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Bond Characteristics of Dual-Cure Self-Adhesive Resin Cements on Eroded Dentin.

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Objectives Bond characteristics of dual-cure self-adhesive resin cement to human dentin exposed to erosion have been rarely investigated. The purpose of this study was to evaluate the bond characteristics on eroded dentin of three different dual-cure resin cements using shear bond strength test and observe the ultrastructural changes on the cement-dentin interface.

Methods Sixty dentin surfaces from caries-free human teeth were collected and randomly divided in two main groups. Thirty dentin samples were exposed (two times daily for 10 minutes) to a solution of hydrochloric acid (2,5mmol/l), simulating dental erosion, for a period of 14 days, while the other thirty samples were maintained in artificial saliva. All samples were then bonded with one of three dual-cure resin cements: SpeedCem Plus (SCP), Bis-Cem (BC) and Rely-X U200 (RXU2). An immediate shear bond strength (SBS) test was undertaken and the interface of the bonded specimens was examined by Scanning Electron Microscopy and Atomic Force Microscopy.

Results The SBS test of SCP to eroded dentin exhibited the highest values, while the bond of BC and RXU2 was significantly lower ($p < 0.05$). The SBS significantly differ between eroded and non-eroded (healthy) dentin groups ($p < 0.05$), with reduced values on dentin exposed to erosion. An interdiffusion zone was observed in all groups, however, the morphology of the bonded interface had variations among the tested cements and eroded vs. non-eroded dentin samples.

Conclusions Bonding interface characteristics to both eroded and non-eroded dentin differed among the cements evaluated. SpeedCem cement provided the most reliable shear bond strength and was best able to adapt the erosion challenge.