MICROROUGHNESS AND BACTERIAL ADHESION OF MONOLITHIC ZIRCONIA AND LITHIUM DISILICATE VENEERS WITH DIFFERENT FINISHING TECHNIQUES AND MARGIN DESIGNS

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Dedication

To the most precious, supportive, and sincere people in my life

To my family

"Without your endless love and encouragement,
I would have never been able to be who I am or where I am
Thanks for supporting me throughout the rough way"

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Introduction

Dental ceramics are the most natural appearing replacement material for missing tooth substance available in a range of shades and translucencies to achieve natural like appearance. The increased popularity of ceramic materials is attributed to their excellent aesthetics, chemical stability and biocompatibility [(1)]. It also provide smooth surface that is easily cleaned and not highly susceptible to surface staining resulting in less bacterial adhesion.

In the clinic the dentist often needs to adjust final restoration by grinding the outer surface before insertion which results in breaking the glazed layer producing a rough surface that needs reglazing or polishing. Some studies suggested that a polished surface may be as acceptable as a glazed surface [(2)]. Many ceramists prefer polishing instead of glazing, to control the surface luster. Some authors found that the fracture toughness of polished porcelain was greater than that of glazed porcelain and both types of finish equally resist staining by coffee [(3)].

Accumulation of bacteria on marginal area of enamel and restorative material may lead to periodontal disease or secondary caries which represent primary reason for restoration replacement. So every effort should be made to prevent plaque or even minimize plaque accumulation on restorative materials. [(4)]

The formation of oral biofilms has been closely correlated with the occurrence of oral diseases [(5)]. Thus, it is obvious that extensive plaque formation on dental restorations may contribute to the occurrence of secondary caries lesions or induces periodontal inflammation, which indicates the demand for dental materials with low susceptibility to biofilm

formation. Numerous factors influencing dental plaque formation, surface roughness (Ra) and surface free energy have been regarded as the most important factors [(6)]. The formation of the salivary pellicle, i.e. the adsorption of salivary constituents to tooth and restorative surfaces, is regarded as the first step in plaque formation. The pellicle plays a decisive role in microbial adhesion as its constituents may interact with oral microorganisms, either by direct interaction with receptors located on the microorganisms, or indirectly by influencing the thermodynamic conditions for microbial adhesion. Pellicle formation is followed by the adhesion of facultative anaerobic pioneer bacteria such as Streptococcus gordonii, streptococcus oralis and Streptococcus sanguinis [(7)]. Early colonizing bacteria play a pivotal role for the subsequent adhesion of cariogenic microorganisms such as Streptococcus mutans and periodontal pathogens such as Tannerella forsythensis, Porphyromonas gingivalis and Aggregatibacter actinomycetemcomitans, which may induce gingival and periodontal inflammation [(8)].