

Anterior clinoid region meningioma treatment

- [Clinical features of intrasellar meningiomas treated with endoscopic endonasal surgery: a case series and comparison with other parasellar meningiomas and a literature review](#)
- [The importance of the optic nerves unlocking during the resection of anterior skull base meningiomas for visual function preservation: surgical nuances and clinical outcome](#)
- [Transpalpebral mini-orbitozygomatic approach for nonvascular skull base lesions: a single neurosurgeon's experience](#)
- [Open-door extended endoscopic transorbital technique to the paramedian anterior and middle cranial fossae: technical notes, anatomomorphometric quantitative analysis, and illustrative case](#)
- [Skull Base Meningiomas](#)
- [Spheno-Orbital Meningioma - Treatment Outcomes and Factors Influencing Recurrence](#)
- [Sphenoid Wing Meningiomas with Secondary Cavernous Sinus Invasion: Surgical Results and Algorithm for Treatment at a Single Brazilian Center](#)
- [Individualized Cerebral Artery Protection Strategies for the Surgical Treatment of Parasellar Meningiomas on the Basis of Preoperative Imaging](#)

Surgery for anterior clinoid meningiomas (ACMs) remains challenging due to their tight adhesion to vital neurovascular and has been traditionally performed through a transcranial approach.

Bao et al. from The First Affiliated Hospital of Nanchang University, [Nanchang](#), China. present the key steps of the endoscopic endonasal approach (EEA) for ACMs with a video illustration and figures. The relevant surgical anatomy is described along with the indications and limitations of this approach.

The EEA offers a good treatment option for selected ACMs. It allows for the removal of involved hyperostotic bone and dural attachments, early identification and control of the neurovascular structure, and avoidance of brain retraction ¹⁾.

A [keyhole approach](#) to a deep-lying [skull base lesion](#), as such a [clinoid meningioma](#), can be a daunting challenge. The [minimally invasive exposure](#) must be precisely placed and adequately wide to accomplish the surgical goal. Surgical rehearsal in [virtual reality](#) (VR) can not only increase the [confidence](#) of the surgeon through practice on patient-specific anatomy, but it can also generate navigation-integrated templates to ensure precise placement and adequate bone openings. In this operative video, Jean demonstrated the use of [augmented reality](#) (AR) template in a 69-yr-old woman with a growing clinoid meningioma. The 3-dimensional, VR rendering (SNAP VR360, Surgical Theater Inc, Cleveland, Ohio) of her right clinoid meningioma was used in surgical rehearsal for the mini-pterional approach with extradural clinoidectomy. The optimal opening was saved as a VR file and, at surgery, projected into the eye-piece of the navigation-tracked microscope (Synchronized AR v3.8.0, Surgical Theater Inc). In this manner, the surgical opening in the template was visible in AR on the patient's anatomy in real-time during surgery. The template enhanced the planning of the incision and soft-tissue exposure, guided the drilling of the sphenoid wing, facilitated the extradural clinoidectomy, and ultimately facilitated the accomplishment of the surgical goal of total resection of

the meningioma. With this application of novel technology, the surgeon is no longer using the navigation to get her/his bearings. Instead, the surgeon is using AR-enhanced navigation to duplicate a plan that is known to work. This is a fundamental paradigm shift. Patient [consent](#) was obtained prior to the creation of the [video](#) and is available on request ²⁾.

Rangwala SD, Russin J. Commentary: Mini-[Pterional Craniotomy](#) and [Extradural Clinoidectomy](#) for [Clinoid Meningioma](#): [Optimization](#) of [Exposure](#) Using [Augmented Reality](#) Template: 2-Dimensional Operative Video. Oper Neurosurg (Hagerstown). 2020 Oct 7:opaa315. doi: 10.1093/ons/opaa315. Epub ahead of print. PMID: 33027820.

¹⁾

Bao YY, Xiao LM, Tang B, Hong T. How I do it: a purely endoscopic endonasal approach for anterior clinoidal meningioma. Acta Neurochir (Wien). 2023 Jan 14. doi: 10.1007/s00701-022-05480-8. Epub ahead of print. PMID: 36640177.

²⁾

Jean WC. Mini-Pterional Craniotomy and Extradural Clinoidectomy for Clinoid Meningioma: Optimization of Exposure Using Augmented Reality Template: 2-Dimensional Operative Video. Oper Neurosurg (Hagerstown). 2020 Jul 28:opaa238. doi: 10.1093/ons/opaa238. Epub ahead of print. PMID: 32720680.

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