

# Research & Table Clinic Day 2020 Structured Abstract

**TITLE:** Optimizing Bond Strength of RMGI and Conventional Composite

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## **OBJECTIVES:**

The “sandwich technique” of placing resin modified glass ionomer (RMGI) as the initial restorative material increment, followed by overlaying with light-cured composite, is a common clinical procedure. This project evaluated the effects of RMGI surface abrasion as well as dentin bonding agent components on the shear bond strength (SBS) of composite to RMGI.

## **METHODS:**

Cylinders (10 mm dia, 3 mm thick) of a commercially available, light-cured resin modified glass ionomer (RMGI) (Fuji II LC, GC) were photocured (Dem iUltra, Kerr, 20s) in the wells of 3D printed holder, without any Mylar covering of the light-exposed surface, to simulate the clinical condition. The as-cured surface was then abraded (240 grit SiC, water irrigation) or not. Each surface was etched with phosphoric acid (Uni-Etch, BISCO) (20s), rinsed and dried, and then the components of a 4<sup>th</sup> generation dentin bonding agent (DBA) (Optibond FL, Kerr) were placed (either only adhesive, or with primer and then adhesive). The DBA was light-cured (Demi Ultra) for 10s. The prepared specimen was then placed in an Ultradent specimen holder, and a small cylinder (2mm x 2mm) of unpolymerized composite (Premise Body, A2, Kerr) was placed and light-cured (20s, Demi Ultra). Specimens were stored in a humidior (37°C, 24h) after which they were thermocycled 500x (5-55°C). SBS was determined in an Ultradent mini-tester. (n=10 per condition).

## **RESULTS:**

2-way ANOVA (pre-set alpha 0.05) indicated neither factor (abrasion  $p=0.057$ ; DBA components  $p=0.791$ ) nor the interaction term ( $p=0.427$ ) significantly affected SBS. Most all failures occurred cohesively within the RMGI.

## **CONCLUSIONS:**

Generally, clinicians would be advised not to surface abrade freshly placed RMGI prior to bonding resin composite, to enhance bond strength between the substrates.

## **LEARNING OBJECTIVES:**

1. To define the term “sandwich restoration” and indicate the clinical indications and advantages of this technique
2. To compare and contrast bond strengths between RMGI and composite with respect to RMGI surface abrasion and the effect of bonding agent application
3. From the results obtained, to state the preferred surface treatment of an RMGI in bonding an overlaying composite increment to optimize clinical strength between the two materials