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Optical and Surface Characteristics of Direct Composite, Polished and Glazed Ceramic Materials After Exposure to Tooth Brush Abrasion and Staining Solution

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Abstract : Aim and background: esthetic and structural reconstruction of anterior teeth may require the application of different restoration material. In this regard combination of direct composite veneer and ceramic crown is a common treatment option. Despite the initial matching, their long term harmony in term of optical and surface characteristics is a matter of concern. The purpose of this study is to evaluate and compare optical and surface characteristic of direct composite polished and glazed ceramic materials after exposure to tooth brush abrasion and staining solution. Materials and Methods: ten 2 mm thick disk shape specimens were prepared from IPS empress direct composite and twenty specimens from IPS e.max CAD blocks. Composite specimens and ten ceramic specimens were polished by using D&Z composite and ceramic polishing kit. The other ten specimens of ceramic were glazed with glazing liquid. Baseline measurement of roughness, CIElab coordinate, and luminance were recorded. Then the specimens underwent thermocycling, tooth brushing, and coffee staining. Afterword, the final measurements were recorded. Color coordinate were used to calculate ΔE76, ΔE00, translucency parameter, and contrast ratio. Data were analyzed by One-way ANOVA and post hoc LSD test. Results: baseline and final roughness of the study group were not different. At baseline, the order of roughness for the study group were as follows: composite < glazed ceramic < polished ceramic, but after aging, no difference. Between ceramic groups was not detected. The comparison of baseline and final luminance was similar to roughness but in reverse order. Unlike differential roughness which was comparable between the groups, changes in luminance of the glazed ceramic group was higher than other groups. ΔE76 and ΔE00 in the composite group were 18.35 and 12.84, in the glazed ceramic group were 1.3 and 0.79, and in polished ceramic were 1.26 and 0.85. These values for the composite group were significantly different from ceramic groups. Translucency of composite at baseline was significantly higher than final, but there was no significant difference between these values in ceramic groups. Composite was more translucency than ceramic at baseline and final measurement. Conclusion: Glazed ceramic surface was smoother than polished ceramic. Aging did not change the roughness. Optical properties (color and translucency) of the composite were influenced by aging. Luminance of composite, glazed ceramic, and polished ceramic decreased after aging, but the reduction in glazed ceramic was more pronounced.

Keywords : ceramic, tooth-brush abrasion, staining solution, composite resin
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