

Letter to the Editor: "Effect of Polydopamine on Bonding Characteristics of Mineral Trioxide Aggregate to Resin Composite"

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Dear Editor,

We read with interest the article by Keerthivasan et al. (1) on the effect of polydopamine (PDA) on bonding characteristics of mineral trioxide aggregate (MTA) to resin composite (RC). The authors carried out a laboratory study to evaluate the shear bond strength (SBS), wettability, and surface morphology of PDA-pretreated MTA to RC. They found that pretreatment with PDA improved the wettability of MTA, protected its surface from erosion caused by self-etch adhesive (SE), and increased the ratio of SBS to RC. They came to the conclusion that pretreatment with PDA might make immediate permanent restoration over MTA possible (1). This is different from the research carried out by Zhong et al. (2) entitled "Modifying polydopamine resin containing nZVI composite to remove hexavalent chromium from aqueous solutions".

Because MTA is so widely used as a pulp capping agent and endodontic repair material, and because bonding it to RC can be difficult due to its slow setting time and poor surface characteristics, we applaud the authors for choosing a research topic that is both original and pertinent. PDA is a synthetic analogue of mussel adhesive proteins, and it can be used as a surface modifier for MTA (3). This is a novel approach that has the potential to improve clinical performance of MTA, and make the restorative procedure easier to perform.

Nevertheless, in addition to that, we do have a few concerns as well as some suggestions regarding the methodology and the interpretation of the results. To begin, the authors of the study only used a single variety of each of MTA (MTA Angelus), SE adhesive (AdheSE One), and RC (Tetric N-Ceram)

in their experiment. It would be interesting to see if the effect of PDA pretreatment is consistent across different brands and formulations of these materials. Since these materials may have different chemical and physical properties that could influence the outcome of the bonding process, it would be interesting to see if the effect of PDA pretreatment is consistent across these variables. Second, after storing the MTA/RC assemblies for 24 hours at a relative humidity of 100 percent, the authors measured the SBS of these assemblies. This may not accurately reflect the situation in the actual clinical setting, which is one in which the restoration is subjected to a variety of environmental factors, such as varying temperatures, saliva, oral bacteria, and occlusal forces. It would be more relevant to test the SBS after it had been stored for longer periods of time in artificial saliva or other simulated oral fluids. Additionally, the samples should be subjected to thermocycling or mechanical loading so that the durability of the bond can be evaluated. Third, the authors did not report the failure mode analysis of the samples that showed cohesive failure in MTA despite the fact that they did conduct the analysis. The quality and strength of the MTA on its own, as well as the influence of PDA and SE adhesive on its integrity, can be inferred from the location and extent of the cohesive failure, which is why it would be beneficial to have this information.

In conclusion, we would like to express our gratitude to the authors for the contribution they have made to the field of dental materials and adhesive dentistry, and we express our hope that they will address the issues that have been mentioned in the preceding paragraphs in their upcoming research.

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