COMPARISON OF CERAM X COMPOSITE AND EQUIA FIL FORTE GLASS HYBRID RESTORATIVE SYSTEM ON THE *S. MUTANS* AND *A. VISCOSUS* MONOSPECIES CARIOGENIC BIOFILM FORMATION IN *IN VITRO* MODELS

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Introduction
The main reason mentioned for the chosen of dental materials is the dental biofilm recurrence. In vitro monospecies biofilm models with *Streptococcus mutans* and *Actinomyces viscosus* around dental filling materials like nano-ceramic composite resin Ceram. X (One Universal, Dentsply, DeTrey, Konstanz, Germany) and Equia Forte Fil (GC, Tokyo, Japan) glass hybrid restorative system have been used to this study.
The aim of the present study was to evaluate the antimicrobial efficacy of a glass hybrid restorative compared with a nano-ceramic composite resin on *S. mutans* and *A viscosus* monospecies biofilm models.

Material and methods
In this *in vitro* experimental model, 40 nano-ceramic composites resin (Ceram. X) samples and glass hybrid restorative system (Equia Forte Fil) applied to polystyrene tiles according to the manufacturer's instructions activated by UV light, respectively. Surface roughness was measured using a profilometer and scanning electron microscopy.
S. mutans and *Actinomyces viscosus* monospecies biofilm formation cultured in brain-heart infusion broth suplemented with 5% xylitol, D-sorbitol and sucrose was used for the assessment of biofilm formation and biomass on the samples.
The relationship between the type of restorative materials, cariogenic monospecies biofilm formation and selected substrates was studied.

Results
A statistically significant reduction was found in the mono-species biofilm formation of *S. mutans* and *A. viscosus* under the influence of the application of Equia Fil Forte glass ionomer compared to Ceram X composite *in vitro* models (Fisher's exact, Mann-Whitney U, tests; $P < 0.05$). In addition, a smaller biofilm was observed under the influence of substrates, i.e. 5% xylitol and D-sorbitol compared to sucrose. Xylitol showed a stronger inhibitory effect on the S. mutans biofilm formation on the Ceram X composite compared to D-sorbitol.
However, in the case of A. viscosus biofilm, D-sorbitol turned out to be a stronger inhibitor than xylitol.

Conclusions
Cariogenic monospecies biofilm generation have been shown to be related to the type of dental restorative materials and substrates within in vitro models, but these results do not correspond exactly with those obtained from in vivo studies using restorations in dental appliances. Though not conclusive, some in vitro restorative materials like Ceram X have shown that certain materials possessing antimicrobial potential may reduce the severity of lesion formation depending on the type of the substrate used.
This studies suggesting possible pathways for modification in the use of composite like Ceram X and their antimicrobial potential with potentially enhanced longevity and caries prophylaxis.