شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

HANAA ALY

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

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

“Retentive Strength, Marginal and Internal Fit of Implant Supported Lithium Disilicate and BioHPP Hybrid Abutment Crowns’’

Thesis

Submitted for the partial fulfillment of the Doctorate Degree requirements in Fixed Prosthodontic Department,

Faculty of Dentistry, Ain Shams University

By

Heba Allah Hesham Hussein Mahmoud Ismail

Assistant Lecturer of Fixed Prosthodontic Department, Faculty of Dentistry, Ain Shams University

B.D.S, Faculty of Dentistry, Ain Shams University, 2012

Master Degree, Faculty of Dentistry, Ain Shams University, 2018

Faculty of Dentistry
Ainshams University

2021

Supervisors

Dr. Marwa Mohamed el-Sayed Wahsh

Professor of Fixed Prosthodontics

Faculty of Dentistry, Ain Shams University

Dr. Ahmad Khaled Abo el-Fadl

Associate Professor of Fixed Prosthodontics

Faculty of Dentistry, Ain Shams University

Dr. Ingy Mohamed Hany Nouh

Lecturer of Fixed Prosthodontics

Faculty of Dentistry, Ain Shams University

Dedication

I lovingly dedicate this thesis to

To My beloved Mother

My precious Sister

To My Family

My beloved Husband

& my daughter lily

To the Soul of My dear Father in law

As they have always given me endless Love, Support and Encouragement

Acknowledgment

First of all, thanks are due to **Allah** the beneficent and merciful.

My deepest appreciation and gratitude to my supervisor ***Prof.Dr. Marwa Mohamed Wahsh,*** *Professor of Fixed Prosthodontic Department, Faculty of Dentistry, Ain Shams University, for all I have learnt from her and for her meticulous supervision, continuous guidance and support.*

My sincere thanks & gratefulness to my mentor ***Dr. Ahmad Khaled Abo el-Fadl,*** *Associate Professor of Fixed Prosthodontic whose vast knowledge, endless support, remarkable help and valuable input couldn't be overseen.*

I am also grateful for the patience, meticulous help ,valuable guidance and endless support provided by ***Dr. Ingy Mohamed Hany Nouh,*** *Lecturer of Fixed Prosthodontics which was much appreciated.*

I would like to extend my sincere gratitude, appreciation and respect to ***Prof. Dr. Tarek Salah Morsi,*** *Professor of Fixed Prosthodontic Department, Faculty of Dentistry, Ain Shams University, to whom I owe a lot for his great support throughout this whole journey.*

Last but not least, I wish to express my sincere thanks to all my colleagues and staff members. Special thanks should be given to ***Dr. Bassem Kandil & Dr. Yasmin Ashraf,*** *Assistant Lecturers of Fixed Prosthodontics for their help and support.*

بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنكُمْ وَالَّذِينَ
أُوتُوا الْعِلْمَ دَرَجَاتٍ

صدق الله العظيم

سورة المجادلة

Table of Contents

List of tables IV

List of figures V

List of abbreviations VVIII

Introduction **1**

Review of Literature **3**

I- Types of Implant abutments **3**

- Prefabricated abutments versus custom abutments **4**

II- Implant abutment materials **6**

1. Titanium abutments **6**

2. All ceramic abutments **7**

3. Hybrid abutments **7**

3.1. Different designs of hybrid abutments(screw versus cement retained) ..... **Error! Bookmark not defined.**

3.2. Hybrid abutment materials Error! Bookmark not defined.

i- Lithium disilicate abutment crowns with titanium insert **11**

ii- PEEK variant (BioHPP) abutment crowns with titanium insert **12**

III- Marginal adaptaion and internal fit analysis **18**

IV- Retentive strength **24**

V- Thermocycling aging protocol 26

Statement of the problem **28**

Aim of the study **29**

Materials and Methods **30**

1. Materials **30**

1.1. Lithium disilicate ingots **31**

1.2. BioHPP granulates (PEEK variant) **32**

1.3. Monobond Plus **34**

1.4. Multilink Hybrid abutment cement **35**

1.5. Methyl methacrylate-based primer **36**

2. Methods **37**

2.1. Study design **37**

2.2. Power analysis **37**

2.3. Sample grouping **38**

2.4. Factorial Analysis **39**

2.5. Sample preparation **39**

2.6. Scanning of the implant analog **40**

2.7. Designing of the hybrid abutment crown **41**

- **Titanium insert design** **43**

2.8. Fabrication of CAD WAX patterns **43**

2.9. Pressing of the wax patterns for implant abutment crowns fabrication **44**

a- Pressing of lithium disilicate abutment-crowns **44**

b- Pressing of BioHPP abutment-crowns **48**

2.10. Measurements of the marginal gap of the pressed abutment crowns to ti-base by stereomicroscope **51**

2.11. Measurements of the marginal & internal gap of the pressed abutment crowns by 3D analysis **53**

2.12. Adhesive bonding protocol **56**