

Immediate Implant Placement and Restoration with Prefabricated Provisional CAD/CAM Crown in Anterior Maxilla : A Case Report

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INTRODUCTION

CASE DETAILS

DISCUSSION

- Immediate implant placement and restoration/loading have been widely studied, showing success comparable to delayed protocols¹.
- Given the increasing esthetic driven demand to reduce edentulous period and development of implant surface as well as surgical and prosthetic protocols, implant-supported immediate provisionalization has been suggested as a viable option to maximize esthetic outcomes particularly after single-implant placement in the esthetic zone².
- Typically, the immediate restoration is fabricated on the day of surgery using a pick-up method. This case report presents a novel technique where prefabricated CAD/CAM interim crown already attached to the abutment is immediately delivered on newly placed implant leveraging precise implant position planning, digital fabrication, and a fully guided approach.



Fig 1. A 62 yo female presented with mobility #7. Radiograph revealed a horizontal root fracture.

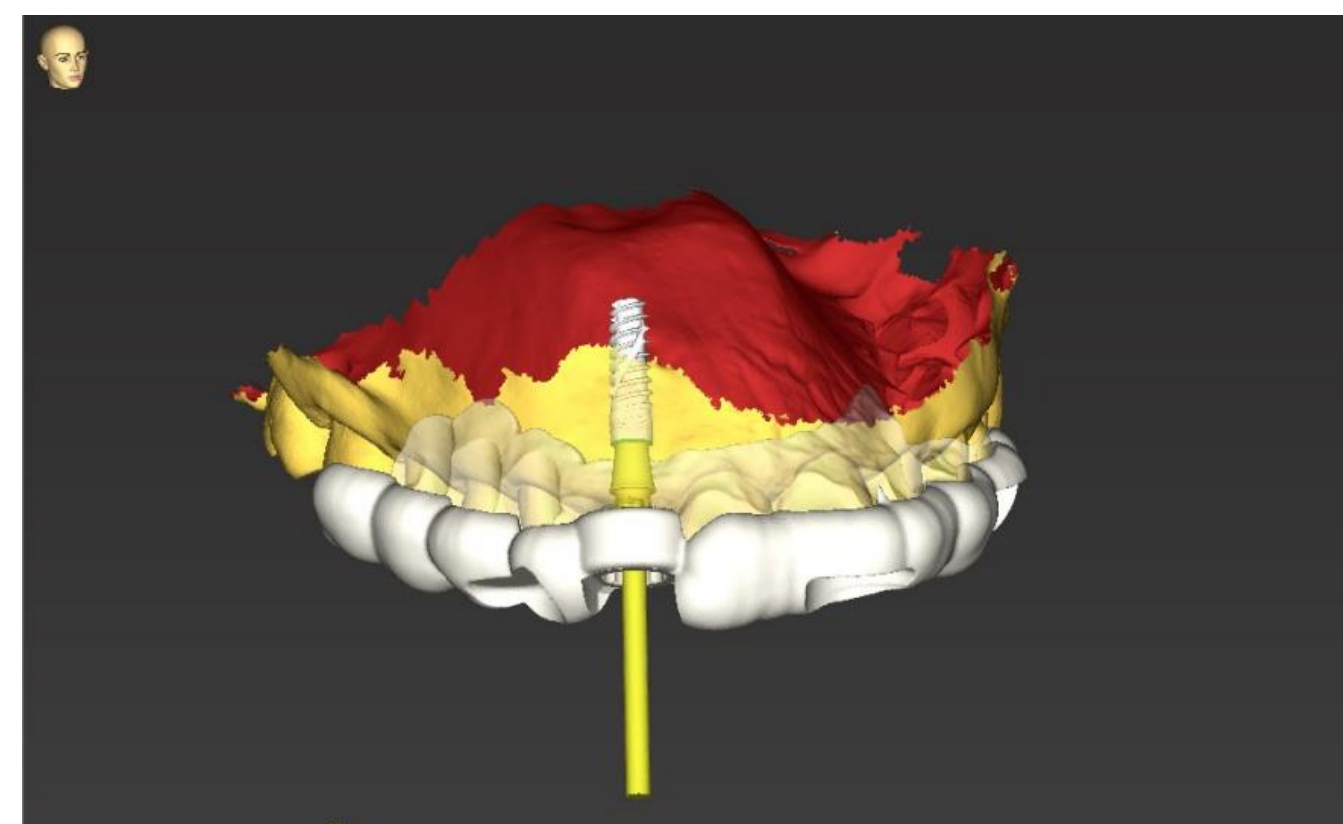


Fig 2. CBCT and Intra Oral Scan were taken. A fully-guided template was designed using CoDiagnostiX software based on ideal implant position.

