

## **Authors**

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## **Proposal Title**

3D-Printed Surgical Guides for Endoscopic Repair of Subcondylar Mandible Fractures

## **Introduction**

Endoscopic repair of subcondylar mandible fractures is a technically difficult procedure and can be time-consuming. Unlike other open mandible repair techniques, the endoscopic approach requires adapting fixation implants to patient-specific anatomy with only 2-dimensional screen displays to guide the surgeon. We initiated a pilot program using 3D-printed surgical guides (3DSG) to aid implant adaption during these challenging cases.

## **Methods**

Pilot program was conducted with the craniofacial reconstruction team at a single level-one trauma center. Patient CT scans were used to create a patient-specific anatomic model for each subcondylar fracture repair. A retrospective review was also performed examining all cases of patients who had undergone endoscopic repair of subcondylar mandible fractures from January 2019 to January 2024. Operative times were compared between cases utilizing a 3D-printed surgical guide (3DSG group) and those done without (non-3DSG group).

## **Results**

Thirty-one cases were examined, of which 10 repairs (32%) were performed with the aid of a 3D-printed surgical guide. Anecdotally, the team reported the use of 3DSG improved their technique and simplified the implant adaptation. Mean total operative times appeared to be less in the 3DSG group when compared to the non-3DSG group (174 min vs 205 min,  $p=0.20$ ) as were the incision to close times (122 min vs. 153 min,  $p=0.17$ ), though neither reached statistical significance. Nineteen cases (61%) involved repair of additional fractures so operative times per fracture were also examined. 3DSG group appeared to have shorter operative times per fracture than the non-3DSG group (78 min vs. 90 min,  $p=0.28$ ).

## **Conclusions**

We report on a single-center pilot program utilizing 3DSG to aid endoscopic repair of subcondylar mandible fractures. Our preliminary experience suggests that using these surgical guides could be helpful to surgeons and may reduce operative times in these challenging cases.