

MORPHOLOGICAL AND ELEMENTAL EVALUATION OF SDF ON DENTINE IN SALIVA

OBJECTIVES: Silver diammine fluoride (SDF) is an effective agent for caries management. Its interaction with saliva is unknown. The aim was to investigate the effect of SDF on dentine with natural and artificial saliva and evaluate different potential saliva solutions.

METHODS: 20 dentine samples were randomly assigned into 4 storage groups: deionized water (DIW, negative control), artificial saliva (AS), basal medium mucin (BMM), and unstimulated whole saliva (UWS, clinical reference). After which they were submitted to the demineralization process (50 mM acetate buffer, pH 4.5) for 3 days. 38 wt% SDF (Saforide™) was then applied onto dentine surface for 3 minutes and afterwards each group was stored in respective “saliva” solutions for 5 days. The treated dentine surfaces were characterized and analysed by Scanning Electron Microscopy (SEM), Energy-Dispersive X-ray analysis (EDX) and X-ray Photoelectron Spectroscopy (XPS).

RESULTS: SEM showed different surface deposits and coatings, occluding the dentinal tubules. Dentine sample in DIW group showed the thinnest coating, whereas BMM group showed the thickest. EDX suggested and XPS confirmed different reaction products were yielded depending on the saliva substitutes (Table 1). The AS group yielded relatively high Ag and Cl, suggesting AgCl was formed. Elemental S was formed in BMM and UWS groups, suggesting a silver-protein interaction.

Table 1 Atomic concentrations % of dentine samples

Group	Ag	Cl	Ca	P	O	C	S	N	Na
DIW	1.2	0.5	4.7	3.6	28.8	49.6	-	11.6	-
AS	12.2	12.9	2.1	2.4	22.7	39.1	-	8.6	-
BMM	3.6	0.5	3.9	3.8	29.8	47.6	0.8	7.6	2.4
UWS	3.2	-	5.9	4.8	30.1	41.4	1.5	13.1	-

CONCLUSIONS: Different saliva substitutes effected the interaction between SDF and demineralised dentine. The correct selection of “saliva” should be considered in future *in vitro* investigations.