Using a 3D-Printed Pterygopalatine Fossa Model to Enhance Student Learning in Medical Gross Anatomy

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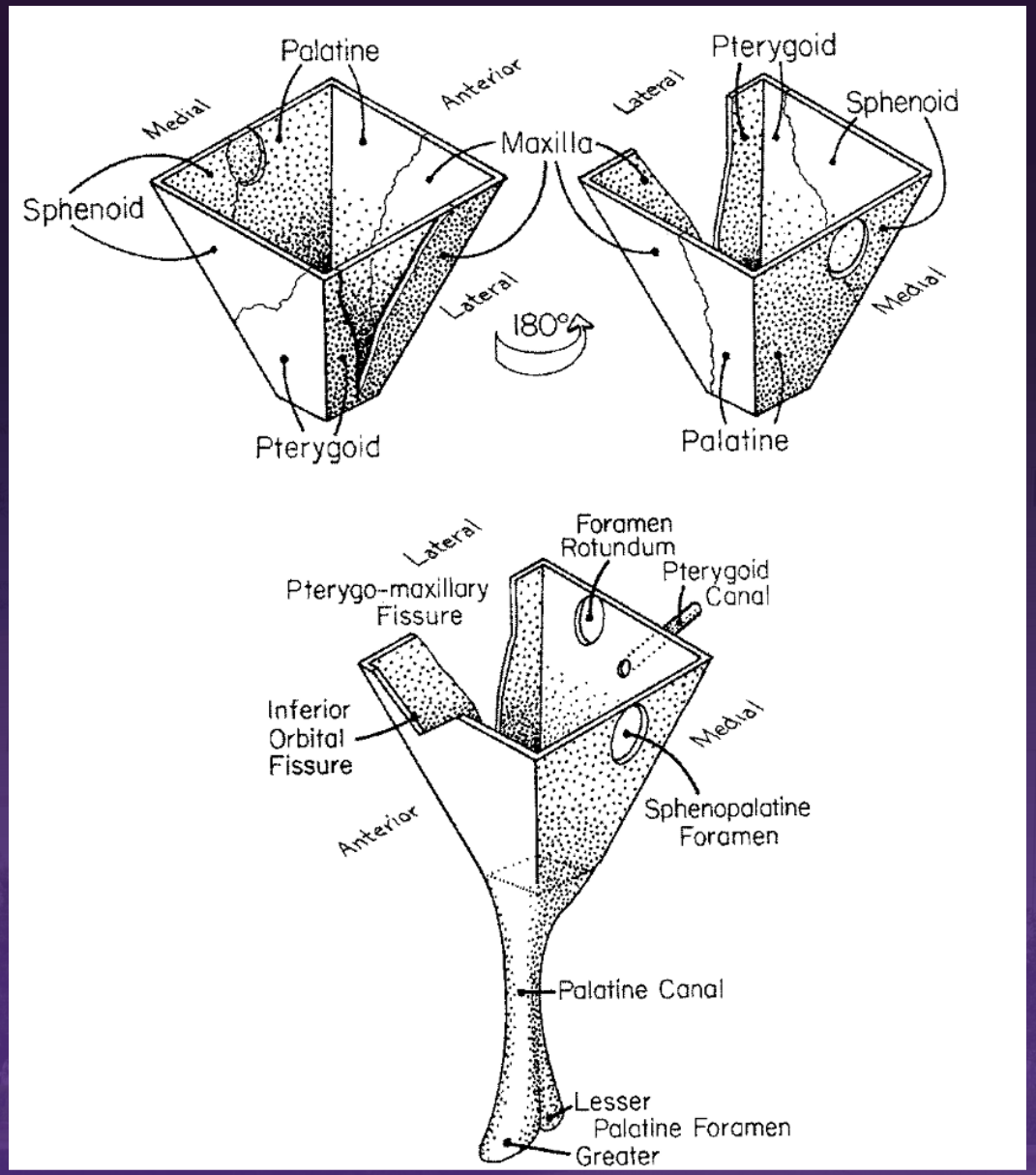
Introduction

- The pterygopalatine fossa is a complex space in the skull base
- Contains:
  - Maxillary artery (terminal branches)
  - Maxillary division of the trigeminal nerve
  - Pterygopalatine ganglion
- Poorly visualized in cadaveric dissection

Introduction



*"The infraorbital and zygomatic nerves pass anteriorly through the infraorbital fissure; the **greater and lesser palatine nerves** pass inferiorly through the greater and lesser palatine canals…"*

