بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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MONA MAGHRABY

The Effect of Post Milling Processing on Translucency of Zirconia Reinforced Lithium Silicate

Thesis

Submitted to the Faculty of Dentistry, Ain Shams University in Partial Fulfillment of the Requirements of Master Degree in Fixed Prosthodontics

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Dedication

I would like to dedicate this thesis to those who gave me so much care and support

My dear **Father** *&* *my* **Mother Soul**, *(may Allah have mercy on her).*

My beloved sisters and brothers

A special dedication to my lovely two sons **Mohammad & Hazem** *and to my lovely unique daughter* **Maram**.

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INTRODUCTION

Metal-free restorations have been raised as an applicable treatment choice in fixed prosthodontics. [1] Nowadays has an increased aesthetic demand over metal ceramic restorations, with reasonable mechanical properties. [2], [3] In the last few years, there have been great advances in the mechanical properties and fabrication methods of ceramic materials.

Metal-free prosthetic materials have enormous types of glass, ceramics and polycrystalline materials. Glass, ceramics have a very large range of glass–crystalline ratios in its microstructure. According to the varying amounts of different types of crystals have either been added or grown in the glassy matrix, this category can be subdivided into three groups which are leucite, lithium disilicate or fluoroapatite.

One of the most popular materials of glass ceramic is lithium disilicate (LS_2). Lithium-disilicate glass-ceramic contains approximately 70% by volume needle-like crystals in a glassy matrix. [4], [5] Allowing for greater flexural strength of 360 to 400 MPa (Milled lithium-disilicate restorations (IPS e.max® CAD) and pressable lithium-disilicate restorations (IPS e.max® Press) Ivoclar Vivadent) respectively. [5], [6] Also, this microstructure allowing for low refractive index and high translucency that provide the optimal esthetics required for restoring anterior teeth. [4], [7]

The polycrystalline ceramics are monophase high strength polycrystalline materials that are formed by directly sintering crystals together without any intervening matrix to form a dense, air-free, glass-

free, polycrystalline structure, such as alumina and yttria-tetragonal Zirconia polycrystalline (YTZP).

YTZP has the highest mechanical properties, which enable them to be used for frameworks for monolithic multi-element bridges in addition to the frameworks for single crowns. [8] It has a flexural strength of 900–1200MPa. [9], [10] The restorations are processed either by soft machining of pre-sintered blanks followed by sintering at high temperature, or by hard machining of fully sintered blanks. [11], [12] Zirconia framework is esthetically better accepted than a metallic framework, but it remains clinically too white and opaque. [13] But to obtain a natural esthetic look we need a very translucent material mimicking enamel translucency.

Translucency defined as the relative amount of light can be transmitted through a material. [14] Ceramic translucency is affected by ceramic thickness, the processing techniques and the microstructure of ceramic. [15], [16]

A trial to combine between the advantages of LS_2 and Zirconia a new ceramic material for dental restorations has been lately introduced. The Zirconia-reinforced lithium silicate (ZLs) e.g. (vita suprinity) and (celtra duo, Dentsply) is consisting of lithium-metasilicate ($Li_2 SOi_3$) glass ceramic which reinforced with about 10% of zirconium dioxide (ZrO_2), that after the final crystallization firing process, a fine grained microstructure (Li_2 O-ZrO_2) will be formed. ZLs belongs to a newly generation of materials prepared for CAD/CAM use that have both the good mechanical properties of the zirconia with the glass-ceramic aesthetic characteristics. [17]