



Surface Corrosion and Roughness of Feldspathic Porcelain Fabricated by Different Techniques

Thesis

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Dedication

I would like to dedicate this piece of work to;

*The soul of my father who guided me through out my life and whom I'm
sure would be happy and proud if he's still among us,*

*My mother and brother who supported me in every possible way to finish
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My friends who gave me all the needed emotional support.

Suzan Nabil El Zamzamy



التآكل والخشونة السطحية للبورساليين الفلدسباري المخلق بتقنيات مختلفة

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Π

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

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سورة البقرة
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INTRODUCTION

Dental ceramic materials are being used increasingly for both anterior and posterior restorations, mainly as a result of their excellent esthetic properties, biocompatibility and resistance to wear. Ceramics for dental reconstructive work are multiphase silicate glass-phase ceramics, glass ceramics or monophased glasses with varying compositions. [1]

Degradation in the oral cavity due to mechanical, chemical or chemical and mechanical influences made these characteristics questionable. Influences of mentioned factors in the oral cavity are inseparable from each other.

If chemical influences are considered, oral cavity is a very aggressive environment for restorative materials. Firstly, saliva pH values constantly change depending on the food intake, amount of plaque present, saliva composition and the stomach acidity. There are numerous in vitro studies investigating chemical degradation of reconstructive materials. [2]

Chemical degradation of dental ceramics enhances its roughness leading to the wear of the opposing natural tooth or restorative material, greater plaque attachment to the ceramics, weakening of the ceramic structure causing the critical ion ex-change at the surface and enhancing the sensitivity to the future chemical agents. [3]

Even though dental ceramic materials are considered more or less inert, the possible effects of degradation products on biological systems must not be overlooked. The composition, microstructure and physical

properties of newly launched ceramic materials differ from those traditional ones, which may affect the inertness and/or influence plaque accumulation on exposed surfaces. Safety cannot be inferred or extrapolated from measurements of one ceramic formulation to other compositions or conditions.[□]

REVIEW OF LITERATURE

Dental Ceramics:

There are several different types of dental porcelains used in dentistry. Feldspathic porcelains, for example, VITA VMK VITA (VITA Zahnfabrik, Bad Sackingen, Germany), are formed from a mixture of potassium feldspar and glass. After incongruent melting, feldspathic porcelains contain 10 weight percentage (wt%) of leucite crystals ($\text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$). Feldspathic porcelains are used as a veneering material for metal ceramic restorations. Feldspathic porcelain provide excellent esthetic and compressive strength¹.

Driven by a debatable need for metal-free restorations, the evolution of all-ceramic systems for dental restorations has been remarkable in the last three decades. Processing techniques novel to dentistry have been developed, such as heat-pressing, slip-casting, and Computer Aided Design-Computer- Aided Machining (CAD-CAM).

Conventional build up ceramics

Ceramics play an integral role in dentistry. Their use in dentistry dates as far back as 1800 when Charles H. Land patented the all-porcelain “jacket” crown. This new type of ceramic crown was introduced in 1800s. The procedure consisted of rebuilding the missing tooth with a porcelain covering, or “jacket” as Land called it. While not known for its strength due to internal microcracking, the porcelain “jacket” crown (PJC) was used extensively until the 1800s².