Assessment of Fracture Resistance and Marginal Adaptation between two different Implant Hybrid Abutment materials.

A thesis

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Dedication

This work is dedicated to
My family and friends for their
love, prayers, support and
encouragement throughout my life.
They taught me many things,
without them I would not be here
today.

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Key words

Lithium Disilicate (E.max)

Polyetheretherketone(bioHPP)

Fracture resistance

Marginal adaptation

Hybrid abutment

Introduction

Recently, implant dentistry has shown huge evolution, due to the high request for this treatment and constant research into new materials. Implant placement has become the first choice for replacing missing teeth, especially single tooth, due to the good clinical performance that is confirmed and accepted by long-term research.[1]

Nowadays, esthetics play an important role in judging the final result of dental restorations. In case of implant, many factors affect esthetics so it is not only enough to place a natural-looking restoration with correct color and dimensions ,but also for a successful result we need a fine management of the peri-implant soft tissue,[2] which is not always easy and straightforward as soft tissue health is controlled by many factors: angle of implant insertion, the periodontal biotype, level of the first contact between bone and implant, alveolar bone crest level and depth of implant platform.

To solve this esthetic problem, many studies were performed with the continuous innovation and development of CAD/CAM systems which facilitate fabrication of customized non-metallic implant abutments. Zirconia abutment was one of the leading and promising solutions to overcome the grayish shadow color of metal abutments. [3]

One of the new techniques is using CAD/CAM systems to produce hybrid abutment crowns either two pieces or one piece.

Also new materials other than zirconia as hybrid ceramics and polymers were introduced, but not all details and information about these new materials are available, so multiple tests should be done to make sure of the durability of these esthetic implant supra-structures.

Review of literature

Implants with ideal position control the success of dental implant supported restorations in a function and esthetic way. Both sufficient bone volume and precise emergence profile are mandatory for natural gingival appearance. [4] Therefore, the success of implant is not only measured by osseo-integration but also good esthetic appearance of the restoration. A common problem after dental implant placement is the buccal gingival margin position and insufficient papilla around the dental implant platform that should hide the color of titanium abutments. [5]

Implant Abutments:

Implant abutments were used as intermediate elements between restorations and implants in multi-unit implant prostheses.[6] However, abutments role expand to support and manage soft tissue emergence profile and to provide base shades at the cervical portion of single and multi-unit implant prostheses.[7,8] Such requirements, along with the presence of computer-assisted design/computer-assisted manufacturing (CAD/CAM) technology, have led to create different techniques of custom abutment fabrication using titanium and zirconia.[9]

1.1 Prefabricated Abutments

Titanium has been widely used as an implant abutment material because of its biocompatibility and mechanical properties.[10,11] Titanium abutments have also shown predictable results in many clinical studies.[12,13] However, these abutments may cause unnatural bluish color appearance at the soft tissue junction in cases of relatively thin tissues that cause