PATIENT-SPECIFIC CUTTING GUIDE FOR ACCESS TO INFRATEMPORAL FOSSA

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Background

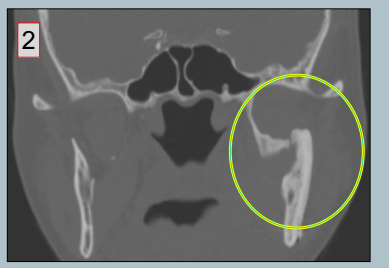
Approach to the infratemporal fossa (ITF) is challenging. ITF contains the internal maxillary artery (IMA) and pterygoid venous plexus (PVP); injury causes significant bleeding. Traditional approaches to ITF are designed to provide wide exposure which has associated morbidity.

Purpose

This case presents a novel design of a patient-specific cutting guide. With this guide, we were able to access ITF, resect heterotopic bone, avoid IMA and PVP, and minimize the surgical burden to patient

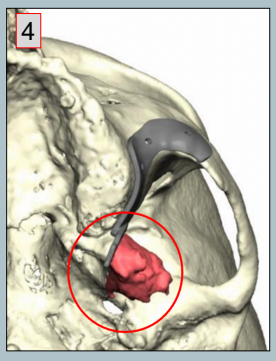
Case Report

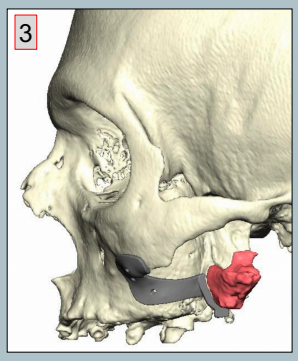
- 65-year-old male with past medical history of HIV and HTN
- Chief complaint: trismus
- 20 years ago, he had open reduction and internal fixation of body and angle mandible fractures at another institution
- His maximum mouth opening was 15 mm (Figure 1)
- CT: bone fusion between coronoid process and lateral pterygoid plate (Figure 2)-
- Size of bone 14 x 17 x 8 mm
- Patient specific cutting guide (IPS KLS Martin) (Figure 5)
- Under general anesthesia, via intra-oral approach, resection of bone fusion,left coronoidectomy, and extraction of teeth
- Maximum mouth opening increased to 46 mm (Figure 6)



Cutting Guide

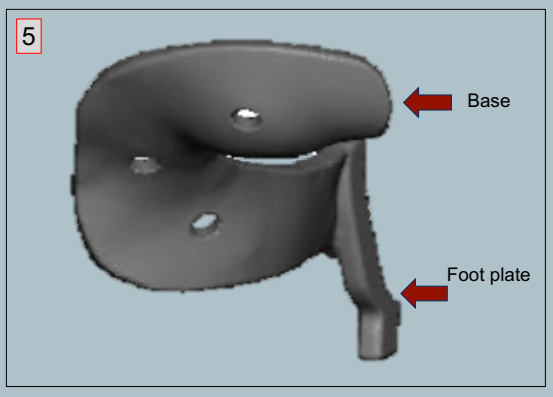
- Base followed shape of the zygomaticomaxillary buttress and fixated with 3 screws (Figure 3)
- Foot plate oriented saw blade in the desired direction and depth of superior osteotomy
- Depth of the superior osteotomy was determined based on the depth of MBF. Therefore, avoided injury to IMA and PVP (Figure 4)
- Cutting guide was fabricated from titanium alloy
  - Less bulky
  - Easily placed through an intraoral incision





Discussion

- The fundamental goals of surgical approaches to ITF are to provide sufficient exposure and access for complete resection of the pathology, minimize risk of intra-operative and post-operative hemorrhage, and decrease extent of surgical intervention.[1]
- Approaches to ITF consist of a wide transcutaneous incision with facial flap elevation, mobilization of the parotid gland, facial nerve exposure and/or main trunk transection, and mandibulotomy.
- These approaches have potential for substantial morbidity. [1,9] Some cases report endoscopic approaches to the ITF.[9,10] A transoral approach avoids the transcutaneous incision [10] and potential associated morbidities.
- In conclusion, this technical note describes our patient-specific cutting guide which we fabricated to approach ITF via a transoral approach. Using this guide, we were able to resect bone located at ITF which was causing fusion of maxilla to mandible.
- Our guide enabled us to avoid a transcutaneous approach, perform a minimally invasive operation, and decrease length of hospital stay for the patient.



References

1. Kim SM, Paek SH, Lee JH. Infratemporal fossa approach: the modified zygomatico-transmandibular approach. *Maxillofac Plast Reconstr Surg*. 2019;41(1):3-3.
2. Campero A, Campero AA, Socolovsky M, et al. The transzygomatic approach. *J Clin Neurosci*. 2010;17(11):1428-1433.
3. Melchenko SA, Kozlov AV, Abramyan AA, Yulchiev UA, Cherekaev VA. [The orbitozygomatic approach. History, technique, and modifications]. *Zh Vopr Neirokhir Im N N Burdenko*. 2019;83(3):102-108.
4. Xue Z, Liu J, Bi ZY, et al. Evolution of transmaxillary approach to tumors in pterygopalatine fossa and infratemporal fossa: anatomic simulation and clinical practice. *Chin Med J (Engl)*. 2019;132(7):798-804.
5. Al-Mefty O, Fox JL, Rifai A, Smith RR. A combined infratemporal and posterior fossa approach for the removal of giant glomus tumors and chondrosarcomas. *Surg Neurol*. 1987;28(6):423-431.
6. Parameswaran A, Jayakumar NK, Ramanathan M, Sailer HF. Mid-Face Degloving: An Alternate Approach to Extended Osteotomies of the Midface. *J Craniofac Surg*. 2017;28(1):245-247.
7. Fonseca RJ. *Oral and Maxillofacial Surgery* Vol 3 volume set: Elsevier Health Sciences; March 8, 2017.
8. Ellis E, Zide MF. Surgical approaches to the facial skeleton. Philadelphia: Lippincott Williams and Wilkins; 2005. pp. 46–48.
9. Caminiti MF, Lam DK. Novel Transoral Approach to the Posterolateral Maxilla and Infratemporal Region. *J Oral Maxillofac Surg*. 2017;75(3):648.e641- 648.e645.
10. Torres-Gaya J, Puche-Torres M, Marqués-Mateo M, García Callejo FJ. Transoral (transvestibular paramandibular) endoscopic approach for benign tumours in the infratemporal fossa. *BMJ Case Rep*. 2019;12(1).