

Endoscopic endonasal approach (EEA)

- [Complex Single-Stage Juvenile Nasopharyngeal Angiofibroma Resection: A Hybrid Pediatric Endoscopic Endonasal and Transmaxillary Approach](#)
- [Endoscopic 360° Vision of the Orbit: A Comparative Anatomical Study of Endonasal and Transorbital Approaches](#)
- [Exclusive Endonasal Endoscopic Removal of an Old, Retained, Displaced Tooth Fragment Causing Isolated, Refractory, Chronic Maxillary Sinusitis](#)
- [Assessing Variability in Sinonasal Measurements Relevant for Nasoseptal Flap Harvest: Is There an Opportunity to Preserve More Anterior Septal Mucosa?](#)
- [The Role of Comprehensive Structural Preservation Strategy in Skull Base Reconstruction Following Endoscopic Endonasal Surgery for Pituitary Neuroendocrine Tumors: A Retrospective Single-Center Study](#)
- [Examining the viability of modern endoscopic endonasal surgery as a first-line treatment for macroprolactinomas: a multicentric study on the results and significance of the highest preoperative prolactin level in predicting long-term surgical outcomes](#)
- [Development of an artificial intelligence-based convolutional neural network for sellar barrier classification using magnetic resonance imaging](#)
- [Road map to enhanced recovery protocol for endonasal endoscopic approach to pituitary adenomas: Surgical short-term outcome and experience of a single ENT/neurosurgery collaboration](#)

History

[Pituitary Surgery History.](#)

Types

[Endoscopic transsphenoidal approach.](#)

[Extended endoscopic endonasal approach.](#)

Indications

[Endoscopic Endonasal Approach Indications.](#)

Advantages

see [Endoscopic skull base surgery advantages](#). The major potential advantage of the endoscopic endonasal approach to the [skull base](#) is that it provides a direct anatomical route to the lesion without traversing any major neurovascular structures, obviating brain retraction. Many tumors grow in a medial-to-lateral direction, displacing structures laterally as they expand, creating natural corridors

for their resection via an anteromedial approach.

Refinements in approach and closure techniques have reduced the risk of Cerebrospinal fluid fistula and infection. This has allowed surgeons to more aggressively treat a variety of pathologies. Now its a safe and effective procedure for various parasellar lesions. Selection of patients who are unlikely to develop complications seems to be an important factor for procedure efficacy and good outcome ¹⁾.

Disadvantages

Potential disadvantages of this procedure include the relatively restricted working space and the danger of an inadequate dural repair with [Cerebrospinal fluid fistula](#) and potential for [meningitis](#) resulting. These approaches often require a large opening of the dura mater over the [tuberculum sellae](#) and posterior planum sphenoidale, or retroclival space. In addition, they typically involve large intraoperative Cerebrospinal fluid fistulas, which necessitate precise and effective dural closure ²⁾.

Sinus opacity is still present after one year of advance endoscopic skull base surgery but symptoms seems to return to basal after 12months of follow-up ³⁾.

Requirements

[Endoscopic skull base surgery requirements](#).

Technique

see [Endoscopic transsphenoidal approach technique](#).

Pediatric population

Endonasal endoscopic skull base approaches are viable in the pediatric population, they are not impeded by sphenoid sinus aeration, and they have minimal risk of Cerebrospinal fluid fistula and meningitis. Outcomes and complications can be predicted based on specific radio anatomical skull base measurements rather than age ⁴⁾.

Challenges

One challenge performing endoscopic endonasal approaches is the surgical conflict that occurs between the surgical instruments and endoscope in the crowded nasal corridor. This conflict decreases surgical freedom, increases surgeon frustration, and lengthens the learning curve for trainees.

The application of a malleable endoscope to transsphenoidal approaches to the parasellar region decreases instrument-endoscope conflict and improves surgical freedom ⁵⁾.

Endoscopic endonasal surgery (EES) of the skull base often requires extensive bone work in proximity to critical neurovascular structures.

