Guided Digital Dental Surgery aided by CBCT, Intraoral Scanner and Smop Surgical Guide

by Dr. Yoko Yamada DDS, MSD

Background

A 49-year-old female patient who was missing tooth #16 and #17 presented at my office. In addition to the missing teeth, the case was further complicated by metal prosthesis.

Diagnosis

Using Carestream Dental's CS 9600 CBCT system, a thorough examination and diagnosis were performed (Figs 1-3). Based on the scans, implant treatment was recommended to replace the missing teeth.
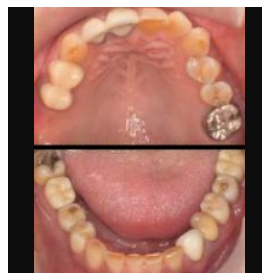

Fig. 1: Panoramic Image

Fig. 2: Intraoral image

Fig. 3: Digital intraoral scan

Treatment

A 3D scan was performed using the CS 9600 CBCT system; its CS 3D Imaging software created an open DICOM file. An intraoral scanner was also used to capture the soft tissue. The two scans—extraoral and intraoral—were transferred to the PDIP module, where they were automatically merged. Typically, it is difficult to merge

CBCT and intraoral scans in cases involving metal prosthesis due to metal artifacts and scatter. Fortunately, CS MAR software, a feature of the CS 9600, had reduced any metal artifacts so a more precise and cleaner CBCT image could be captured, resulting in a more accurate merger of the extraoral and intraoral scans. The PDIP module also allowed for the implants to planned with the final aesthetic placement of the crowns in mind (Fig. 4).
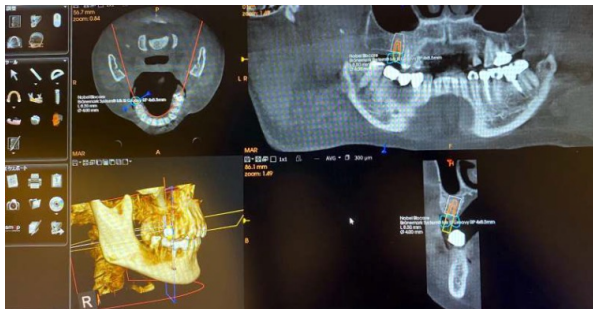

Fig. 4: Implant planning in the PDIP module

Next, the merged files were exported to Smop application where surgical guide design took place (Fig. 5). Once the surgical guide was fabricated (Fig. 6) it was used on the day of surgery during implant placement. The guide fit well, and adjacent teeth were used as a reference point during surgery (Figs. 6-10).

Fig. 5: Surgical Guide Design in SMOP

Fig. 6: Fabricated surgical guide

Fig. 7: Surgical guide placement

Fig. 8: Final placement of the implant
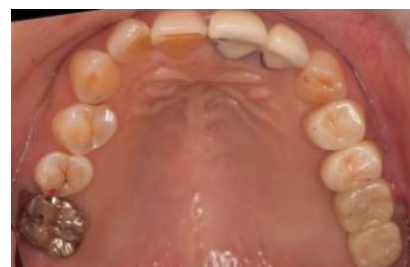

Fig. 9: Post-op panoramic scan

Fig. 10: Final zirconia restoration

"**Guided dental implant surgery makes my case outcome precise, safe and easy to operate. It's also easy to prepare and plan precise cases without significant investment.**"

Dr. Yoko Yamada, DDS, MSD

Conclusion

The PDIP module offers a simple and easy-to-use way to combine CBCT and intraoral data to gain precise results. When exported to Smop software, the results are digitally precise surgical guides that deliver faster, more efficient results. Designing surgical guides virtually with the help of Smop also reduces the number of steps in the overall process. This digital planning process with PDIP and Smop ultimately led to more accurate implant placement, resulting in an improved patient experience and outcome.