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In vitro adherence of oral streptococci to zirconia core and veneering glass-ceramics.

Rosentritt M, **Behr M**, **Bürgers R**, **Feilzer AJ**, **Hahnel S**.

Department of Prosthetic Dentistry, Regensburg University Medical Center, Regensburg, Germany.

Plaque formation on dental ceramics may cause gingival inflammation and secondary caries. This in vitro study compared the susceptibility of various dental ceramics to adhere oral streptococci, and verified the influence of substratum surface roughness and surface hydrophobicity. Three zirconia ceramic materials and three veneering glass-ceramics were investigated. Fifteen test specimens were prepared for each material, polished, and surface roughness and hydrophobicity were determined. After incubation with artificial saliva (2 h, 37 degrees C) for pellicle formation, specimens were incubated with suspensions of Streptococcus gordonii DSMZ 6777, Streptococcus mutans DSMZ 20523, Streptococcus oralis DSMZ 20627, or Streptococcus sanguinis DSMZ 20068, respectively, for 2.5 h at 37 degrees C. Adherent bacteria were quantified using a fluorescence dye for viable cell quantification (Alamar Blue/Resazurin). Statistical analysis was performed using one- and two-way ANOVA and the Tukey-Kramer multiple comparison test for post hoc analysis (alpha < 0.05). Surface roughness and surface hydrophobicity differed significantly among the various ceramics; protein coating hydrophilized the surfaces, and led to a homogenization of the surface hydrophobicity of the various ceramics. Before protein coating, almost similar relative fluorescence intensities indicating similar adhesion of streptococci were found for the various ceramics; more distinct differences were observed after protein coating. Correlations between surface parameters and streptococcal adhesion were poor. Within the limitations of these experiments, the findings of this in vitro study indicate only little differences between zirconia and glass ceramic with regard to streptococcal adhesion. Judging from these results, it is unlikely that exposed zirconia surfaces yield more plaque than glass ceramic surfaces in vivo. (c) 2009 Wiley Periodicals, Inc. J Biomed Mater Res Part B: Appl Biomater, 2009.