Diminishing Nanoleakage at the Bonding Interface of Composite Resin and Dentin

**Objectives:** To evaluate the effect of high-pressure air blowing during adhesive application on the resin infiltration and nanoleakage of an etch-&-rinse adhesive system to dentin.

**Materials and Methods:** An etch-&-rinse adhesive system (Single Bond 2) was bonded to dentin surface under simulated pulpal pressure. In the control group, the adhesive was thinned by ordinary air blowing with a pressure of 0.2 MPa for 5 sec and bonded as the manufacture’s instruction. In the experimental group, a high-pressure air blowing technique (air blowing with a pressure of 0.4 MPa for 5 sec) during adhesive application was used. All the other procedures were the same as those in the control group. Resin tag formation and nanoleakage at the bonding interface were evaluated with scanning electron microscopy (SEM) and transmission electron microscopy (TEM).

**Results:** Longer and more homogeneous resin tags were formed when the adhesive was air-thinned with high-pressure air blowing. In nanoleakage evaluation, silver deposits could barely be identified from the adhesive/dentin interface when the infiltration of adhesive resin was driven with high pressure air-blowing.

**Conclusions:** High-pressure blowing technique could facilitate the resin monomer infiltration into the demineralized dentin in the single bond 2 adhesive/dentin bonding interface. It is a feasible method to eliminate nanoleakage in the dentin hybrid layer.

**Clinical Significance:** Air thinning of adhesive with high-pressure air blowing provides a clinically possible adjunctive procedure for better resin infiltration in the Single Bond 2 etch-&-rinse adhesive system. This study was financially supported by NSFC, grant 81130078 and NKBRPC, grant 2012CB526704.