

Anatomical Step-by-Step Dissection of Complex Skull Base Approaches for Trainees: Surgical Anatomy of the Endoscopic Endonasal and Endoscopic-Assisted Transmaxillary Transpterygoid Approaches

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Introduction The endoscopic endonasal transpterygoid approach (EETPA) with or without the addition of the endoscopic-assisted sublabial anterior transmaxillary approach (ESTA) has become increasingly utilized for lesions posterior to the pterygopalatine fossa (PPF), including infratemporal fossa (ITF), lateral recess of the sphenoid sinus, Meckel's cave, petrous apex, and parapharyngeal space. The main goal of this study is to develop an educational resource to learn the steps of the EETPA for trainees.

Methods EETPA and ESTA were performed in 12 specimens by neurosurgery trainees, under supervision from the senior authors. One EETPA and one ESTA were performed on each specimen on opposite sides. Dissections were supplemented with representative cases.

Results After a wide unilateral sphenoidotomy, ethmoidectomy, and partial medial maxillectomy, the anteromedial bone limits of the PPF were identified and drilled out. The pterygoid process was modularly removed. By enlarging the opening of the posterior and lateral walls of the maxillary sinus through EETPA and ESTA, respectively, the neurovascular and muscular compartments of the PPF and ITF were better identified. The EETPA opens direct corridors to the PPF, medial ITF, middle cranial fossa, cavernous sinus, Meckel's cave, petrous apex, and internal carotid artery. If a more lateral exposure of the ITF is needed, the ESTA is an appropriate addition.

Conclusion Despite the steep learning curve of the EETPA, granular knowledge of its surgical anatomy and basic surgical steps are vital for those advancing their learning in complex endoscopic approaches to the ventral skull base when expanding the approach laterally in the coronal plane.