



Dural and ligamentous architecture of the endoscopic endonasal approaches

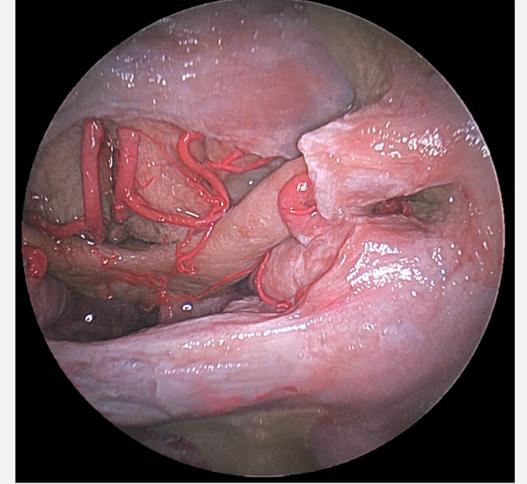
Aysu Kabakci, MD^{1,2}; Elena Rosellini, MD^{1,2}; Sergio Farias, MD^{1,2}; Gabriel V Rosales, MD^{1,2}; Cezar K Prigenzi, MD^{1,2}; Joao P Almeida, MD, PhD^{1,2}

¹Department of Neurosurgery, Indiana University, Indianapolis, IN, US

²Almeida's Skull Base Lab, Wile Hall, IU Health

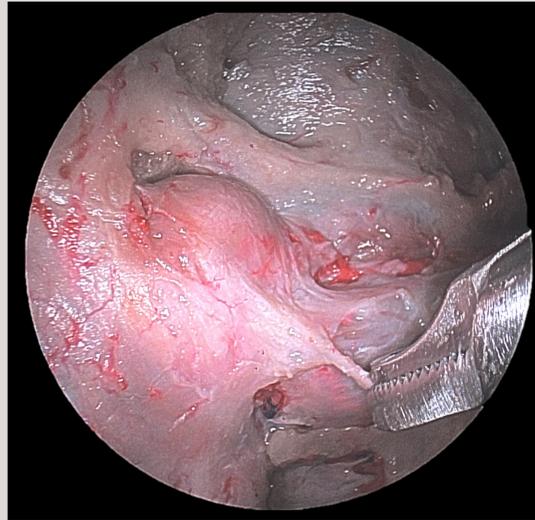
INTRODUCTION:

The endoscopic endonasal approaches (EEAs) have been increasingly used in neurosurgical practice and many anatomical studies have been conducted to enhance its certainty and reliability. As a result of these studies, both the expanded use of EEA has increased and new techniques have been developed. However, the growing application of EEA requires a more comprehensive examination of the dural and ligamentous architecture of all the components exposed during EEA, particularly those of the sella, CS, ICA and bony structures.



METHODS:

Five formalin flushed, red and blue colored silicone-injected human specimens were used for dissections. Endoscopic endonasal dissections were performed using 0° and 30° endoscopes. Following our dissections, the specimens were 2D and 3D photo-documented



RESULTS:

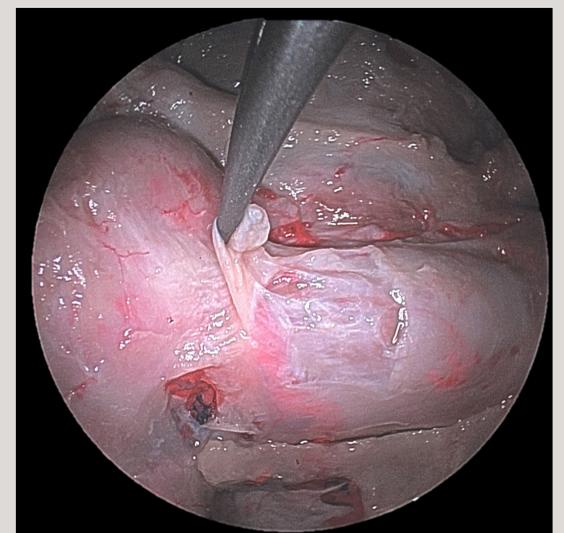
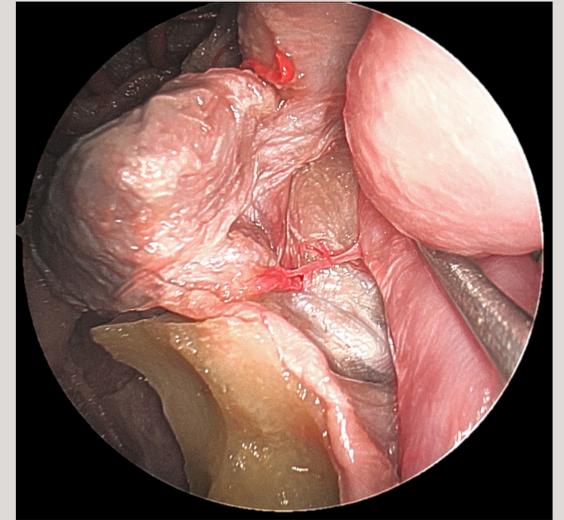
Distinct After a standard binostril endoscopic endonasal approach, a wide exposure of sella turcica and parasellar region with bilateral CS was accomplished. Bony removal was performed on the planum sphenoidale, tuberculum sellae, sella turcica, parasellar region, and clivus.

Dural architecture;

The dissection proceeded by opening the sellar dura, both periosteal and meningeal layers were exposed together with the pituitary capsule. It was demonstrated that the distal dural ring consists of a single layer formed by the fusion of two dural layers, whereas the proximal dural ring continues as an extension of the periosteal dural layer. The medial, anterior and posterior wall of the CS were fully exposed together with their relationships to the surrounding structures and ligaments.

Ligamentous architecture;

Anterior, posterior and medial clinoid processes (ACP, PCP, MCP), petrous apex, the lingual process of the sphenoid bone were found to be connected with one another by anterior and posterior petroclinoidal, interclinoidal, petrosphenoidal, petrolingual, caroticoclinoidal ligaments which are the continuation of the periosteal layer. Identification of the cleavage plane between the meningeal and ligamentous portion of the periosteal dura enables safe unlocking of the CS.



SUMMARY: To facilitate greater precision and safety in EEA procedures, knowing the details of the dural and ligamentous architecture behind the EEA is crucial. Thus, identifying the weak points of this architecture enables their use during dissection in surgical techniques, facilitating the preservation of intact tissues thereby contributing the safety of the surgery.