Moirai of the Skull Base; Microsurgical And Endoscopic Perspectives on the Clinoid Processes

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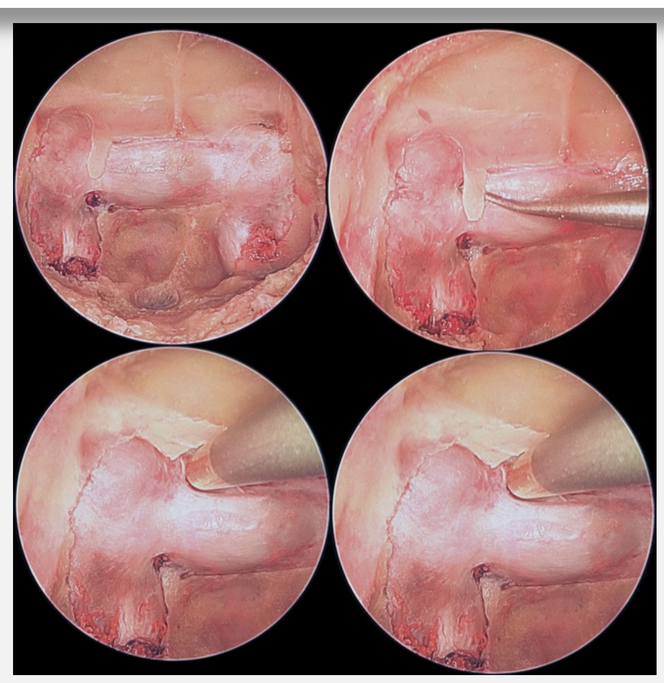
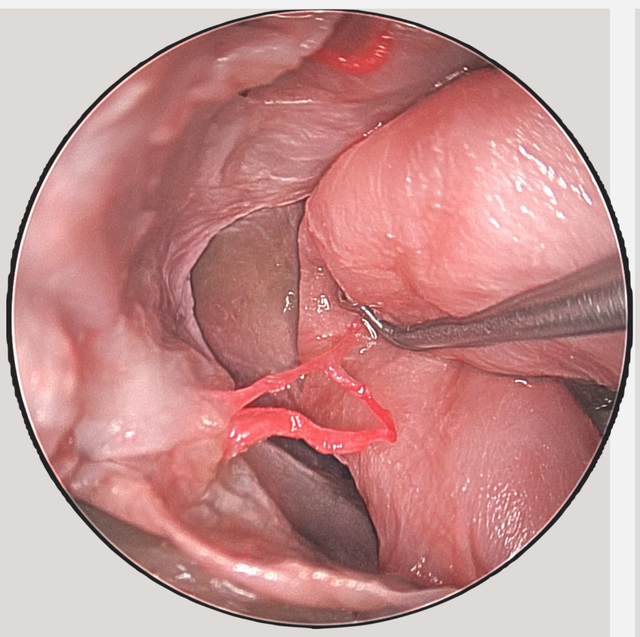
INTRODUCTION:

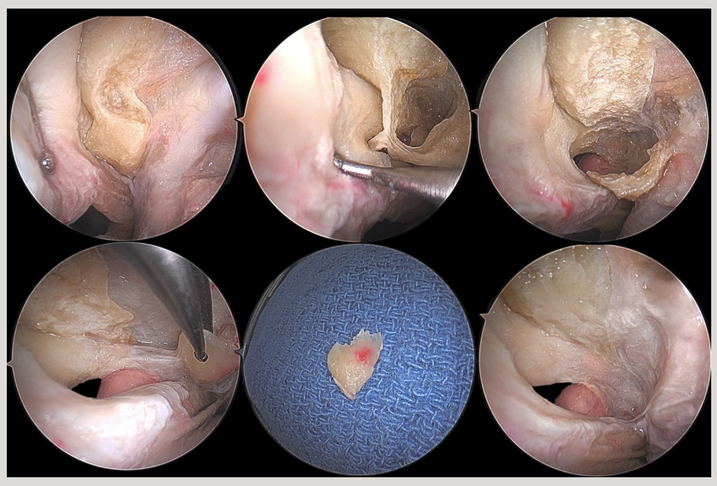
The clinoid processes (anterior, middle and posterior) located within the skull base serves as an important landmark for surgical procedures especially for the skull base lesions. There may even be lesions arising directly from around the clinoid process, particularly from the anterior clinoid process (ACP). In the literature, there are anatomical and clinical studies focusing individually on these clinoid processes. Growing use of expanded endoscopic endonasal approaches and more sophisticated microsurgical techniques may necessitate exposure of all three clinoid processes in a single approach. Moreover, using these processes as landmarks is anticipated to enhance the certainty of the surgical technique. This study describes the surgical anatomy of the three clinoid processes and their relations with endoscopic and microsurgical perspective.