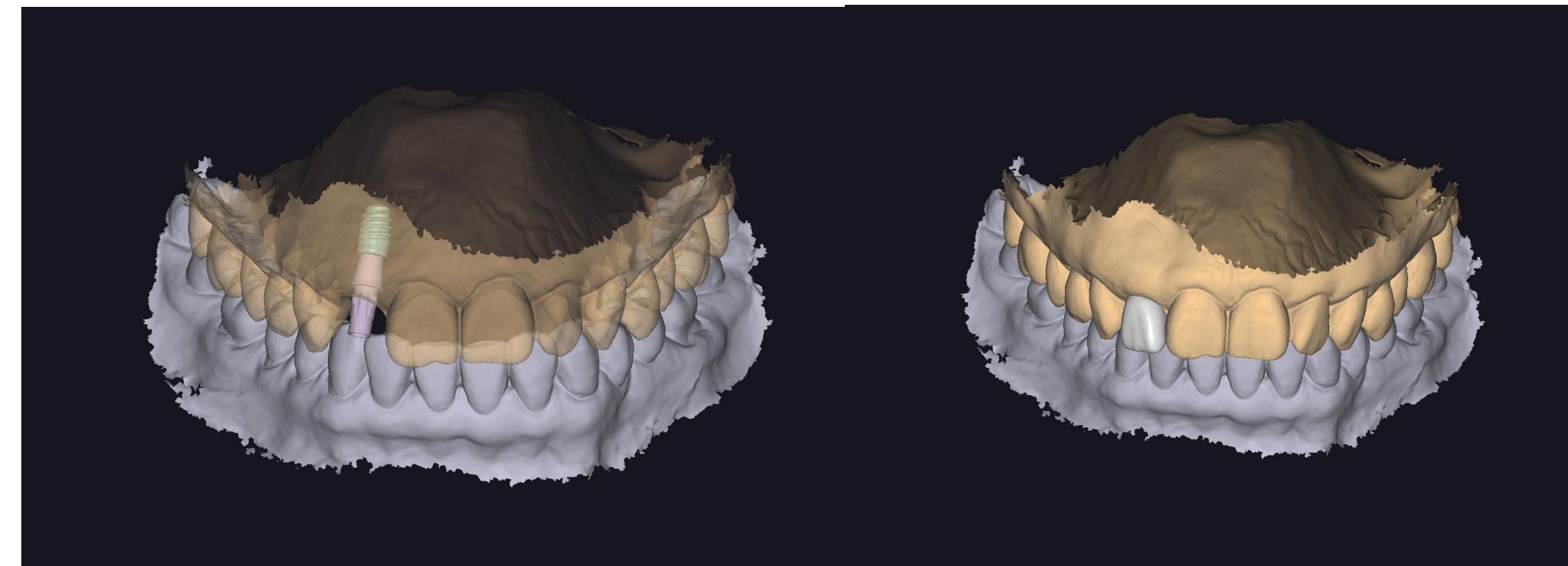


Fig 3. The virtually planned implant position was accurately transferred through a virtual scan body generated by the software. The STL files of the scan body and the arch scans were imported into Exocad.

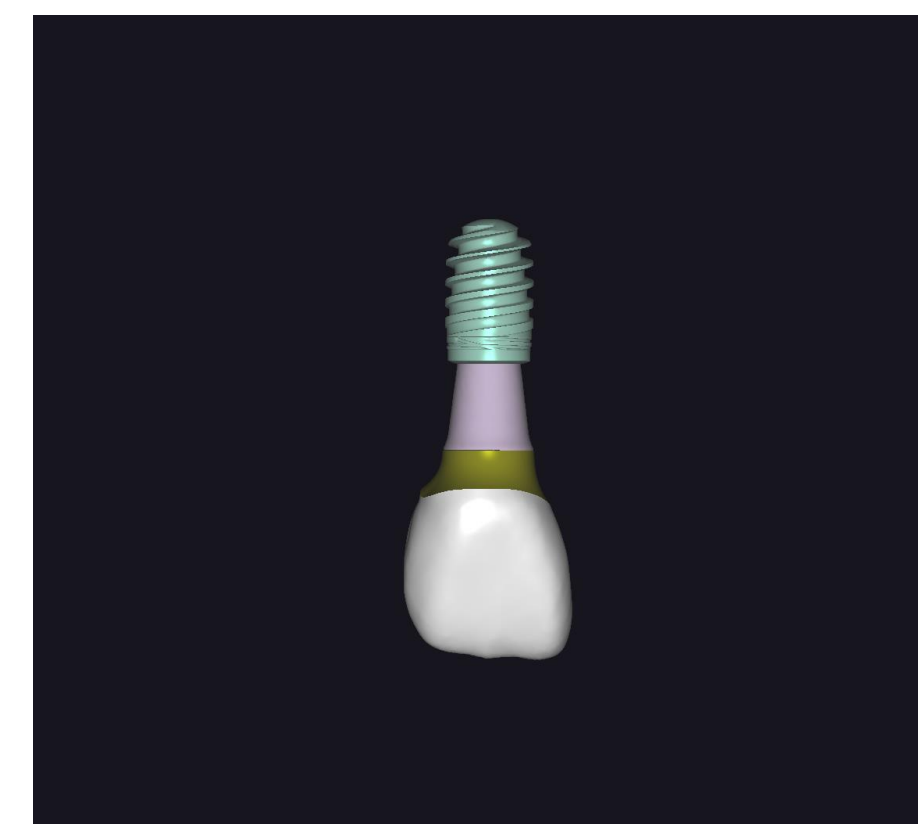


Fig 4. A tibase abutment was selected. An immediate implant crown was designed.