In selected EES, the ultrasonic bone curette was successfully used to remove loose pieces of bone in narrow corridors, adjacent to neurovascular structures, and it has advantages to high-speed drills in these specific situations ⁶⁾.

Complications

see [Endoscopic endonasal approach complications](#).

Outcome

Quality-of-life instruments

see Shukla A, Ahmed OG, Orlov CP, Price C, Mukherjee D, Choby G, Rowan NR. Quality-of-life instruments in endoscopic endonasal skull base surgery-A practical systematic review. *Int Forum Allergy Rhinol*. 2021 Feb 21. doi: 10.1002/alr.22783. Epub ahead of print. PMID: 33611853.

The Endoscopic Endonasal Sinus and Skull Base Surgery Questionnaire (EES-Q), is a comprehensive, multidimensional, disease-specific instrument. A distinguishing characteristic is that, apart from the physical and psychological domains, the EES-Q also encompasses a social domain. Understanding different HRQoL aspects in patients undergoing EES may help caregivers restore, improve, or preserve the patient's health through individualized care, which depends on identifying their specific needs ⁷⁾.

Case series

[Endoscopic endonasal approach case series](#).

¹⁾

Yano S, Hide T, Shinojima N, Hasegawa Y, Kawano T, Kuratsu J. Endoscopic endonasal skull base approach for parasellar lesions: Initial experiences, results, efficacy, and complications. *Surg Neurol Int*. 2014 Apr 16;5:51. doi: 10.4103/2152-7806.130901. eCollection 2014. PubMed PMID: 24818058; PubMed Central PMCID: PMC4014825.

²⁾

Cavallo LM, Messina A, Cappabianca P, Esposito F, de Divitiis E, Gardner P, Tschabitscher M. Endoscopic endonasal surgery of the midline skull base: anatomical study and clinical considerations. *Neurosurg Focus*. 2005 Jul 15;19(1):E2. PubMed PMID: 16078816.

³⁾

Langdon C, Enseñat J, Rioja E, Jaume F, Berenguer J, Oleaga L, Bernal-Sprekelsen M, Alobid I. Long-term radiological findings after endonasal endoscopic approach to the skull base. *Am J Otolaryngol*. 2016 Mar-Apr;37(2):103-7. doi: 10.1016/j.amjoto.2015.12.006. Epub 2015 Dec 9. PubMed PMID: 26954861.

4)

Banu MA, Rathman A, Patel KS, Souweidane MM, Anand VK, Greenfield JP, Schwartz TH. Corridor-based endonasal endoscopic surgery for pediatric skull base pathology with detailed radioanatomic measurements. *Neurosurgery*. 2014 Jun;10 Suppl 2:273-93. doi: 10.1227/NEU.0000000000000252. PubMed PMID: 24845548.

5)

Elhadi AM, Zaidi HA, Hardesty DA, Williamson R, Cavallo C, Preul MC, Nakaji P, Little AS. Malleable Endoscope Increases Surgical Freedom When Compared to a Rigid Endoscope in Endoscopic Endonasal Approaches to the Parasellar Region. *Neurosurgery*. 2014 May 12. [Epub ahead of print] PubMed PMID: 24818786.

6)

Rastelli MM Jr, Pinheiro-Neto CD, Fernandez-Miranda JC, Wang EW, Snyderman CH, Gardner PA. Application of ultrasonic bone curette in endoscopic endonasal skull base surgery: technical note. *J Neurol Surg B Skull Base*. 2014 Apr;75(2):90-5. doi: 10.1055/s-0033-1354580. Epub 2014 Feb 17. PubMed PMID: 24719795; PubMed Central PMCID: PMC3969437.

7)

Ten Dam E, Feijen RA, van den Berge MJC, Hoving EW, Kuijlen JM, van der Laan BFAM, Vermeulen KM, Krabbe PFM, Korsten-Meijer AGW. Development of the Endoscopic Endonasal Sinus and Skull Base Surgery Questionnaire. *Int Forum Allergy Rhinol*. 2017 Aug 23. doi: 10.1002/alr.22000. [Epub ahead of print] PubMed PMID: 28834622.

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