بسم الله الرحمن الرحيم

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بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات : لا يوجد

Effect of Preparation Depth for an Endocrown on the Trueness and Precision of Intraoral Digital Scanners

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Dedication

'Knowledge is of no value unless you put it into practice'

This work is dedicated to

My parents who are the reason for being here today, who always support and love me.

My lovely wife who is there for me every step of the way, and the reason for my passion and energy.

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List of Contents

Title Page No.

List of Tables

Table No.	Title	Page No.

List of Figures

Fig. No.	Title	Page No.

List of Figures

List of Figures

INTRODUCTION

With the advancement of the digital dentistry over the last years, it becomes so important to evaluate all the computer aided design/computer aided manufacturing (CAD/CAM) devices.

Several scanners have been introduced in the market and since then a great number of intraoral scanners have appeared with different technologies aiming for capturing scans with a high resolution and accuracy.

With the increased pace of life, increased awareness, rising esthetic and functional demands and high expectations from both patients and dentists, the development of a faster and more precise prosthetic solution became of paramount importance.

The success rate of prosthesis depends on several factors, an accurate impression is one of the most important factors to ensure a proper prosthesis from a functional and esthetic aspects.

Conventional impression was utilized to be the sole solution for capturing intra oral data and send it to the laboratory where all the traditional steps were performed starting from disinfecting the impression to pouring, casting, investing down to fabrication of the prosthesis.

The digital process of construction of dental restoration eliminated the drawbacks produced by the conventional impression such as the risk of

storage and damage, the inconvenience and unappreciation regarding the patient, the prolonged overall treatment time and the risk of contamination.

Studying the accuracy of the intraoral scanners has an important role in developing the digital dentistry. The accuracy of impression is described as trueness and precision. Trueness is the ability of measurements matching the real image, While Precision is the ability of measurements to be constantly repeated [1].Several factors affect both Trueness and precision of digital scanners as excessive reflection due to metallic restorations or excessive saliva or with areas poor access, all of these will affect the quality and the sharpness of captured image. Further, light obstruction will cause shadowing and loss of the entire shadowed area like (steep surfaces, sharp edges, proximal areas and gingival margins). [2]

Over the years, the importance of tooth tissue preservation along with the evolution of dental materials has introduced new principles in the restoration of teeth leaving aggressive micromechanical approaches aside, the introduction of Minimally invasive dentistry paved this approach with the involvement of partial coverage restoration as Inlays, onlays, endocrowns, and veneers as variants to the conventional preparations, and the involvement of different new materials like glass ceramics, hybrid materials, and composite materials.[3]

REVIEW OF LITERATURE

Most of the literature concerning restoration of endodontically treated teeth has focused on the post-core unit, where the post is inserted in a root canal, and the core is retained by an apical extension and supports the coronal portion that stimulates a prepared tooth to sustain a definite cast restoration, the traditional objective for a post was to strengthen the weakened tooth. It was assumed that there was a basic change in the dentin of the pulpless tooth, and immediate steps were suggested to strengthen thee tooth and improve resistance to occlusal forces. However, these techniques commonly weaken the tooth.[4]

Dentin that is required to be removed during preparation of the post hole and the consequent reduction in fracture resistance may outweigh any likely gains. The post doesn't actually strengthen the root, but rather improve retention of the core. [5]

The placement of endodontic post creates an unnatural restores structure since it fills the root canal space with a material that has a defined stiffness unlike the pulp. Therefore, it was not possible to recreate the original stress distribution of the tooth. Steel posts are the most dangerous for the root, potentially leading to its fracture, even working on the cement layer stress adsorbing effect by using less rigid cements, it is not possible to improve the stress arising in the system because of the high rigidity of the steel post.[6]

With the advancement of Adhesive dentistry, the need for using posts and filling cores has become less evident. Moreover, the appearance of ceramics that had high mechanical strength and were capable of being acid etched (such as Reinforced with leucite or lithium disilicate), allied

with the adhesive capacity of adhesive systems and resinous cements, made it possible to restore posterior teeth, especially molars, without cores and interradicular posts, it became feasible to restore posterior teeth with extensive coronal destruction by means of onlay and/or overlay restorations, and endocrowns, without the use of radicular posts and while using the entire extension of the pulp chamber as a retentive resource.[7–9]

Endocrown

Pissis [10] was the forerunner of the endocrown technique describing it as the "mono-block porcelain technique." The nomenclature endocrown was described for the first time by Bindle and Mörmann [8] in 1999 as adhesive endodontic crowns, and was characterized as total porcelain crowns fixed to depulped posterior teeth. These crowns would be anchored to the internal portion of the pulp chamber and on the cavity margins, thus obtaining micromechanical retention provided by the pulpal walls, and microretention would be attained with the use of adhesive cementation. This technique is easily performed, demands less clinical time when compared with conventional crowns, costs less because of the fewer number of steps involved, overcomes the patient's lack of available time, and has good esthetic acceptance because it's made of ceramic.[11]

Endocrowns are especially indicated in cases of Molars with short, obliterated, dilacerated, or Fragile roots. Also, they may be used in situations of excessive loss of coronal dental tissue and limited interocclusal space, in which it is not possible to attain adequate thickness of the ceramic covering on the metal or ceramic substructure. [7,12]

Since Endocrown retention mainly lies on bonding , it is crucial to use prosthetic materials , which can be resin bonded to tooth tissues, currently the range of materials available for endocrown comprises lithium-