



BACKGROUND

Extensive surgery for maxillary tumor resection usually results in severe functional, esthetic, and social impacts on patients. In most patients, prosthodontic treatment with conventional or implant-retained maxillofacial prosthesis are challenging. The complexity of these cases is due to the limited bone support, tooth loss, and the need to restore extensive areas of oral soft tissues, facial soft tissues, or both. The conventional maxillofacial obturator may not be feasible in cases with severe maxillary defects. Alternative treatments with zygomatic implants are an option to treat these clinical scenarios. The purpose of this poster is to illustrate the integration of digital and analog workflows and the use of the digital multi-functional tray (MFT) to increase the possibility of successful results and efficiency when treating these cases

CLINICAL CASE

A 65-year-old male presented to LSUHSC School of dentistry with the chief complaint of an unretentive maxillary obturator with an inadequate seal between the oral and nasal cavity, making it difficult to eat, drink and speak. The lack of retention was associated with inadequate anatomic supporting structures and the existing defect. The Patient had a history of Squamous Cell Carcinoma of the anterior maxilla, which was treated with a partial maxillectomy which included teeth #5-12. The residual bone and teeth (3 and 14) did not allow for proper retention

METHOD

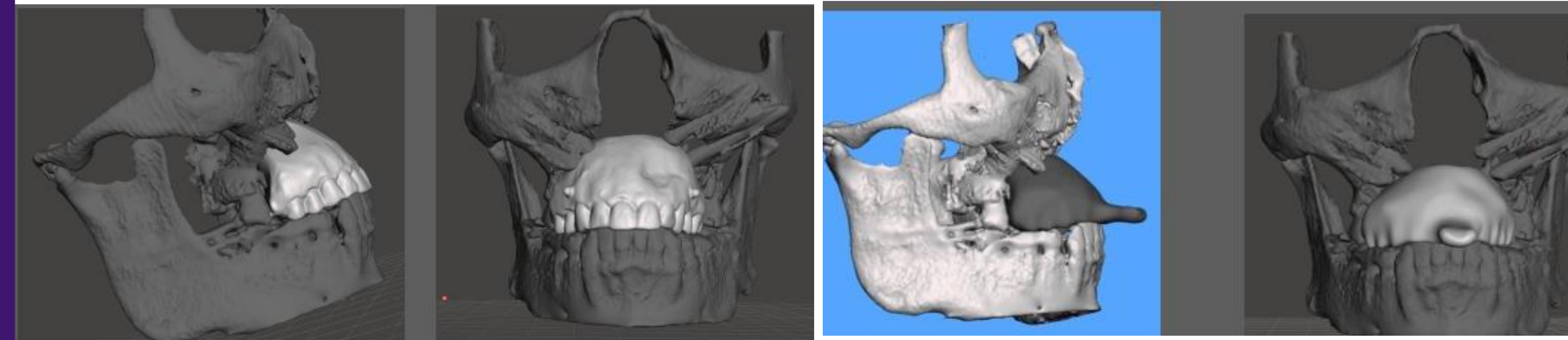
- Based on the Cone Beam Computer Tomography (CBCT) imaging, a three-dimensional (3D) model of the entire skull was printed to help plan the placement of 4 zygomatic implants
- The 3D printed surgical guide was fabricated based on the patients existing obturator as the teeth position, occlusion, and occlusal vertical dimension (OVD) were satisfactory. This guide aided in a more accurate position of the zygomatic implants
- After implants osseointegration, the patient's obturator was scanned and modified to generate a 3D-printed MULTIFUNCTIONAL TRAY (MTF). This device allowed to simultaneously make a final impression of the defect, record the implant position and serve in the jaw relation record process, all in one appointment



EXCISED LESION

3D PRINTING MODEL OF THE SKULL

PLANNING THE SURGICAL GUIDE



DIGITAL PLANNING OF THE MULTIFUNCTIONAL TRAY



3D-PRINTED MFT

VERIFICATION JIG

DIGITAL PLANNING OF THE BAR & LOCATORS



BAR TRY-IN

FINAL PROSTHESIS

- The final impression was poured, and a master cast was mounted on an articulator to design the prosthetic bar
- A verification jig using temporary abutments and pattern resin was made on the master cast to confirm the accuracy of the definitive impression
- A titanium bar with locator attachments was fabricated by using the DTX studio lab software (Nobel BioCare)
- The milled bar was tried in, and a new Maxillomandibular relationship (MMR) record was taken by using a bar-supported baseplate and wax rim. At this point, tooth selection was also made
- An esthetic try-in of the teeth was done in a subsequent appointment and sent to the laboratory for final processing.
- The final prosthesis was delivered, and oral hygiene instructions (OHI) were given to the patient.

RESULT

A hybrid workflow using an analog impression technique with a digitally designed and 3D printed multifunctional tray was used and helped fabricate a final prosthesis with adequate hard and soft tissue adaptation. The precise fit of the prosthesis allowed the Patient to have improved speech, swallowing, and mastication. The new prosthesis also improved the patient's oral and facial appearance. The patient reported improved function and quality of life outcomes after treatment

CONCLUSION

Maxillofacial defects are challenging to any clinician. Zygomatic implants are a viable option in prosthetic rehabilitation for patients with maxillofacial defects. Digital technology provides valuable tools that can help improve traditional techniques in the field of maxillofacial prosthodontics. Making accurate impressions with the help of the 3D printed MFT helped increase the final prosthesis retention and stability, which helped benefit for affected patient's quality of life