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## Full crowns overrated: save the tooth, salvage the tooth structure with aid of intraoral scanner- A case report

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### ABSTRACT

*Dentistry has evolved in the recent era whether in technology of digital impressions or conservative restoration of endodontically treated tooth. Intraoral scanners (IOS) are devices for capturing direct optical impressions in dentistry. Optical impressions reduce patient discomfort. IOS are time-efficient and simplify clinical procedures for the dentist, eliminating plaster models and allowing better communication with the dental technician and with patients. The images of the dentogingival tissues captured by imaging sensors are processed by the scanning software, which generates point clouds. These point clouds are then triangulated by the same software, creating a 3D surface model (mesh). The 3D surface models of the dentogingival tissues are the result of the optical impression and are the 'virtual' alternative to traditional plaster models. Porcelain veneers have long been a popular restorative option that have evolved into a well-accepted treatment that can be fabricated in various ways. With the availability of newer high-strength materials such as lithium disilicate and processing technologies like CAD/CAM and heat pressing, dental professionals are now able to produce highly esthetic, high-strength restorations that blend seamlessly with the natural dentition while also withstanding posterior occlusal forces. This has resulted in innovative methods of providing minimally invasive dentistry. So instead of full crowns lets try to save the tooth and salvage the tooth structure. The purpose of this article is to summarize the restorations that may compete the full crowns so that they are kept into the minds of dentists when a tooth is planned to receive cuspal coverage.*

**Keywords**— Occlusal tabletops, intraoral scanner, CAD/CAM

### 1. INTRODUCTION

The full crown is considered as GOLD STANDARD when it is indicated for teeth heavily weakened by dental caries, fractures or previous conservative-prosthetic preparations. The improvement of adhesion with mechanical properties close to those of dental tissues offers the option of a conservative restoration, able to seal, reinforce and protect the tooth and delay the execution of full crown, with subsequent sacrifice of dental tissue. Occlusal table tops preserve coronal structure, avoid contamination of root canal systems, reinforce residual dental tissues, guarantee optimal form, function, aesthetics and offer ergonomic and economic undoubted clinical advantages.

Intraoral scanners (IOS) are devices for capturing direct optical impressions in dentistry [1–3]. Similar to other three-dimensional (3D) scanners, they project a light source (laser, or more recently, structured light) onto the object to be scanned, in this case the dental arches, including prepared teeth and implant scan bodies (i.e. cylinders screwed on the implants, used for transferring the 3D implant position) [2, 3]. The images of the dento-gingival tissues (as well as the implant scan bodies) captured by imaging sensors are processed by the scanning software, which generates point clouds [3, 4]. These point clouds are then triangulated by the same software, creating a 3D surface model (mesh) [3, 4]. The 3D surface models of the dento-gingival tissues are the result of the optical impression and are the 'virtual' alternative to traditional plaster models [4, 5]. Newer high-strength materials such as lithium

disilicate and processing technologies like CAD/CAM and heat pressing, dental professionals are now able to produce highly esthetic, high-strength restorations that blend seamlessly with the natural dentition while also withstanding posterior occlusal forces.



## 2. CASE REPORT

### 2.1 Ceramic Occlusal Top Preparation on Posterior Molar Using Intraoral Scanner

A 19-year-old systemically healthy, female patient reported to the department of Conservative Dentistry and Endodontics with the chief complaint of continuous dull pain in right lower back region of the jaw for more than 4 months. Clinical examination showed occlusal caries in tooth 46. Radiographically furcal periapical tissue involvement was seen and tender to percussion was present. To ascertain any canal morphological variation, eccentric radiographs at different angulations were taken.

Treatment planned was Conservative Root canal treatment in relation to 46 followed by conservative restoration “OCCLUSAL TOP” with help of CAD-CAM designing of the prosthesis. Digital impressions taken by intraoral scanners commence final restoration as soon as possible after root canal treatment leads to chair side crown designing.

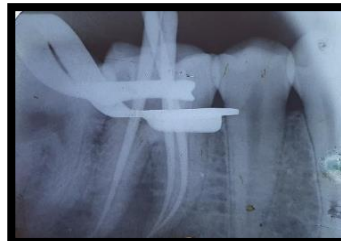


Pre-operative radiograph i.r.t 46

#### A. Root canal treatment with tooth no. 46



Conservative access opening i.r.t 46



Radiograph of master cone



Obturation complete i.r.t. 46

#### B. Core build up with tooth no. 46



Ethching (15 secs) with 37% orthophosphoric acid



Applying of bonding agent



Incremental composite placement



LED light cured(20 secs)



