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Surface treatment of yttria-stabilized tetragonal zirconia polycrystals with argon plasma-jet: A pilot study

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This study aimed to evaluate the surface roughness and wetting properties of Zirconium as a prosthetic material after different durations of argon plasma-jet surface treatment. Six yttria-stabilized tetragonal zirconia polycrystals (Y-TZP) discs were machined and smoothed with silicon polishing discs. The surface roughness was evaluated in a control group and in groups with different plasma-jet exposure application times [15-30-60-90-120 seconds (s)]. The average surface roughness (Ra) and contact angle (CA) measurements were recorded via an atomic force microscope (AFM) and tensiometer, respectively. Data were analyzed with one-way analysis of variance (ANOVA) and the Tukey HSD test ($\alpha = .05$). According to the results, the argon plasma-jet surface treatment significantly affected the wettability properties ($P < 0.05$), but there is no significant between application time and surface roughness changes ($P > 0.05$). With an increase in the application time, a remarkable reduction in CA was observed. With the limitation of this study it can be concluded that the argon plasma-jet could enhance the wetting performance of Y-TZP but the effect on roughening not been clearly established.

Biography

Emre Seker has completed his Under-graduate education and PhD from Ankara University and Near East University respectively. He served as a Lecturer and Clinical Specialist and currently working as an Assistant Professor at Eskisehir Osmangazi University Faculty of Dentistry Department of Prosthodontics. He has published more than 30 papers and presentations, and continues to study on surface treatment techniques of dental materials, CAD/CAM dentistry and plasma technology.

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