The Effect of Professional Dental Hygiene Measures on Surface Roughness of Different Monolithic Ceramics

A thesis submitted to the Fixed Prosthodontics Department,

Ain Shams University for the fulfillment of the requirements of the Master's Degree in Fixed Prosthodontics

By

Doaa Maher Mahmoud Moussa

B.D.S (Ain Shams University 2009)

Faculty of Dentistry

Ain Shams University

2019

Supervisors

Dr. Marwa Mohamed Wahsh

Associate Professor, Fixed Prosthodontics Department

Faculty of Dentistry-Ain Shams University

Dr. Maged Mohamed Zohdy

Associate Professor, Fixed Prosthodontics department

Faculty of Dentistry-Ain Shams University

سورة البقرة الآية: ٣٢

Acknowledgment

*First thanks to **ALLAH** to whom I relate any success.*

*I would like to express my deepest thanks, gratitude and appreciation to **Dr.Marwa Mohamed Wahsh,** Associate professor, Fixed Prosthodontics department, Faculty of dentistry,Ain Shams University for her meticulous supervision, kind guidance, valuable instructions and generous help.*

*I am deeply grateful to **Dr. Maged Mohamed Zohdy,** Associate professor Fixed Prosthodontics department, Faculty of dentistry,Ain Shams University for his great help, outstanding support, kind guidance and continuous motivation.*

Last but not least, deepest thanks to my dear professors and staff members of Fixed Prosthodontics Department, Faculty of Dentistry, Ain Shams University, for their support and encouragement.

Dedication

This work is dedicated to ***My Father's soul, My Mother*** *and* ***My Brothers*** *for their endless support and continuous encouragement.*

List of Contents

List of Tables

List of Figures

Introduction

In recent years, the patients demand for more esthetic restorations that mimicked natural tooth color has led to the increased use of ceramic materials.[1] Dental ceramics are the restorative material of choice for indirect restorations, mainly due to their biocompatibility, low thermal conductivity, color stability and esthetics.[2] Dental ceramics are used in restorative dentistry because of their success rate as well as diverse range of chemical and structural compositions, resulting from recent improvements in biomaterial technology.[3] Many attempts by manufacturers try to produce highly esthetic all-ceramic materials with acceptable mechanical and physical properties. [4]

Prosthetic dentistry is witnessing a trend toward monolithic ceramic restorations. Monolithic ceramic structure is formed into its shape with the same starting material without adding any other product. These structures must meet the biomechanical requirements and implement durability comparable to metal ceramic restorations, [5]while providing superior esthetics.[6]

Nowadays, glass-ceramics are broadly used in prosthetic dentistry due to Their adequate mechanical properties and their excellent esthetics.[7] The most popular are the leucite- and the lithium disilicate-reinforced ones. Also these last years witnessed the development of esthetic monolithic zirconia restorations. [8][9] Ultra-translucent zirconia(UTZ) has excellent optical features compared to traditional zirconia and translucent ones.

Plaque control is essential for the prevention of inflammatory periodontal disease. A smooth surface is preferred for optimal biocompatibility of restorative material because rough surfaces encourage plaque retention and cause surrounding soft tissue irritation. Professional dental hygiene measures involve the plaque, calculus and endotoxin removal from teeth or exposed root surfaces.[10] This can be carried out with manual or mechanical instruments.[11] Ultrasonic scaling has become the most commonly used method among dental practitioners as they are more efficient and are easier to use than conventional handheld instruments. [12] Air polishing system is used for removing extrinsic stains and bacterial deposits from teeth or restorative material surfaces.[13]

Unfortunately these procedures may affect the integrity of the prosthesis; as they may compromise the marginal seal of the prosthetic structure and can damage the surface and surface texture of the structures. [14] The effect of these instruments on metals ceramics, titanium and amalgam has been investigated and documented.[15] However, with the increased use of lithium disilicate, leucite reinforced glass ceramics and ultra-translucent zirconia more information on how these structures react to professional dental hygiene measures is still needed.

Review of Literature

Ceramics

Dental ceramics is one of the fastest developing areas of dental material research and development. During the past two decades numerous types of ceramics have been developed with the introduction of various processing methods to accommodate the broad range of applications and requirements in the oral cavity. Ceramics are the material of choice for patients with high esthetic demands due to their superior physical, optical properties and their ability to match natural dentition also they are biocompatible, have high compressive resistance and their thermal expansion is similar to that of tooth structure. These materials are used to form inlays, onlays, veneers, crowns and more complex fixed partial dentures (FPD's).

Fabricating all-ceramic restorations with minimal or no application of a secondary phase while maintaining esthetics has been a sought-after goal of the dental profession. The objective has been development of a monolithic material with optical properties similar to the natural tooth without the need for esthetic layering of porcelain. [16] The esthetics of monolithic crowns can be individualized by using staining techniques.

By offering monolithic prostheses, clinicians are able to overcome one of the major problems associated to multilayered restorations, which is the fracture of the low-strength veneering layer, usually made of a feldspathic dental ceramic.[17] All-ceramic systems are classified into three major categories based upon their major composition, which are feldspathic and glass-ceramic, alumina-based, and zirconia-based system.