Fig 5. The Printed crown was cemented to the tibase before the surgery (attached to TiBase anti rotational features).



Fig 6. Implant sleeve marked 6 facet according to implant internal connection (hexagon). Implant orientation was controlled by markers on the template. A hexed PEEK sleeve was fixed to reflect the direction of the hex of the planned implant.



Fig 7. Following atraumatic tooth extraction, a Straumann BLX 3.5 x 12 mm was immediately placed through the fully guided template. Implant orientation was controlled by markers on the template.



Fig 8. The implant was placed at the cingulum of a fresh socket and the mix of cortical and cancellous bone grafts was utilized to closed the gap on the facial. The minimally invasive incision was made at the apical to access the anticipated implant exposure seen from CBCT, packed bone and enclosed with collagen membrane, closed with PGA 7.0.



Fig 9. The prefabricated implant crown was then accurately placed.



Fig 10. Post operative. The patient was dismissed with prefabricated temporary implant crown #7

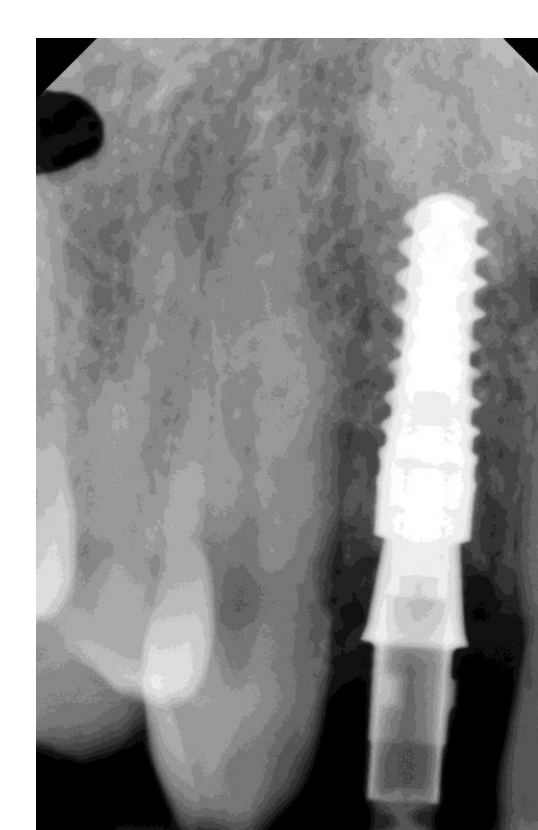


Fig 11. Post operative PA. Temporary engaging abutment is fully seated.



Fig 12. Two weeks post operative. Papilla height was preserved, and healing was good.

Prefabricated laboratory provisional may be more costly than chairside provisional restoration. However, they offer several advantages over chairside provisional restorations.¹

MECHANICAL PROPERTIES

Wang et al and Proussaefs suggested that prefabricated CAD/CAM crown has superior mechanical properties compare to chairside pick up provisional to better withstand simulated mastication cycles than chairside fabricated provisionals^{1,3}.

ACCURACY

The clinical accuracy of prefabricated restoration is based upon **two factors**. The **first** is the accuracy of transferring the virtual implant planning to the cast on which immediate restoration will be made. Compared to other techniques, the digital workflow using virtual scan body was accurately positioned by implant planning software. As a result, the process was not influenced by errors from technical skills or dimensional changes of casts⁴.

The **second** factor is the accuracy of transferring the virtual implant planning to the patient mouth. This factor is controlled by surgical template and clinician's skills. The errors may result from digital impression, aligning the CBCT with digital cast, printing the surgical template, sleeve tolerance, seating the sleeve into the surgical guide, and guide stabilization during surgery⁴.

REDUCED MBL

Berberi et al demonstrated that the use of provisionalization on a prefabricated abutment was effective in preserving the initial blood clot and served as a template for shaping the soft tissue around the implant in the esthetic area. This immediately loaded restoration significantly reduced marginal ridge resorption in freshly extracted socket⁵.

SOFT TISSUE CONTOUR & IMPLANT STABILITY

The CAD/CAM provisional are saved in the designing software and the contour can be made identical to future definitive prosthesis. Proussaefs and Wang et al elaborated that since the soft tissue acquires contour of the definitive restoration, the future definitive restoration requires minimal adjustment that leads to minimal or no pressure on the tissue. This result in more superior long-term tissue and implant stability^{1,3}.

SUMMARY

- Immediate implant placement and loading are reliable procedures as long as exclusion and inclusion criteria are respected⁵.
- Prefabricated CAD/CAM provisionalization can be accurately placed through a fully-guided approach, which can substantially reduce laboratory work and chair-side time, preserves gingival architecture, prevents marginal bone loss, produces restorations with high dimensional accuracy. Ultimately, digital prefabricated provisionals enhance patient comfort and satisfaction^{1,2,4,5}.

References

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