Introduction

Despite the evolution in adhesive dentistry over the past decades, degradation of tooth-bonded interfaces still contributes to the reduced long-term clinical success of adhesive restorations. 

Etch-and-rinse approach still relies on traditional wet-bonding technique to couple relatively hydrophilic adhesives to the hydrated dentin substrate in clinically relevant protocols. A partially wet dentin substrate has been consensually advocated to maintain the demineralized collagen matrix expanded for proper resin infiltration by relatively hydrophilic monomers. Nevertheless, management of adequate moisture is not easily accomplished, and either excess or lack of dentin moisture may compromise resin–dentin bonding. 

Recently, dimethyl sulfoxide (DMSO) has been introduced as a new potential solvent to be used in adhesive dentistry. DMSO [(CH3)2SO] is a polar aprotic solvent that dissolves both polar and non-polar compounds. It is a polyfunctional molecule, with a highly polar S=O group and two hydrophobic methyl groups, fully miscible in most solvents and monomers used in adhesive dentistry. DMSO is perhaps the best currently known penetration enhancer for medical purposes with the ability to dissociate the highly cross linked collagen into a sparser network of apparent fibrils. In addition, dissociation of water self-associative tendency by DMSO improves wettability of demineralized dentin, monomer diffusion into the collagen matrix and concomitantly re-expands collapsed collagen to a fairly modest level.

Materials and Methods

The teeth will be divided into 2 groups according to the applied adhesive (n=28); Group A: etch-and-rinse adhesive, Group B: universal adhesive (etch-and-rinse mode). Each group will be further subdivided into 2 sub-groups according to the surface pretreatment method (n=14); sub-group A: without application of DMSO primer, sub-group B: with application of 50% DMSO dissolved in distilled water. The rational for using 50%(v/v) DMSO was based on previous studies used the same concentration, albeit only the aqueous solutions. Then each sub-group will be divided into 2 divisions according to the testing time; (n=7), division A: specimen will be tested immediately, division B: tested after 37ºC artificial saliva storage for 6 months.

Results:

Microtensile-bond strength test:

Etch-and-rinse adhesive with DMSO pretreatment was statistically significant from control group (p<0.05). While in universal adhesive with DMSO pretreatment showed no significant result from control group.
**Modes of Failure**

Mixed failure was predominant among test group

**Nanoleakage Expression**

Etch-and-rinse adhesives showed decrease in silver impregnation, while universal adhesive showed insignificant change in silver impregnation

**Discussion:**

Recently, DMSO was found to be useful in improving and preserving the long-term coronal dentin adhesive bond strength. This positive effect was attributed to improved wetting of collagen by the adhesive. Nevertheless, the collapsed of dried collagen matrix caused by air-drying can be reversible, as previously reported with the use of DMSO-water solutions.

**Conclusion:**

DMSO prevent sever reduction in bond strength of etch-and-rinse adhesives and universal adhesives.

**References**