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DIGITAL IMPLANT PLANNING FROM VIRTUAL TO REALITY "FULLY DIGITAL IMMEDIATE PLACEMENT AND LOADING OF PREFABRICATED IMPLANT SUPPORTED RESTORATION" (CASE REPORT)

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INTRODUCTION

The immediate loading protocol has emerged as a result of the increasing demand to reduce treatment time and surgical procedures as well as the improved designs and surface qualities of dental implants (1).

Different prosthetic techniques can be used to create immediate implant-supported restorations. Clinical relining of prefabricated shells is one of the commonly used techniques, but their adaptation needs much chairside time and skills for clinical adjustment procedures. On the other hand, the use of postoperatively fabricated restorations is considered accurate and requires less chairside time than the prefabricated shells, however, they require a postoperative impression followed by a second insertion visit and may require clinical facilities and equipment that are not usually available (2).

Recent advances in digital implant dentistry not only improve virtual implant planning but also lead to the evolution of the prefabricated implant-supported prosthesis (3).

METHODOLOGY

A female 35 years patient was presented with a badly destructed maxillary left first premolar and planned to receive an implant supported esthetic restoration. (Figure 1)

Figure (1): Intraoral diagnostic photographs

Data acquisition includes intraoral scan of the dental arches using omnicam intraoral scanner as well as Cone beam computed tomography (CBCT) of both arches. The Digital Imaging and Communications in Medicine (DICOM) file from the CBCT examination and the Standard Tessellation Language (STL) file of the intraoral scan were imported and merged into an implant-planning software (Blue Sky Bio) for prosthetically-driven virtual implant planning. (Figure 2)

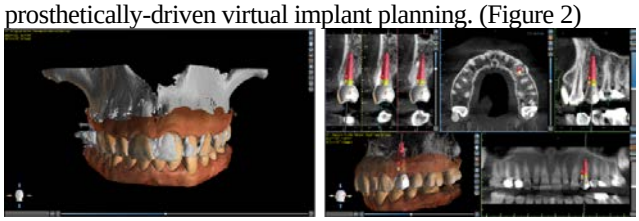

Figure (2): Prosthetically-driven virtual implant planning.

According to the virtual implant plan, a fully guided tooth supported surgical guide with a slot to adjust the implant hex orientation was fabricated from a photopolymer resin using a 3D printer (formlabs2). (Figure 3)

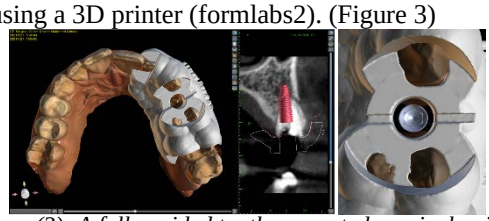

Figure (3): A fully guided tooth supported surgical guide was fabricated with a slot to adjust the implant-hex orientation.

A compatible virtual scan body was attached to the planned implant and the STL file was exported to the prosthesis-designing software (Exocad Dental CAD software (Exocad GmbH)) for designing a screw retained crown on Ti-base. (Figure 4)

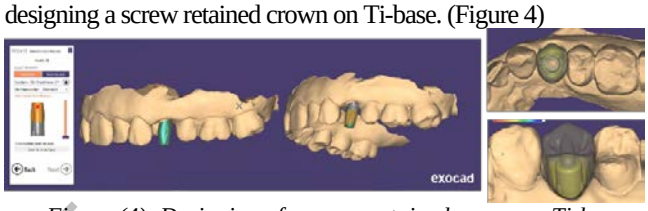

Figure (4): Designing of a screw retained crown on Ti-base.

On the day of surgery, dental implant (Neodent) was placed with a fully guided flapless surgical protocol following the company guidelines of the drilling sequence with a fully guided surgical kit. (Figure 5)

Figure (5): On-spot atraumatic extraction then the dental implant was placed with a fully guided flapless surgical protocol.

The implant insertion torque was more than 30 Ncm as well as ISQ (Implant Stability Quotient) value was above 70 so the implant was ready for immediate loading. (Figure 6)

Figure (6): Implant was ready for immediate loading.

After the guided implant placement, the prefabricated crown was screw-retained in its place. (Figure 7)

Figure (7): The prefabricated crown was screw-retained in its place.

RESULTS AND DISCUSSION

Accurate fit of the prefabricated crown in its place with acceptable contacts, esthetics, and occlusion.

CONCLUSION

A fully digital workflow of a prefabricated single implant restoration is a predictable treatment approach that satisfies the patient's need for immediate restoration of aesthetics and function.

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