

Rebuilding Esthetics with Cad Cam Designed Titanium Cement Retained Implant Prosthesis: A Case Report

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Abstract

The aim of this paper is to present a clinical case in which the CAD-CAM procedure was applied for implant prosthesis. Digital CAD-CAM production by laboratory of the final restoration. CAD-CAM production offers the opportunity to easily collaborate with laboratory. This prosthetic production provides better and demonstrated clinical results for the patient. The CAD-CAM production is a very important device for prosthetic team. This workflow compared with traditional methods is faster, precise and predictable.

Keywords: Cad-Cam Prosthesis, Castable Abutment, Cements Retained Prosthesis.

Introduction

Esthetics has taken a leading position in today’s dentistry.

People are getting more diverged towards dental implants for good esthetics.¹ In the dental Implantology, the truly passive and optimal fit of the framework is essential for the long term success of a restoration owing to the physiology of bone tissue around implants. CAD/CAM technology provides such a high level of precision that it has revolutionized the field of prosthetic and restorative dentistry². CAD-CAM technology is an advanced computerized technique that allows to obtain a three dimensional object from a vector illustration performed on the computer³. Both the CAD and CAM are acronyms for Computer Aided Design and Computer Aided Manufacturing respectively. Born in the 60s-70s of last century, this CAD-CAM technology is now used in

industry for the fabrication of multiple numbers of objects also in the dental field⁴.

Titanium is used either as the pure metal, or in an alloyed form in aerospace applications, medical and dental work. It is commonly alloyed with other metals such as Vanadium (V) and Aluminum (Al). It forms then light-weight but at the same time strong alloys for the fabrication of dental implants.⁵ In addition, Ti has a low modulus of elasticity (i.e. Young's modulus) which matched closely to the bone; this ensures a more uniform distribution of stress along the bone-implant interface.⁶

The aim of this paper is to present a clinical case in which the CAD-CAM and titanium cement retained abutment was applied for prosthetic rehabilitation of missing anterior teeth where assessing esthetics and patient satisfaction is prime concern.

Case Report

A 30 year old male patient in good general health reported to the Department of Prosthodontics and Crown and Bridge with a chief complaint of loosen and unesthetic prosthesis in maxillary arch in respect to tooth number 12 (Figure: 1).



Figure 1: Extra oral view after loosening of prosthesis
He desires to replace the previous prosthesis with a more naturally appearing prosthesis. His past dental history reveals that he lost his upper front tooth following a traumatic road traffic accident 10 years back for which

miniplates were placed in premaxilla region and in mandible mid-symphysis region (Figure: 2).

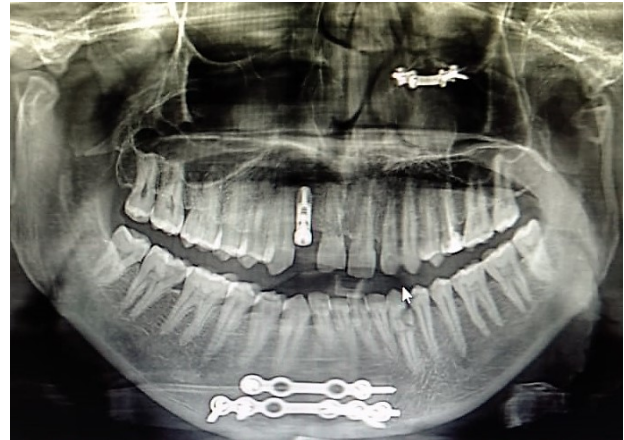


Figure 2: OPG

No abnormality was detected on the extra oral examination. On Intraoral examination, the patient's right lateral incisor was missing. Mild spacing is present in the upper anterior with chronic generalized gingivitis.

Patient has a straight profile with class I molar relationship with normal overjet and overbite. Soft tissue examination reveals no lesions of the oral mucosa, alveolar mucosa and tongue. IOPA radiographic examination reveals that a implant was placed of size 3.75 d / 13 l (Adin-dis Israel) six month before with a faulty prosthesis (Figure: 2).

After a careful evaluation of the case and the execution of diagnostic radiographic examinations taking into consideration, the high esthetic requirements in the anterior region, CAD CAM designed titanium screw retained implant prosthesis was planned and patient was explained about the treatment method.

As the implant was covered with soft tissue, the healing cap was placed after performing the second stage surgery (Figure: 3). On the next appointment open tray impression coping was placed and impression of the entire upper arch was taken (Figure: 4).

