

The protective effect of toothpastes containing TiF₄ and chitosan on erosive tooth wear *in vitro*

This study evaluated the protective effect of the experimental TiF₄ and chitosan toothpaste on erosive tooth wear (ETW) *in vitro*. Seventy-two bovine enamel and 72 root dentin samples were embedded, polished and subjected to the baseline profile analysis. The samples were protected in 2/3 of the surface and randomly assigned to 5 toothpastes (n=12): 1) Experimental containing TiF₄ (1400 ppm F⁻, pH 3.08), 2) 0.5% chitosan (75% deacetylation, 500 mPas, pH 7.14), 3) TiF₄ (1400 ppm F⁻) plus 0.5% chitosan (75% deacetylation, 500 mPas, pH 4.22), 4) Placebo (no F and no chitosan, pH 6.97), 5) Erosion Protection (Elmex[®] - GABA, Suíça, 1400 ppm F⁻, NaF, AmF and SnCl₂, chitosan, pH 4.55); Twelve samples were only eroded (control). All samples were submitted to erosive pH cycles (4x90s in 0.1% citric acid, pH 2.5, per day) and the groups 1-5 to abrasive challenges using toothpastes' slurries (1.5 N, 2 x 15 s per day) plus 45 s of treatment, for 7 days. Between the challenges, the samples were immersed in artificial saliva. The final profile was overlaid to the baseline one for the calculation of the ETW (µm). The data were subjected to Kruskal-Wallis/Dunn tests (p<0.05). TiF₄ toothpastes, regardless of the presence of chitosan [TiF₄: 0.60(0.31) and 0.40(0.46) µm for enamel and dentin; TiF₄ + Chitosan: 0.62(0.57) and 0.97(0.46) µm for enamel and dentin, respectively], were able to significantly reduce ETW (around 80%) compared to placebo [6.65(1.10) and 4.96(1.44) µm for enamel and dentin], while chitosan alone [6.50(1.05) and 5.17(1.63) µm for enamel and dentin] was similar to placebo. The toothpastes containing TiF₄ were even superior to the commercial Elmex[®] toothpaste [3.75(1.10) and 1.33(0.86) µm for enamel and dentin] on enamel wear, which were also significantly different from placebo (p<0.0001) for both tissues. Tooth wear medians from samples belonging to both groups TiF₄ and Elmex[®] toothpastes were similar to erosion only (control) [2.90(1.05) and 4.20(1.26) µm for enamel and dentin]. TiF₄ toothpastes, regardless the presence of chitosan, showed to be effective in minimizing the ETW *in vitro*.