# Influence of flavonoids on long-term bonding stability on caries-affected dentin

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## Abstract

Objectives. To evaluate the effect of experimental dentin pre-treatment solutions formulated with different flavonoids on microtensile bond strength (mu TBS), nanohardness (NH) and ultra-morphological characteristics of artificial caries-affected dentin (CAD) bonded using a universal bonding system.

Methods. A microbiological method was used to create an artificial CAD in 91 human molars. Five experimental pre-treatment solutions were created using the following flavonoids: quercetin (QUE); hesperidin (HES); rutin (RUT); naringin (NAR), or proanthocyanidin (PRO). A placebo solution (PLA) with no flavonoids added was also evaluated. The flavonoids or placebo solutions were applied to the CAD prior to the application and photoactivation of a universal adhesive (Scotchbond Universal, 3M Oral Care). A control group (CON), in which only the bonding agent was applied without any flavonoid solution, was also evaluated. A 3-mm-thick block of resin composite (Opallis, FGM) was built up on the flat bonded CAD surfaces and was light-cured following the manufacturer's instructions. Specimens were sectioned to obtain resin-dentin slices and sticks (cross-sectional area of 0.8 mm(2)). The mu TBS, NH, and confocal ultramorphology analysis of resin-dentin interface was evaluated at 24 h and after thermo-cycling aging (25,000 cycles). The results were analyzed using 2-way ANOVA followed by Bonferroni's post hoc test (pre-set alpha = 0.05).

Results. The specimens from groups QUE, NAR, and RUT presented greater mu TBS values than those from CON group ($p<0.05$). Specimens from some of these experimental groups presented greater nanomechanical properties ($p<0.05$), and no morphological degradation at the resin-dentin interface after aging.

Significance. The use of exogenous cross-linkers as dentin pre-treatment before bonding procedures may represent a suitable strategy to improve the longevity of universal adhesive systems applied to caries-affected dentin. (C) 2020 The Academy of Dental Materials. Published by Elsevier Inc. All rights reserved.

## Palabras clave

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