HPLC analysis of adhesive eluates

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Purpose: Latest improvements in the formulation of dentin bonding systems involved the addition of chlorhexidine (CHX) within the adhesive blends. Despite its possible antibacterial role, no information is available on CHX elution from the polymerized adhesive. Aim of this preliminary study was to assess elution of CHX in water. The tested hypothesis was that no release of active material occurs over time.

Methods and materials: Two universal adhesive systems were selected for the study: Fissi Universal (Ultradent), and Scotchbond Universal (3M ESPE; control). Adhesive disks (1 mm thick and 6 mm in diameter) were prepared, fully cured using a LED lamp (VALO, Ultradent) for 3 min and immersed in water for 72 h. Elution of CHX was monitored by an optimized and validated high-performance liquid chromatographic (HPLC) method. In details, the mobile phase was a binary mixture of a pH 3.0 triethylamine phosphate buffer and acetonitrile under gradient elution; the stationary phase was a Kinetex PFP column (5 μm, 150 mm x 4.6 mm) and the detection wavelength was 254 nm.

Results: The results of the study revealed that under the tested conditions, the selective analysis of chlorhexidine could be performed with limit of quantification (LOQ) of 0.1 ppm. Interestingly, no CHX was found in the eluates, despite the high sensitivity of the tested HPLC system.

Conclusion: Further studies are needed to clarify the role of active compounds blended within the adhesive formulations.

Keywords: HPLC, Chlorhexidine

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And erosive potential of bioactive glasses on dentine

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Purpose: The aim of this study was to determine the efficacy of two commercial bioactive glasses in reducing the rate of erosion in dentine.

Methods and materials: Thirty 5 mm x 5 mm of dentine specimens were obtained from cross sections of the middle third of roots of sound human premolars and molars. The specimens were flattened and polished and subjected to demineralization in 0.3% citric acid at pH of 3.2 ± 0.1. Thereafter baseline surface topography images were taken with an optical profilometer (Infinite Focus4, Alcina Imaging GmbH). The demineralized samples were then randomly divided into a control group, CO, and two test groups, NU and SY. Samples in NU were treated with NUFO® Sensodyne® Prophylaxis paste (Dentifrye) whilst those in SY, with Syfic® Propoxy Powder (Novamine®). Surface topography images were taken again after 24 h of storage in remineralization solution at 37°C. Subsequently, samples in all 3 groups were subjected to daily cycles of acid challenge for 10 min and storage in remineralization solution at 37°C for six days. Surface topography images were taken every day before acid challenge. Additional samples were prepared for SEM analysis at Baseline, Intervention, and Day 6 of demineralization. For surface roughness analysis, an area of 350 μm x 350 μm with no visual defects was chosen and the mean Roughness Average (Ra) of five scan lines was recorded. The difference of the mean Ra between the var-