Effect of Different Neutralizing Agents on Feldspathic Porcelain Etched by Hydrofluoric Acid

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Abstract

Objective The aim of this study was to evaluate the effect of neutralizing agents on the shear bond strength of hydrofluoric (HF)–etched porcelain in nonaging and aging conditions.

Subjects and Methods One hundred and twenty feldspathic porcelain specimens were prepared and divided into six groups to undergo different surface conditioning methods—group 1: control; group 2: HF; group 3: HF + calcium hydroxide; group 4: HF + calcium carbonate; group 5: HF + calcium gluconate; and group 6: HF + ultrasonic. All samples were immersed in 37°C distilled water for 24 h. Half of the samples were thermocycled in water for 5,000 cycles. The shear bond strength test was performed using a universal testing machine at a crosshead speed of 0.5 mm/min. Data were statistically analyzed by two-way ANOVA and Tukey's multiple comparison test at a 95% confidence level. The surface micromorphology and surface elements were analyzed using scanning electron microscope (SEM) and energy-dispersive X-ray spectroscopy (EDX), respectively.

Results The shear bond strengths of groups 2–6 were significantly higher than the control group in both aging and nonaging conditions ($p < 0.05$). There were no significant differences among all of the HF-etched porcelain groups ($p > 0.05$). SEM images of groups 2–6 illustrated similar patterns of irregularity on the specimen surfaces. Elemental analysis of EDX demonstrated identical elements on surfaces of specimens of groups 2–6.

Conclusion Within the limitations of this study, shear bond strength values between HF-etched porcelain, HF-etching followed by application of neutralizing agents, and HF-etching followed by ultrasonic cleaning were not significantly different in both nonaging and aging conditions.

Keywords
- dental porcelain
- hydrofluoric acid
- neutralizing agents
- restoration repair
- surface treatment

Introduction

Dental porcelain offers key advantages in its extremely pleasing esthetic appearance as it can mimic the various colors and shades of natural teeth and its superior biocompatibility.[1,2] However, as dental porcelains are brittle, potential technical problems include the chipping or fracture of the veneering ceramic.[3] Furthermore, it cannot be directly repaired by the same material, due to the high temperatures involved with the sintering process. The available options for repair of

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