0243

Drug-Doped Nanogel for Dentin Remineralization

M. Toledano[1], E. Fernández-Romero[1], F. Aguilera[1], O. Estrella[1], J. Rodríguez-Santana[1], M. Garrido[1], P. Solis[1], F. Garcia-Godoy[2], R. Osorio[1]

[1]University of Granada, Granada, Spain, [2]Health Science Center, College of Dentistry, University of Tennessee, Memphis, Tennessee, United States

Objectives This study targets to assess the remineralization capability of conditioned dentin infiltrated with polymeric nanoparticles (NPs) doped with tideglusib (TDg) (TDg-NPs).
Methods Dentin conditioned surfaces were infiltrated with NPs and TDg-NPs. Bonded interfaces were created, stored for 24 h and submitted to mechanical challenging. Resin-dentin interfaces were evaluated through nanohardness, Masson's trichrome staining microscopy, and Raman analysis. ANOVA and Student-Newmann-Keuls were employed to ascertain for differences ($p<0.05$).
Results At the hybrid layer, dentin interfaces treated with TDg-NPs after 24 h (0.55±0.07GPa) and mechanically loaded (0.49±0.08GPa) attained the highest nanohardness ($P<0.05$). Any sample treated with TDg-NPs attained the highest *Hi* among all groups of study, at the bottom of the hybrid layer ($P<0.05$), ranging from 0.62±0.07GPa (dentin treated with TDg-NPs mechanically loaded) to 0.72±0.12GPa (dentin treated with TDg-NPs after 24 h). Active remineralization underneath the hybrid layer was detected in all groups, after TDg application and load cycling, inducting new dentinal tubuli formation. Raman analysis confirmed the increase in mineralization, enriched carbonate apatite formation, and improved crosslinking and scaffolding of the collagen.
Conclusions Mechanical loading on the specimens obtained after TDg-NPs dentin infiltration inducts an increase of mineralization at the resin/dentin interface, indicating remineralization of peritubular and intertubular dentin with augmented crystallographic maturity in crystals. Enriched collagen quality was produced, generating an adequate matrix organization to promote apatite nucleation, TDg-NPs infiltration. Grant PID2020-114694RB-I00 funded by MCIN/AEI 10.13039/501100011033.