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Bonding of veneering porcelain to zirconia based ceramics using a novel surface treatment

Thesis

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by

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The porcelain-fused-to-metal restoration has proved to be a reliable treatment option for Fixed Partial Dentures (FPD) owing to its high predictable strength and reasonable esthetics. (1)

However, the disadvantage of such restorations is its artificial appearance due to the increased light reflectivity caused by the opaque porcelain needed to mask the metal substrate (2) and the graying effect of the metal at the gingival margin.(3)

The increasing demand for superior esthetics in addition to the increasing public awareness of the adverse side effects of some dental alloys have accelerated the development of alternatives to metallic dental restorations.(4)Numerous attempts have been made to develop all-ceramic systems that eliminate metal substructures providing optimal distribution of reflected light.(5)

There is a growing interest in the use of zirconia oxide ceramics as substitutes for metal copings. This is due to the fact that zirconia oxide ceramic has superior mechanical properties, including a high flexural strength and toughness. In addition, the development of new technology, such as computer-aided design/computer-aided manufacturing (CAD/CAM), enables the fabrication of zirconia-based restorations for all-ceramic crowns in a more practical process.

Current processing technologies however cannot make zirconia frameworks as translucent as natural teeth. In order to achieve acceptable esthetics, the zirconia based core structure is veneered with