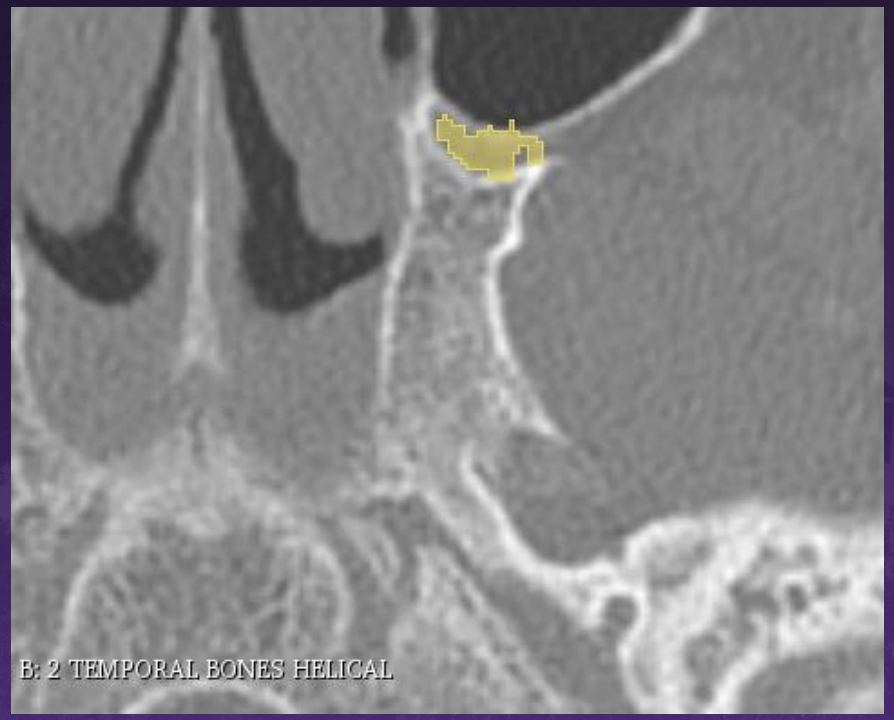
BSOM M1 Anatomy Course Pack,

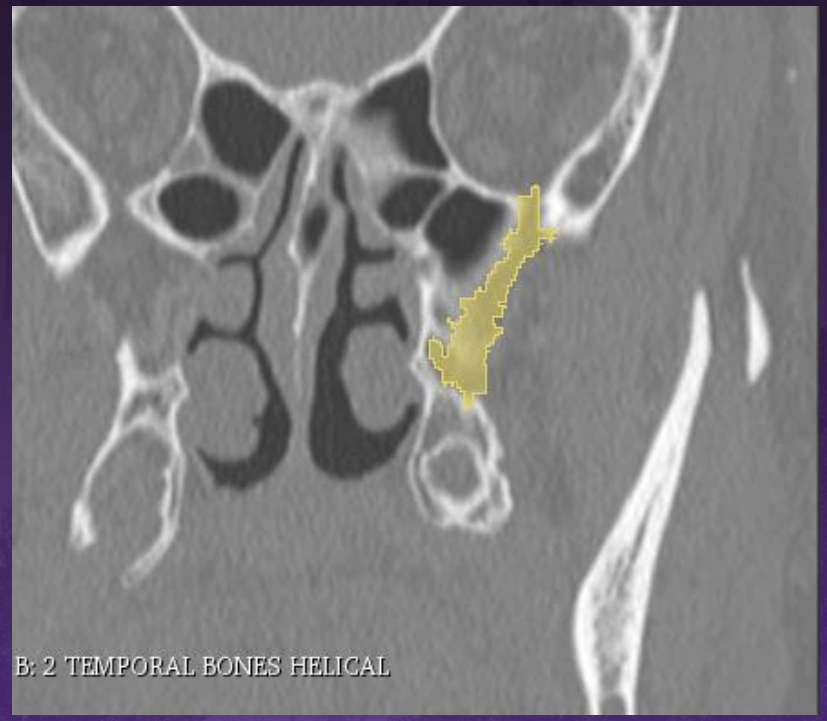
Used with permission from Dr. Alex Meredith, Virginia Commonwealth University School of Medicine

Study Design

- Target
  - Education project for first–year medical students enrolled in gross anatomy at the Brody School of Medicine (BSOM)
- Intervention
  - 3D-printed model of the pterygopalatine fossa reconstructed from CT scan
  - Accessed during voluntary review sessions, with 3D model as a supplement
- Outcome measure
  - Pre- and post-session assessment scores
  - Post-session survey
  - BSOM M1 Medical Gross Anatomy assessments (course-level)