METHODS:

Five formalin flushed, red and blue colored silicone-injected human specimens were used for dissections. Microscopical dissections and endoscopic endonasal dissections were performed using 0° and 30° endoscopes. Following our dissections, the specimens were 3D photo-documented.

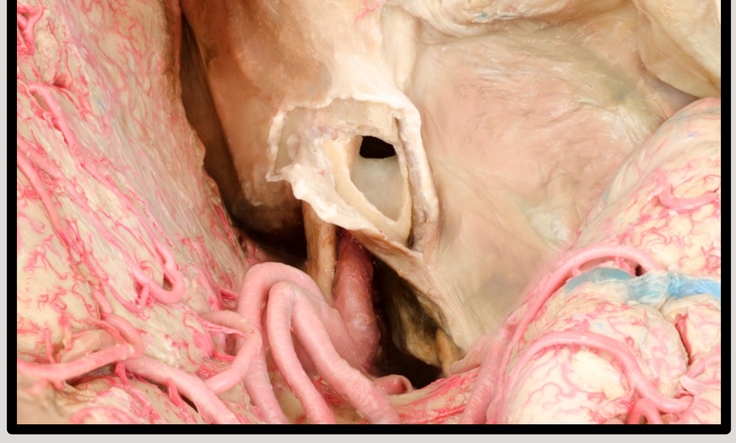




RESULTS:

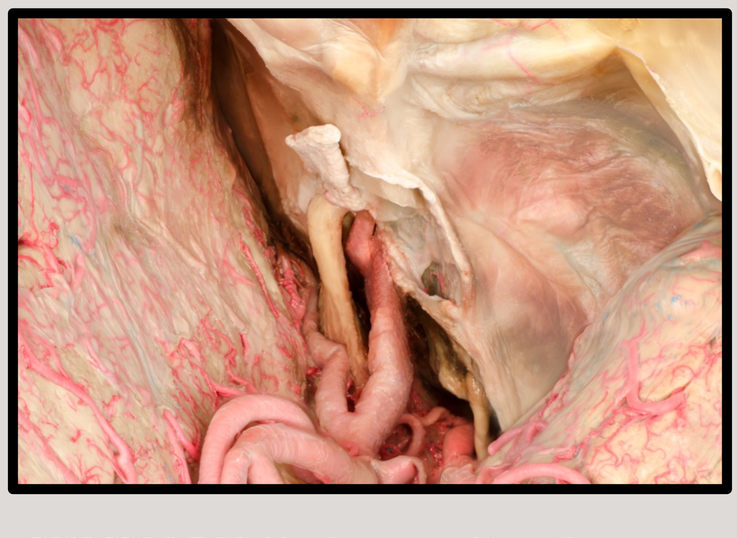
Endoscopic endonasal dissection

After the standard endoscopic endonasal approach to sphenoid sinus, firstly encountered CP was the middle clinoid process (MCP). MCP, a pyramidal cone in shape, was exposed between the paraclinoidal and cavernous internal carotid artery (ICA). MCP's tip represents a point where distal and proximal dural ring meets. Sometimes ACP and MCP can be joined by the caroticoclinoidal bony ring. Posterior clinoid process (PCP), which has an apex and posterolateral prominence, was exposed after performing the transcavernous approach and transposing the pituitary gland. PCP was connected to the dorsum sella and its two dural attachments, interclinoid and posterior petroclinoid ligaments were exposed. ACP was located both superior and inferior to the optic nerve, both in the supraoptic and lateral opticocarotid recess triangle. ACP was found to have close relationship with three structures: optic nerve, clinoidal segment of the ICA and and third cranial nerve.



Microsurgical dissection ;

After frontotemporal craniotomy the meningoorbital band and inferolateral to it ACP were exposed. Removal of the ACP allowed exposure of the clinoidal ICA and optic nerve with less brain retraction. Understanding the relation between the superior orbital fissure (SOF) and ACP was found crucial to prevent damage to any SOF contents. After opening the carotidooculomotor triangle PCP was accessed and drilled to expose basillary artery.



SUMMARY: Understanding the three-dimensional relationships of the anterior, middle, and posterior clinoid processes from both microsurgical and endoscopic perspectives can enhance surgical safety and broaden the indications for combined approaches to complex skull-base lesions.

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