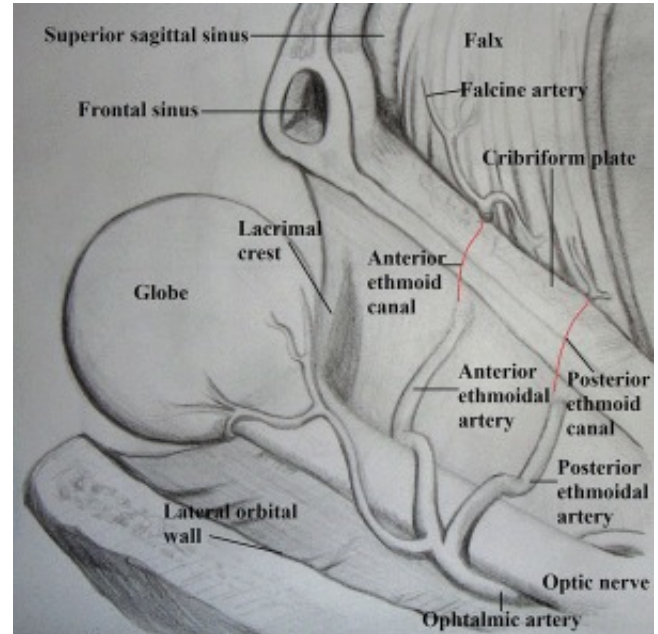


## Reducing blood loss in brain surgery with extracranial early devascularization techniques



The anatomical region located under the frontal lobes of the brain, just above the eyes and the nose is called “anterior skull base”. The most common tumors involving this region arise from the soft tissue layers that surround and protect the brain: the meninges. Because of their origin, these tumors are called “meningiomas”. Unfortunately, the vascular anatomy of this region is complex and multiple arteries are recruited by the tumor from the surrounding regions, in particular from the orbits. The most important arteries involved are the anterior and posterior ethmoidal arteries.

When dealing with highly vascular meningiomas, the surgeon should always try to interrupt blood supply as early as possible. Endovascular surgeons have tried to reach these tumor through the femoral artery, at the groin. Unfortunately, this clever technique is burdened by a high rate of visual damage because of the possible occlusion of the fragile ophthalmic artery.

With this issue in mind, we sought for the solution by reviewing all the available medical literature, crossing over different surgical specialities: neurosurgery, ophthalmic and orbital surgery, nose surgery. A review of the available literature on the topic has been carried out, with the aim to identify the best surgical approaches to perform an early microsurgical devascularization of the tumor. Our research has finally selected two surgical sites of arterial occlusion that can be best exposed through five microsurgical approaches (Table 1).

Anatomical site	Surgical approach	Pros	Cons
Medial orbital wall	Lynch	Time saving No brain retraction Short trajectory	Eyelid scar Risk for orbital hematoma Risk for orbital structure damage
	Transcaruncular	No eyelid scar No brain retraction Short trajectory	Risk for orbital hematoma Epiphora Ophtalmic surgery technique Risk for orbital structures damage Learning curve
	Subperiosteal subsuperiorbital	Familiarity No additional scar Easy AEA occlusion	Risk for infratrochlear and supraorbital nerve damage Risk for orbital hematoma PEA not always visible
Cribriform Plate	Subfrontal extradural	Familiarity No additional scar No orbital access	Brain retraction Only for small lesions Usually incomplete devascularization
	Subfrontal intradural	Familiarity No additional scar No orbital access	Brain retraction Usually incomplete devascularization Needs partial debulking

Tab. 1. Pros and cons of surgical approaches to the ligation of ethmoidal arteries

The medial orbital wall with its ethmoidal foramen is the first surgical site. It can be reached directly through the orbit (via a small incision on the upper eyelid or on the caruncle) or coming down from the forehead. The cribriform plate (the region located on the anterior skull base, just below the frontal lobes, where the olfactory nerves pierce the cranium to get into the nose) is the second surgical site and different surgical corridors bring it into view.

In the paper we describe the anatomic details and the surgical technique to perform an early devascularization of the tumor without damaging the optic nerves and allowing the surgeon to remove the meningiomas without unnecessary blood loss.

## Publication

[Anterior and Posterior Ethmoidal Artery Ligation in Anterior Skull Base Meningiomas: A Review on Microsurgical Approaches.](#)

Cecchini G

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