Core build up done with 46

**C. Tooth preparation (occlusal table top) done with 46**



← Occlusal top preparation →



Bite clearance checked

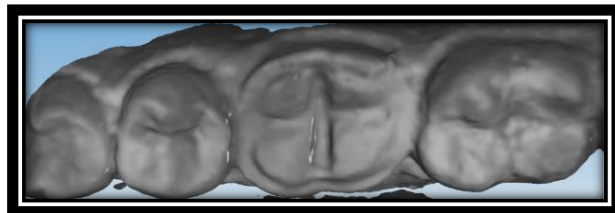


Shade selection done- A3

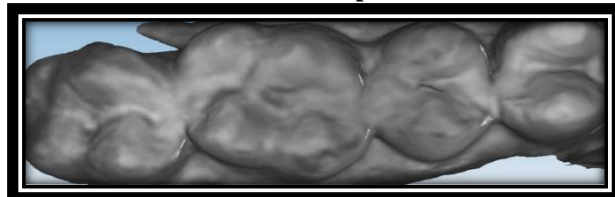
**D. DIGITAL IMPRESSION TAKEN WITH INTRAORAL SCANNER (CEREC II BY SIRONA)**



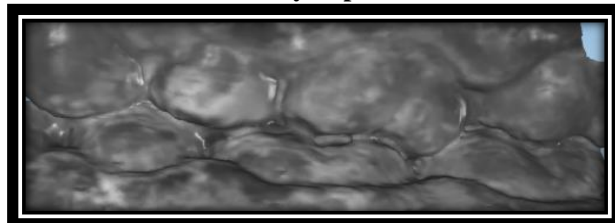
**SHADE SELECTION**



**Mandibular impression**



**Maxillary impression**

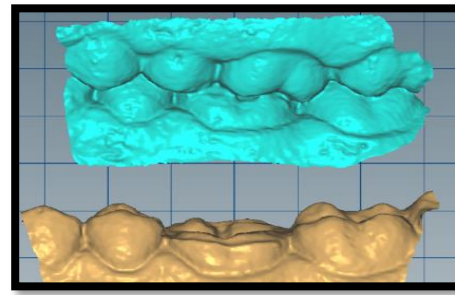


**Bite impression**

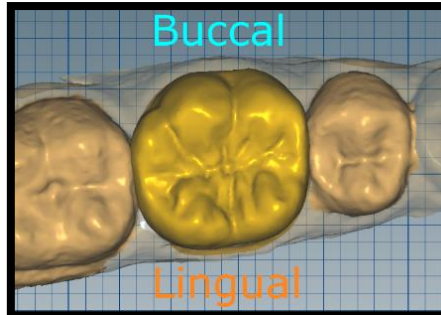
**E. CAD-CAM DESIGNING OF THE FINAL PROSTHESIS**



**Occlusal view**



**Bite registration view**



**Final prostheses designed**

**F. Wax Up Design for Try-In**



**Cad milling machine for wax designs and final prosthesis ceramic designs.**



**Wax pattern prepared**

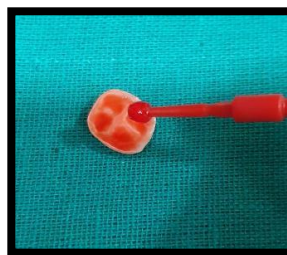


**Checking fit of wax pattern**

**G. Final Prosthesis Luting**



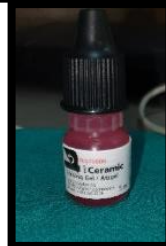
**Final prosthesis OCCLUSAL TABLE TOP ceramic lithium di-silicate**



**Etching of ceramic occlusal top with IPS ceramic etching gel (IVOCLAR)**



**Applying bonding agent MONOBOND N (IVOCLAR) on ceramic tissue surface**





**Etching of the tooth**



**Applying primer & bonding agent  
MULTILINK N PRIMER  
A+ B on tooth**



**Applying MULTILINK N  
(IVOCCLAR) dual curing material to  
occlusal top for luting**

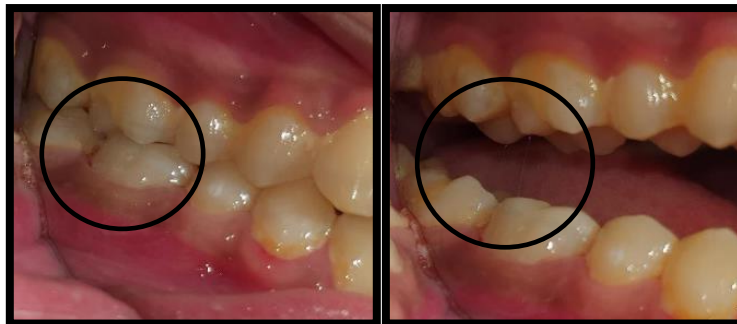


**Light curing after cementation**



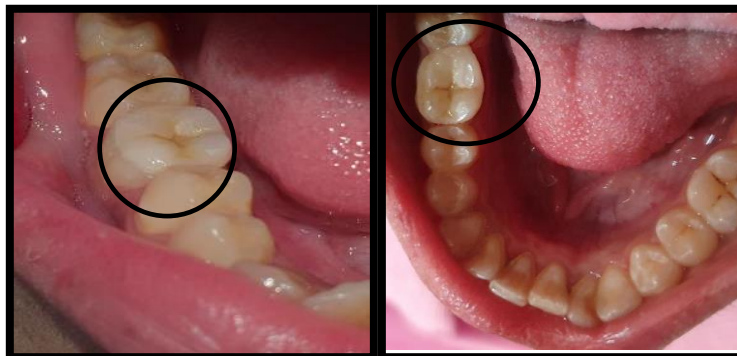
**Final prosthesis after cementation**

### **H. Post-Operative Photographs**



**Bite view**

**Buccal view**



**Occlusal view**



**Post-operative radiograph i.r.t 46**

### **3. CONCLUSION**

- The trend in recent years has been “minimally invasive” dentistry, which means preserving as much tooth structure as possible whenever feasible.

- A successful clinical outcome of endodontically treated teeth depends on adequate root canal treatment as well as on adequate restoration treatment.
- In the presence of small sized cavity, direct bonded restoration, cuspal coverage with indirect restorations is treatment of choice.

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