# بسم الله الرحمن الرحيم

"قَالَ رب أَوزِعنِي أَن أَشْكُر نِعمتَك الَّتِي أَنْعمتَ
علَي وعلَى والِدي وأَن أَعملَ صالِحاً تَرضاه
وأَدخِلْنِي بِرحمتِك فِي عِبادِك الصالِحِين"

**صدق الله العظيم**

**سورة النمل؛ آية ١٩**

# Effect Of Implant Abutment Type On The Vertical Marginal Gap Distance And Fracture Resistance Of Implant-Supported All-Ceramic Crowns
# (An In-Vitro Study)

Thesis

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# *Dedication*

***To my lovely husband,***

***My dearest mother, father and sister***

***Whom without their help, support, patience and prayers***

***I would not have accomplished that work***

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# Introduction

The coincidental discovery of the tenacious affinity between living bone and titanium oxides, termed osseointegration, propelled dentistry into a new age of reconstructive dentistry.[1] The use of osseointegrated implants as abutments for fixed partial dentures has become an alternative treatment option for partially edentulous patients.[2]

Titanium implant abutments are commonly used to support superstructures of dental implants, however their use in critically esthetic areas can invariantly display a characteristic grayness.[3,4] This esthetic problem is recently solved by the introduction of ceramic implant abutments fabricated by modern technologies.

The use of all-ceramic materials for fixed restoration has become a key topic in esthetically oriented dentistry.[5] All-ceramic restorations are the material of choice to achieve an esthetic match with the adjacent dentition.

Recently new ceramic materials and techniques have been introduced to fabricate esthetic ceramic restorations with improved strength and marginal adaptation.[6]

Achievement of a close marginal adaptation is crucial for the long term prognosis of the restoration.[7] Misfit in all-ceramic restorations reduces longevity in addition to other adverse effects such as cement dissolution, discoloration and soft tissue irritation.[8]

Clinically, all ceramic restorations are subjected to masticatory forces under dry and wet conditions. Since the forces applied on different restorations are more likely to be of cyclic nature and well below the ultimate strength of the restoration, therefore mechanical fatigue mimics more accurately the physiological conditions imposed by the forces of mastication.[9]

Since ceramic abutments have been proven to be esthetically successful , it was important to investigate marginal fit and fracture resistance of all ceramic crowns supported by ceramic abutments in comparison with traditional titanium abutments.

# Review of literature

Dental implants are artificial tooth replacements that offer a permanent solution for tooth loss. The use of dental implants to provide support for replacement of missing teeth is becoming an important component of modern dentistry and many individuals could conceivably benefit from dental implant therapy. Advances in researches on implant design, materials and techniques led to a dramatic increase in the use of these devices in the past years and is expected to expand in the future.[10]

Dental implants offer the advantage of being tooth conservative, natural-looking, durable and stronger than their restorative counterpart (bridges and dentures). Missing tooth, whether congenitally absent or lost through trauma, caries or periodontal disease is predominantly associated with esthetic, functional, biological, and emotional problems.[11]

While restoring the missing tooth, the ultimate goal is the preservation of teeth and surrounding oral structures. However this goal is not always met when using traditional dental treatment methods, instead, technical procedures related to tooth replacement sometimes contribute to biologic risks that lessen the prognosis of the abutment teeth.[12]

Alternative treatment options for single-tooth replacement include fixed partial denture, removable partial denture, resin-bonded fixed partial denture, or an implant-supported prosthesis. The final choice between these treatment modalities depends upon specific characteristics in the patient's dentition and his preferences.[13,14]

Fixed partial denture has been regarded as the standard care for sometime in replacement of single and multiple missing teeth. However, it is associated with preparation of sound tooth tissue and high risk of caries of the natural abutments.[15]

A second option for single tooth replacement is a removable partial denture. This line of treatment rarely accepts the patient's desire. However, it still represents the easiest and cheapest temporary treatment modality.[14]

A third option is resin-bonded fixed partial denture. One of the major advantages of this type of prosthesis is the minimal tooth preparation. However, debonding is a usual cause of failure which often occurs during function.[16]

Despite some limitations and obvious clinical challenges, single-tooth implant supported restoration is a highly justified treatment option with an acceptable clinical quality to satisfy the