

Skull Base Anatomy



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KEYWORDS

- Endoscopic endonasal • Skull base • Cranial base • Anatomy • Pituitary
- Cavernous • Sella

KEY POINTS

- The sphenoid bone is at the center of the skull base and understanding its anatomy from multiple perspectives is important to understanding endonasal approaches.
- Within the sphenoid sinus, the lateral opticocarotid recess is a key landmark for identifying the locations of the parasellar carotid artery and optic nerve.
- The tuberculum sellae is the anterior and superior limit of the sella. Limited removal of the tuberculum during pituitary surgery helps avoid CSF leak, while complete removal allows for access to the suprasellar space.
- The major neurovascular structures of the cavernous sinus are located in the lateral compartment and lateral wall.
- The clivus can be divided into thirds. The upper third corresponds to the dorsum sellae, the middle third is in the sphenoid sinus below the sella, and the lower third behind the nasopharynx.

INTRODUCTION

The nasal cavity has been used as a corridor to access the midline skull base since the turn of the twentieth century. The transsphenoidal route to the pituitary was initially explored in the 1890s because of the high mortality associated with early transcranial approaches. Although the transsphenoidal approach showed some

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promise, it fell largely out of favor as neurosurgeons became increasingly proficient with transcranial approaches. It was not until the 1960s when Gerard Guiot was able to publish excellent results with the transsphenoidal approach that it began to regain popularity. He was also the first to report trying to use an endoscope in transsphenoidal surgery, but he abandoned it because of poor visualization compared with the microscope.¹

It was also in the 1960s that Harold Hopkins introduced his rod-lens system, greatly improving on the prior 100 years of endoscopy. Combined with cameras and evolving video technology, endoscopy took a big step forward in the medical field. Otolaryngologists began using the rod-lens in the nasal cavity and endoscopic sinus surgery was born. Simultaneously, neurosurgeons began using these new endoscopes as adjuncts to their microscopic resections. These two parallel developments finally came together in the 1990s when the first multidisciplinary endoscopic skull base teams were formed.²

Endoscopic endonasal surgery has now become an invaluable alternate means of accessing and treating pathology of the skull base. It offers a direct route for accessing the anterior, middle, and posterior cranial fossa. It has been shown to be safe and effective, but requires a detailed understanding of the intricate anatomy to be successful. This article reviews the anatomy of the midline skull base from the frontal sinus to the clivus, with special attention to the endonasal perspective.

SPHENOID BONE

The sphenoid bone sits at the center of the skull base, and knowing its anatomy is central to understanding endonasal approaches. The sphenoid bone has been described as resembling a bat with its wings outstretched (**Fig. 1**). It consists of a central body, which is cuboidal in shape and houses the sphenoid sinus at its center. The sella turcica is located superiorly and the upper clivus posteriorly. The lesser wings extend from the superolateral aspect of the body and the greater wings from the inferior aspect of the body. The superior orbital fissure is the space between the greater and lesser wings. The paired pterygoid processes and pterygoid plates project downward from the body on either side.

The lesser wings extend laterally to form part of the floor of the anterior cranial fossa. The inferior surfaces of the lesser wings form the posterior roof of the orbits. Medially the lesser wings join with the planum sphenoidale, which forms the roof of the sphenoid sinus. The planum articulates anteriorly with the cribriform plate. At the posteromedial ends of the lesser wings are the anterior clinoid processes and the optic canals. The optic canals are separated from the superomedial aspect of the superior orbital

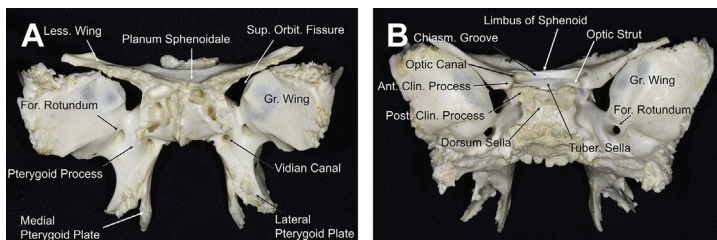


Fig. 1. (A) Sphenoid bone, anterior view. (B) Sphenoid bone, posterior view. Ant. Clin., anterior clinoid; Chiasm., chiasmatic; For., foramen; Gr., greater; Less., lesser; Post. Clin., posterior clinoid; Sup. Orbit., superior orbital; Tuber., tuberculum.

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