Developing a Model using a CT Scan

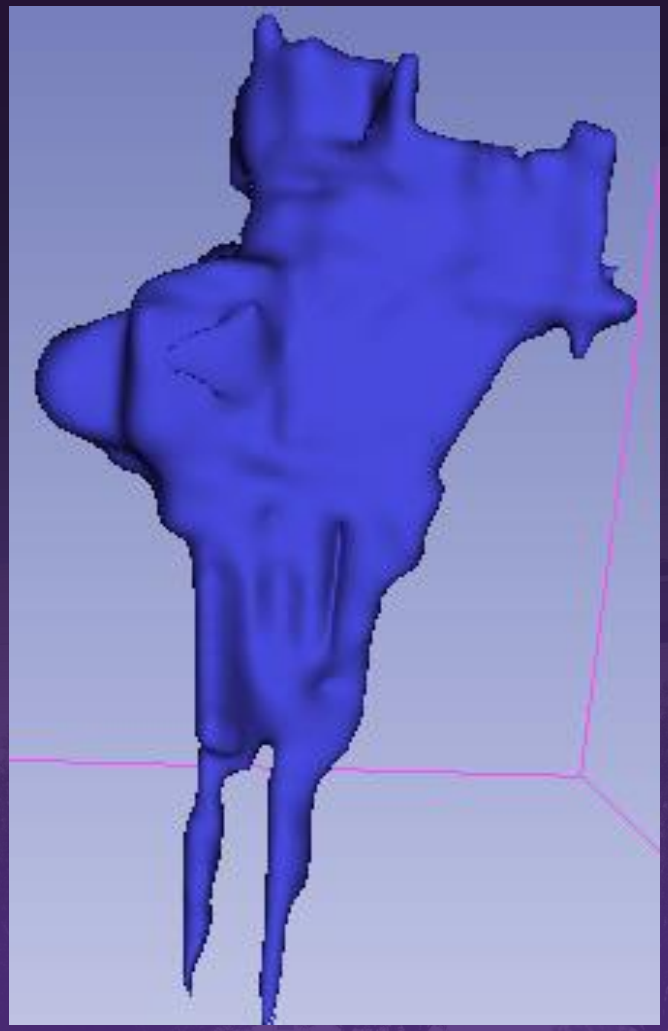




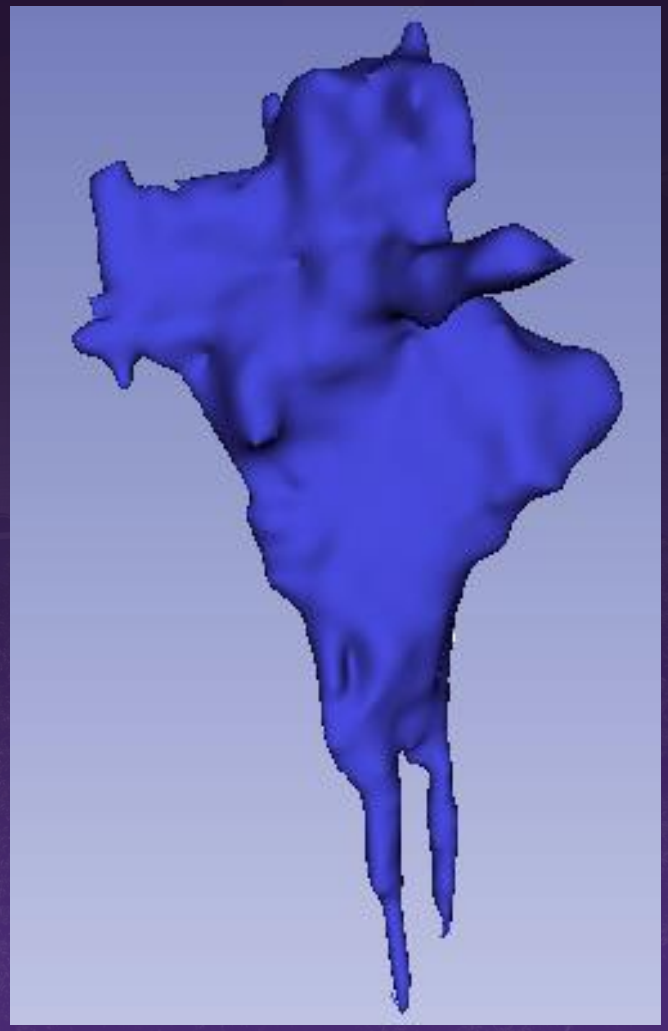
Selected pixels indicate manual segmentation used for 3D rendering

3D Rendering of Selected Pixels

Anterior View



Posterior View



Timeline

Spring 2022

Model Creation:
Acquire CT, create model using *3DSlicer*, label model for clarity

Fall 2022 (early)

Recruitment:
Email, use BSOM Class of 2026 Facebook page and GroupMe

Fall 2022 (late)

Session:
Voluntary, 30-minute sessions with access to labeled model, pre- and post-session quiz

Post-Session

Post-session:
Email post-session survey

Winter 2022

Data analysis

Future Directions

- Increase model complexity
  - “Hollowed out” model vs. negative-space model
  - Show nerves and vasculature passing through
- Develop 3D models of other complete anatomical structures from radiological images