Optimization of Surface Treatment for Bonding Strength between Zirconia and Veneering Porcelain

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Abstrat: All-ceramic prostheses are widely used to fulfill the high esthetic demand. However, bonding failure between zirconia and porcelain is one of the all-ceramic prostheses failures. In order to improve clinical sucess of all-ceramic prostheses, laboratory or in-office surface conditioning techniques on zirconia have been studied.

1. Introduction

Improving the bonding strength between zirconia and veneering porcelain would decrease the all-ceramic prostheses failures. By assessing the bonding strength between variously treated zirconia and porcelain, the most effective surface conditioning technique has been researched.

2. Experimental

Fully sintered zirconium oxide ceramic blocks(5x4.5x7.5mm)(NaturaZ, D.max, Korea) were polished with SiC paper (100, 2000-grit) and treated with (n=10): (1) no treatment; (2) liner (Zirliner, Ivoclar) (3) 9.5% HF acid etching for 1 min; (3) 9.5% HF acid etching for 2 min; (4) 9.5% HF acid etching for 5 min (6) 9.5% HF acid etching for 7 min; (7) 9.5% HF acid etching for 2min + liner. After surface treatment, veneering porcelain (e.maz Ceram, Ivoclar, 5x4.5x3mm) was builded-up.

Values of each specimen's roughness were measured by surface roughness testing machine (Surfcorder, SE3500 Kosaka Laboratory Ltd., Japan) Shear bond strength was obtained using a universal testing machine (Shimadzu, AGS-1000D, Japan) with crosshead speed 1mm/min. Treated surface of zirconia and fractured surface were observed with a field emission scanning electron microscope (FE-SEM S-4800, Hitachi, Japan).

3. Conclusion

In shear bonding test, the group which was treated with liner showed higher bond strength than no treated group. It was the HF etching group for 1min that showed the lowest bond strength. There were no statistically significant differences among HF etching groups for 2min, 5min, and 7min. And the highest bonding strength were detected at the HF etching for 2min + liner group. Applying liner on the surface of zirconia after HF etching for 2min is the most effective way to improve bonding strength between zirconia and porcelain in this study(hcchoe@chosun.ac.kr,son0513@chosun.ac.kr)

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