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Anatomical Step-by-Step Dissection of Complex Skull Base Approaches for Trainees: Surgical Anatomy of the Endoscopic Endonasal Approach to the Sellar and Parasellar Regions

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Abstract

Introduction Surgery of the sellar and parasellar regions can be challenging due to the complexity of neurovascular relationships. The main goal of this study is to develop an educational resource to help trainees understand the pertinent anatomy and procedural steps of the endoscopic endonasal approaches (EEAs) to the sellar and parasellar regions. **Methods** Ten formalin-fixed latex-injected specimens were dissected. Endoscopic endonasal transsphenoidal transsellar, transtuberculum-transplanum, and transcavernous approaches were performed by a neurosurgery trainee, under supervision from the senior authors and a PhD in anatomy with advanced neuroanatomy experience. Dissections were supplemented with representative case applications. **Results** Endoscopic endonasal transsphenoidal approaches afford excellent direct access to sellar and parasellar regions. After a wide sphenoidotomy, a limited sellar osteotomy opens the space to sellar region and medial portion of the cavernous sinus. To reach the suprasellar space (infrachiasmatic and suprachiasmatic corridors), a transplanum-prechiasmatic sulcus-transtuberculum adjunct is needed. The transcavernous approach gains access to the

contents of the cavernous sinus and both medial (posterior clinoid and interpeduncular cistern) and lateral structures of the retrosellar region. **Conclusion** The anatomical understanding and technical skills required to confidently remove skull base lesions with EEAs are traditionally gained after years of specialized training. We comprehensively describe EEAs to sellar and parasellar regions for trainees to build knowledge and improve familiarity with these approaches and facilitate comprehension and learning in both the surgical anatomy laboratory and the operating room.

Keywords: anatomical understanding; endoscopic endonasal approaches; skull base surgery; step-by-step description; transcavernous approach; transplanum approach; transsellar approach.