The evaluation was conducted on extracted human molars to assess bonding efficacy across different substrates and etching modes, following the ISO 29022:2013(E) standard.

The results indicate no statistically significant differences in shear bond strengths and more consistent results with reduced variability between Clinician's Choice MPa Universal and market leading universal adhesives: 3M[™] Scotchbond[™] Universal Plus, Kerr Optibond[™] Universal, and Dentsply's Prime & Bond Active®.

Introduction

Adhesives play a crucial role in dental restorations, impacting longevity and clinical performance. This study aims to compare the shear bond strength of Clinician's Choice MPa Universal adhesive and market leading universal dental adhesives when applied to dentin and enamel substrates.

Universal Adhesives Evaluated:

- MPa Universal (Clinician's Choice)
- 3M Scotchbond Universal Plus (Solventum)
- OptiBond Universal (Kerr)
- Prime & Bond Active (Dentsply Sirona)

Restorative Material:

• Evanesce® Nano-Enhanced Universal Restorative (Clinician's Choice), packable composite

Study Design

Human extracted, caries-free molars were utilized as specimens. They were stored in water with a formaldehyde alternative for up to six months postextraction. Teeth were embedded in denture repair material, with the bonding surface created using a diamond cutting disc to expose superficial dentin. The surfaces were polished to a 320-grit finish and bonded within four hours of preparation. Specimens were treated with primer/adhesive per manufacturer instructions. The bonding process involved using an Ultradent[®] shear bond strength apparatus and curing the composite with a 3M ESPE Elipar™ S10 light. Specimens underwent 2,000 thermocycles and then were tested for shear bond strength using a universal testing machine (Instron 5565) at a crosshead speed of 1 mm/min.



Ultradent testing fixture



Instron 5565 universal testing machine

Results:

Analyzed using four one-way ANOVAs, the results revealed no significant differences among the shear bond strengths of all the adhesives tested on either dentin or enamel substrates.

- **Dentin:** No statistical significance (F = 1.209, p = 0.325)
- Enamel: No statistical significance (F = 0.770, p = 0.554)

Conclusion:

The findings show no significant differences in shear bond strength among the adhesives tested, indicating that Clinician's Choice MPa Universal performs on par with 3M Scotchbond Universal Plus, Kerr Optibond Universal, and Dentsply's Prime & Bond Active.



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