



Effect of Surface Treatment on Bond Strength of Low Fusing Porcelain to pure Titanium

Thesis

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Thesis Abstract

Titanium is known as a useful metal because of its superior biocompatibility, good corrosion resistance, low specific gravity, good mechanical properties, and low cost. Titanium is an exceptional metal, reacting strongly with gaseous elements such as oxygen at high temperature, which yields an excessive thick layer of TiO₂. This high reactivity causes problems when dental ceramics are fused to titanium. The oxide layer produced on titanium surface was considered a source for adverse consequence on titanium-porcelain bonding.

The purpose of this study was to investigate the effect of bonding agent and surface treatment using sandblasting and hydrochloric acid on the bond strength of low fusing porcelain to pure cast titanium.

The study was designed to evaluate the bond strength of ceramic to cast pure titanium, using a 3-point bending test and scanning electron microscopic analysis of the titanium-ceramic interfaces. The titanium specimen's surface was treated by sandblasting or hydrochloric acid with or without bonding agent prior ceramic application.

The debonding test showed that surface treatment with sandblasting and bonding agent combination resulted with the strongest (35.60 MPa) titanium-ceramic bond ($P < 0.001$), followed by sandblast alone (25.60 MPa) and bonding

agent alone (24.65 MPa). Hydrochloric acid surface treatment provide no effect on the titanium-ceramic bond strength ($p=0.76$).

It was concluded that the combination of sandblasting and bonding agent has the superior effect on ceramic-titanium bond strength. However, titanium surface treatment with hydrochloric acid offers no effect on the ceramic-titanium bond.