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EFFECT OF SDF+KI AND AgF+KI ON SHEAR BOND STRENGTH

OBJECTIVES

To evaluate the effect of Silver Diamine Fluoride and Potassium Iodide (SDF+KI) and Aqueous Silver Fluoride and Potassium Iodide (AgF+KI) on shear bond strength (SBS) of resin-based composite (RBC) or conventional glass-ionomer cement (GIC) to dentin.

EXPERIMENTAL METHODS

Extracted human teeth were embedded, sectioned (diamond-blade, Buehler IsoMet 1000) to expose sound occlusal dentine, wet-polished (600-grit SiC) and randomly divided into 6 groups (n=10). Sample treatments and materials are outlined in *Table 1*.

***Table 1* – Treatment steps**

	1. Preparation	2. Rinse	3. Pre-treatment	4. Rinse	5. Restore
RBC	10 seconds 37% phosphoric acid (Super Etch)	Rinse thoroughly with deionised water, then air dry avoiding desiccation of the dentin	1. Control (None)	Rinse thoroughly with deionised water, then air dry avoiding desiccation of the dentin	Zipbond Universal Adhesive & Luna Composite
			2. SDF+KI (Riva Star)		
			3. AgF+KI (Riva Star Aqua)		
GIC	5 seconds 37% phosphoric acid (Super Etch)		4. Control (None)		Riva Self Cure HV
			5. SDF+KI (Riva Star)		
			6. AgF+KI (Riva Star Aqua)		

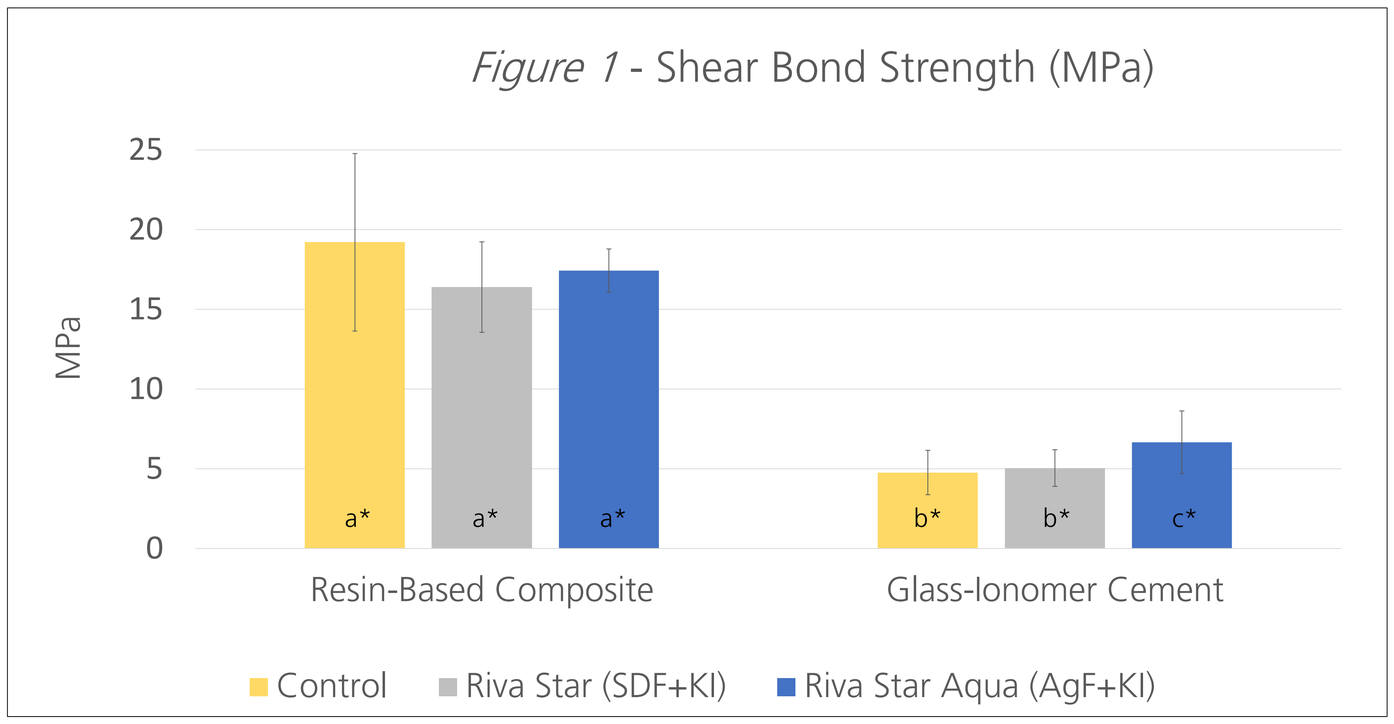
All materials in *Table 1* supplied by SDI Limited, Bayswater, Australia

RBC samples were stored in deionised water (37°C, 24h) and GIC samples stored in 100% humidity (37°C, 1h) then deionised water (37°C, 23h). Shear Bond Strength (SBS) was tested (Instron 5942, 0.75mm/min) and statistically analysed (two-tailed, unpaired t-test, $p<0.05$).

It is important to note that thorough rinsing (Step 4) of the treatment site after application of SDF+KI or AgF+KI is critical for successful bonding with RBC. Silver precipitate formed on the dentin surface and in tubules can adversely affect the micromechanical retention and hybrid layer formation. Rinsing can eliminate the excess of silver precipitate, favouring adhesion[1]. Rinsing is also recommended when using GIC to ensure adequate contact for bonding with the tooth surface.

RESULTS

SBS was not negatively impacted for any of the groups. No significant difference in SBS of RBC to dentin was found when pre-treated with SDF+KI ($p=0.17$) or AgF+KI ($p=0.34$) or GIC with SDF+KI ($p=0.63$) (*Figure 1*). GIC with AgF+KI significantly increased the SBS ($p=0.02$) to dentin (*Figure 1*).



* Means with same letter are not statistically different ($p<0.05$)

CONCLUSION

Within the limitations of this study, pre-treating sound dentin with Silver Diamine Fluoride or Aqueous Silver Fluoride, both with Potassium Iodide, does not significantly reduce Shear Bond Strength when restoring with Glass-Ionomer Cements or Resin-based Composite materials.

REFERENCES

[1] Fröhlich TT, Botton G, Rocha RO. Bonding of Glass-Ionomer Cement and Adhesives to Silver Diamine Fluoride-treated Dentin: An Updated Systematic Review and Meta-Analysis. J Adhes Dent. 2022 Mar 1;24(1):29-38.