

## BACKGROUND

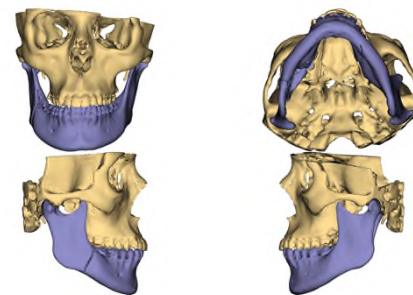
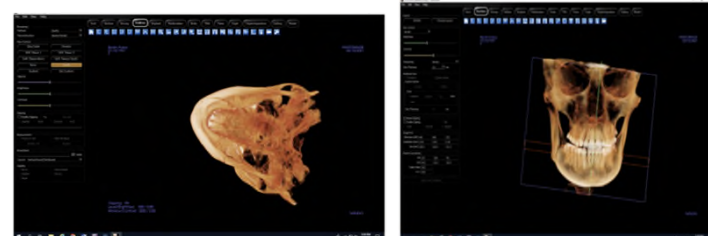
In recent years, virtual surgical planning (VSP) has been employed by craniomaxillofacial surgeons to assist with planning and executing a multitude of surgical procedures. Custom 3D-printed cutting guides and plates designed using VSP reduce operative length and produce predictable aesthetic outcomes. Despite this, the use of VSP for facial trauma is poorly represented in the literature. Herein, we detail the use of VSP to assist with surgical correction of bilateral mandibular fractures.

## METHODS

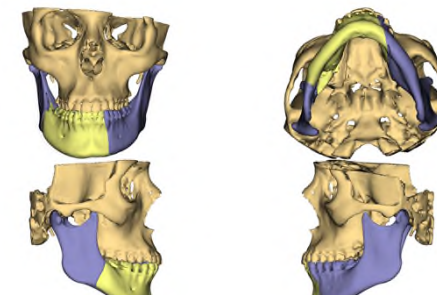
Upon literature review, only 3 articles were identified detailing the use of VSP for treatment of mandibular fractures. All articles detailed management of parasymphiseal fractures in elderly, edentulous patients. NSQIP data was collected to compare the operative length of the surgical procedure using VSP to the operative length of conventional surgery.



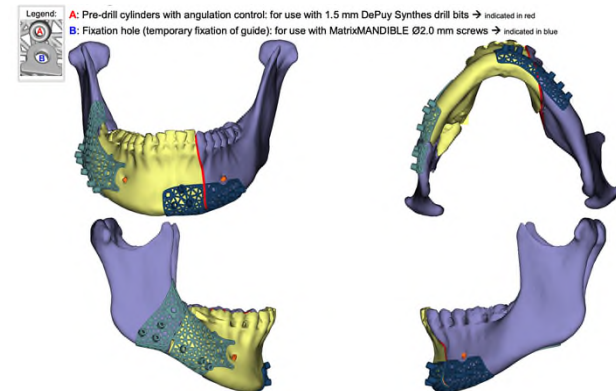
Pre-operative radiographs



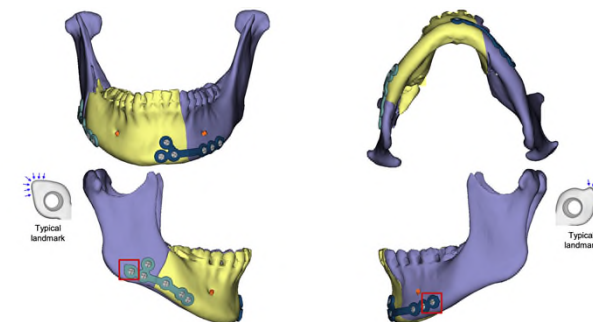
Surgical Plan: Preoperative Position



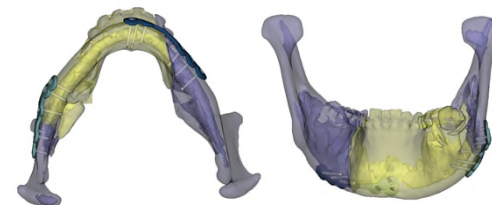
Surgical Plan: Mandible Reconstruction



Guide Design: Titanium 3D Printed Guide for Mandible



Implant Design: Titanium 3D Printed Plate for Mandible, Mini (1.5 mm)



Implant Design: Titanium 3D Printed Plate for Mandible (screw angulation)

## RESULTS

Our patient presented to our team with bilateral facial pain and fractured teeth after falling from her bike two days prior to presentation. A decision was made to perform open repair of the mandibular fractures and to place osseointegrated dental implants following extraction of the fractured dentition in a single surgery. VSP was performed using images generated by cone-beam computed tomography to create custom orthognathic splints, cutting guides, and titanium plates for the procedure. The patient's procedure was completed in under two hours without immediate complications. Postoperatively, the patient demonstrated normal occlusion along with aesthetic outcomes. Treatment of bilateral mandibular fractures along with placement of osseointegrated dental implants was performed quicker than the median operative length of patients undergoing conventional surgical repair of bilateral mandibular fractures (**137 minutes**).

## CONCLUSION

The use of VSP for treatment of mandibular fractures exhibits significant potential; however, cost analysis studies are needed to determine whether the cost reduction resulting from decreased operative length is greater than the costs associated with using VSP.