"The effect of different surface treatments on bond strength in repairing hybrid ceramics with composite resin"

Thesis submitted to Crown & Bridge Department Ain-shams University for the partial fulfillment of the requirements of the Master degree in Fixed Prosthodontics

By

Donia Mohamed Rashad

BDSc Faculty of Dentistry , MSA University

(2013)

Email: donia_fingohope@hotmail.com

Faculty of Dentistry

Ain Shams University

2019

Supervisors

Prof. Amina Hamdy

Professor of Fixed Prosthodontics Department

Faculty of Dentistry , Ain Shams University

Dr. Maged Mohamed Zohdy

Associate Professor Fixed Prosthodontics

Faculty of Dentistry , Ain Shams University

Ain Shams University

Faculty of Dentistry

Ain Shams University.

2019

Acknowledgments

*In the name of **Allah**, the Most Gracious and the Most Merciful Alhamdulillah, all praises to Allah for the strengths and His blessing in completing this thesis*

I am highly thankful to **Prof. Amina Hamdy** ;Professor of Fixed Prosthodontics, Faculty of Dentistry Ain Shams University, for her immense knowledge, continuous motivation, friendy advice and kind support. Without her help, this work, would never have been possible

I would like to express my sincere gratitude to **Dr. Maged Mohamed Zohdy**, Associate Professor of Fixed Prosthodontics Faculty of Dentistry Ain Shams University, for the efforts and time he has devoted to accomplish this work, for his continuous support, his patience and motivation in all the time of research and writing of this thesis

I also have to thank **Dr. Bassam Ahmed El-Sayed** Assistant Lecturer of Fixed prosthodontics Faculty of Dentistry Fayoum University for his great effort with me in my statistical work.

Finally, I am highly grateful to all staff members at Fixed Prosthodontics Department at Faculty of Dentistry Ain Shams University for their great support for me to finish my Master's Degree at the department

*I must express my very profound gratitude to my **mum** and **my brother** for their support and continuous encouragement*

Contents

List of Tables

List of Figures

Introduction

The rapid evolution of CAD/CAM technology, has led to a dramatic impact on all disciplines of dentistry especially in the fields of prosthodontics and restorative dentistry. The integration of these technological systems with advances in biomaterials, such as zirconia high strength ceramics, has led to major alterations in education and patient care[1].

Recently hybrid ceramics are introduced to the market having the advantage of both ceramics and composite resins; such as esthetics, durability and color stability of ceramics and young modulus of elasticity which is close to that of dentin, improved flexural properties , low abrasiveness, ease of repair of composite resins and can be used in lower thickness than ceramics ,such as Cerasmart , Crystal Ultra and Lava Ultimate

However some localized failures could happen such as discoloration, microleakage, ditching at the margins, delamination, or simple fracture, it needs to be repaired or replaced .But Some minor defects around margins such as minor discoloration or ditching may not result in impaired function, and thus such failures could be only monitored instead of repaired or replaced. [2] But there is few clinical study about the survival rate of resin nano-ceramics present in the current literature.With intraoral repair; removal of the restoration is not necessary, only bonding resin composite to the imperfect restorations. The procedure includes surface preparation of restoration [3].There are several treatment concepts including : physical, physico-chemical, or chemical adhesion.

However, there is few data available on the bond characteristics of resin composite cements to the hybrid ceramic[4].Therefore, it seemed interesting to

investigate the effect of different surface treatments on bond strength between CAD/CAM blocks (cerasmart and crystal ultra) and composite resin(polofil NHT Flow) in order to provide a recommendation for the best clinical procedure to be used.

Review of Literature

CAD/CAM

The practice of prosthodontics and the supporting technology involved has evolved tremendously from the traditional to the contemporary.The trend in dentistry is utilizing technology to make it more comfortable ,durable, efficient and natural-looking for the patient. As a result of continual developments in technology, new methods of production and new treatment concepts may be expected. Clinicians must have certain basic knowledge if they are to benefit from these new procedures.

Is it the future? One can never say. As the technology is progressing at a rapid pace, one cannot say whether the newly developed procedures will become obsolete even before it can be used in general practice.Digital dentistry is opening new arenas in dentistry. As the trend continues, digitization will become an integral part of contemporary prosthodontics with the probability of most of the procedures being based on digital techniques in the near future[5]

Dental technology that used to be centered on the standardized lost-wax casting technology has been greatly improved with the introduction of dental computer-aided design/computer-aided manufacturing (CAD/CAM) systems . CAD/CAM has transformed the fabrication of dental prostheses offering; improved accuracy, longevity , biocompatibility , assure the standardization , fewer complications than casting technologies with the advantage of reduced treatment time and the elimination of temporary chairside prosthesis[6]. Different material options were introduced since the CEREC system was first marketed in 1985.Uniform material quality of the restorations is considered an advantage due to the homogeneity of the materials used[7] [8] [9] [10] [11].