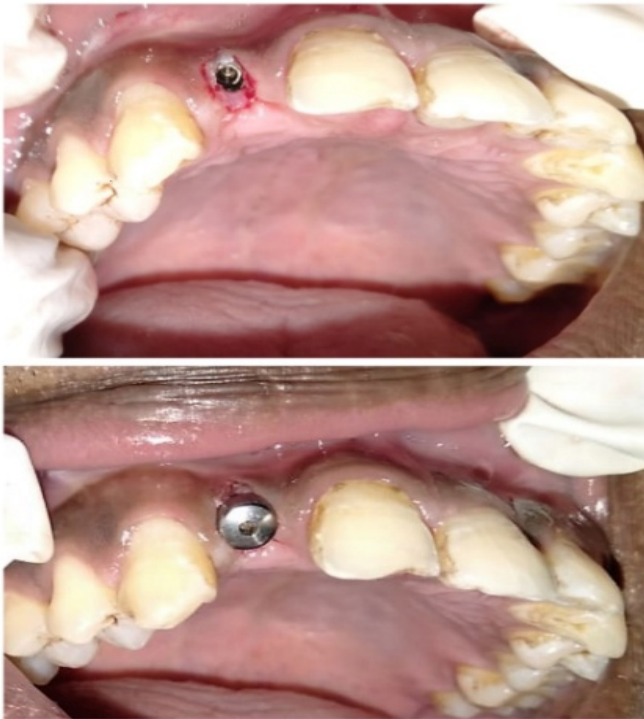


Figure 3. Placement of healing cap



Figure 4: Impression in 12 region with open tray technique

The impression was made by open tray (direct) technique using a putty wash single impression technique (condensation polyvinyl siloxane silicone-photosil DPI). A plastic stock tray was customized by cutting out a window over the area of the implant to allow clearance for the fixture mount.

The impression tray should be assessed in the oral cavity. Following this, the impression was transported to the lab for fabrication of the titanium cement retained prosthesis using castable abutments and Cad-Cam technique (Figure: 5).

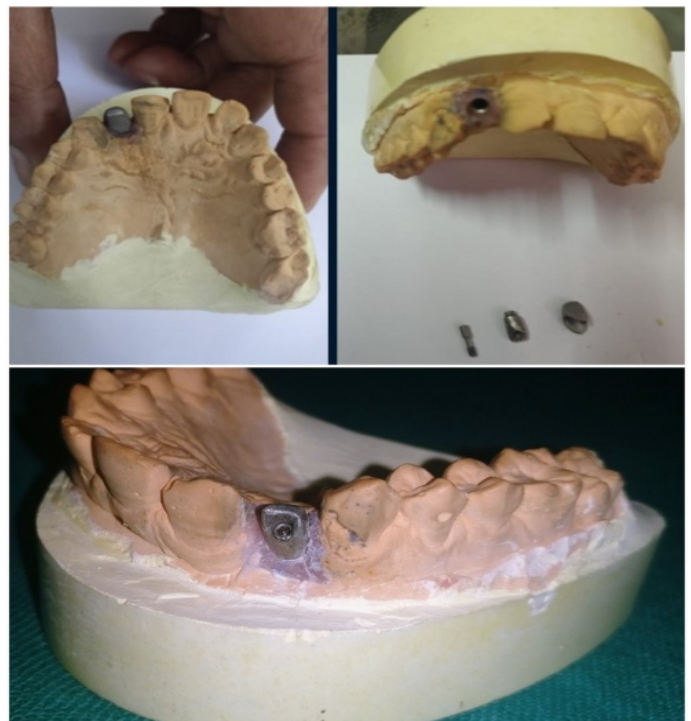


Figure 5: Fabrication of metal coping with castable abutments

Final prosthesis retrieved from the laboratory has been inserted into the patient's mouth to check for fit and accuracy and necessary adjustments were made (Figure: 6).



Figure 6: Fabrication of crown with Cad-Cam technique

Discussion

The dental trauma is a frequently occurring event in our society with anterior region of the maxilla being by far the most affected site. Over the years, various treatment methods have been used for the replacement of lost anterior teeth, including the removal partial dentures and resin bonded or cemented bridges. An implant-supported prosthesis is a best treatment option for restoring such difficult situations, which is sometimes impossible via conventional prosthesis.⁷

In addition to this the esthetic demands are very high in the maxillary anterior region. This objectionable procedure can be avoided by the implant treatment, where the tooth lost can be replaced by an implant supported crown without involving the adjacent teeth. The choice of method is usually based on clinician's preference for allowing the better control on the hygiene of the implants and surrounding mucosa.

The use of CAD/CAM machining for implants retained restorations guarantees a highly accurate and predictable framework fit. In addition, application of gingival porcelain gives the esthetics of anatomical gingival sulcus

and allows removal of the excess cement before processing the pink esthetics.⁸

Conclusion

The substantiation of our clinical practice suggests that the CAD-CAM applications in dentistry offer a valuable aid for the Prosthodontist, these techniques give clinicians the opportunity to easily collaborate with laboratory, and their prosthetic production gives better clinical results for the patient.

CAD/CAM offers a level of quality and accuracy incomparable by any of the traditional techniques. Passive fit, which is very significant to the outcome of an implant-supported prosthesis, is a determinant of the long-term success of a restoration.

Given that the patients have finished growth and a careful treatment planning and timing are performed, the functional and esthetic outcome of single tooth implant treatment today is excellent and can be recommended in the anterior region of the maxilla.

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