

TITLE: New trends in dental interfaces degradation's studies: Presence of MMP-2 in dentin carious lesions.

ABSTRACT

Objective: To examine the differential expression of matrix metalloproteinase-2 (MMP-2) in human coronal and radicular sound and carious dentine using combined trichrome staining technique and immunofluorescence approach.

Methods: Freshly extracted human premolars were fixed with formaldehyde, demineralised with 10% EDTA (pH 7.4), dehydrated and sectioned for light and immunofluorescence microscopy. Half of the sections were stained with Masson's trichrome and examined with light microscopy to identify regions in the coronal and radicular parts of the teeth that contained sound, caries-affected and caries-infected dentine. The rest of the sections were hybridized with anti-mouse MMP-2 primary antibody and FITC-conjugated secondary antibody. Immunofluorescence of the FITC that was indicative of the distribution of the MMP-2 in coronal and radicular dentine was analysed by fluorescence light microscopy.

Results: Trichrome staining revealed a green zone of unaffected sound dentin, red irregular regions of caries-infected dentine and pink regions of caries-affected dentine. Immunofluorescence signals that were indicative of MMP expression were the lowest in sound dentine and most intense in the caries-infected dentine. Caries affected-dentine showed intermediate immunoreactivity. The variations in the intensities of immunofluorescence corresponded well with the distribution of caries-infected and caries-effected dentine in the trichrome-stained sections, for both coronal and radicular dentine.

Conclusion: Caries stimulates MMP-2 expression, resulting in the differential expression of this protease in sound, caries-affected and caries-infected dentine. The more intense MMP-2 expression in caries-affected dentine compared with sound dentine may imply more rapid hybrid layer degradation when caries-affected dentine is employed as the substrate for bonded restorations.