

Novel hybrid-glass-based material for infiltration of early caries lesions

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Streszczenie

To assess the effectiveness of two experimental, hybrid-glass-based infiltrants in arresting artificial white spot lesions (WSLs) in vitro, and to compare it with resin-based infiltrant Icon. Artificial WSLs were formed on bovine enamel specimens (n = 68). Specimens were divided into four groups according to WSLs treatment: 1) no-treatment control (NTC), 2) infiltration with Icon (Icon), 3) infiltration with experimental hybrid-glass material (EXP), and 4) infiltration with experimental hybrid-glass material containing hydroxyapatite (HAp) nanoparticles (1%) (EXP-HAp). Half of the specimens from each group were subjected to cariogenic challenge using pH-cycling, consisting of a 7-day alternate incubation (37°C) in demineralization (4 h/day, pH=4.6) and remineralization solutions (20 h/day, pH=7.2). Another half of the specimens was incubated in distilled water (control). Caries progression was assessed by measuring surface micro-hardness (SMH), roughness (R_a) and average surface level, and by analyzing WSLs morphology. Non-cycled and pH-cycled specimens were compared with Man-Whitney U test, while different treatment groups were compared with Kruskal-Wallis test with pairwise comparisons ($p < 0.05$). In all groups (NTC, Icon and EXP-HAp) except EXP, SMH decreased significantly after pH cycling. In addition, SMH increased in EXP upon pH cycling and was significantly higher than in other pH-cycled groups (<0.001). R_a increased considerably, while surface level decreased after pH cycling in all groups except in EXP. Signs of demineralization and roughness increase in NTC, Icon and EXP-HAp were also observed with the SEM.

Słowa kluczowe

Composite resin, Resin infiltration, Icon, Hybrid glass, Proximal caries, White spot lesions, Hydroxyapatite

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