Pterygopalatine Fossa Approach

The pterygopalatine fossa (PPF) is a small but complex anatomical space located posterior to the maxillary sinus and anterior to the pterygoid process. It acts as a neurovascular crossroads and is increasingly accessed via **endoscopic endonasal transpterygoid approaches** in neurosurgery and skull base surgery.

Indications

Endonasal access to the PPF is indicated in the following scenarios:

- Tumors involving:
  - PPF (schwannomas, carcinomas)
  - Infratemporal fossa
  - Lateral sphenoid sinus
  - Parasellar region (Knosp III–IV adenomas)
- Management of vascular lesions:
  - Juvenile nasopharyngeal angiofibroma
  - Arteriovenous malformations
  - Severe posterior epistaxis
- Neuralgia management:
  - Vidian nerve neuralgia
  - Sluder's syndrome
- Rare cases:
  - Abscess drainage (deep face spaces)

Surgical Corridor

The **endonasal transpterygoid approach** involves the following steps:

1. Medial maxillectomy (partial or complete)
2. Identification and resection of the posterior wall of the maxillary sinus
3. Removal of pterygoid process (partial)
4. Exposure of PPF and its contents

Key Anatomical Landmarks

- **Maxillary nerve (V2)** — passes through the foramen rotundum
- **Infraorbital nerve** — lateral to infraorbital artery
- **Greater palatine nerve** — medial to the descending palatine artery
- **Vidian nerve** — runs through the pterygoid canal
- **Pterygopalatine ganglion** — located anterior to the vidian nerve, medial to V2
- **Sphenopalatine artery** — a key vessel supplying the nasal cavity

Measurements (Cadaveric Study Reference)

Recent anatomical data from a cadaveric study (Akdemir Aktaş et al., 2025):

- Maxillary nerve: ~15.93 ± 6.19 mm (length), 3.96 ± 0.69 mm (diameter)
- Infraorbital nerve: ~24.4 ± 4.38 mm / 3.00 ± 0.71 mm
- Greater palatine nerve: ~13.15 ± 4.25 mm / 2.70 ± 0.39 mm
- Vidian nerve: ~16.78 ± 1.18 mm / 2.15 ± 0.51 mm
- Pterygopalatine ganglion: ~4.59 mm wide / 5.18 mm tall

→ These metrics are useful for **navigation**, **instrument reach**, and **avoiding complications**.

Complications to Avoid

- Injury to the internal maxillary artery or its branches → bleeding
- Neuropathic pain syndromes due to nerve damage
- Cerebrospinal fluid leak if extended laterally toward the skull base
- Diplopia from injury to branches of the abducens nerve (in more extended routes)

References

1. Akdemir Aktaş H, et al. *Endoscopic endonasal approach to the nerves of the pterygopalatine fossa: a detailed cadaveric anatomical study*. Surg Radiol Anat. 2025; 47(1):122. doi:10.1007/s00276-025-03637-5.

TIP: Consider neuronavigation, especially in tumors with lateral or superior extension, and preoperative CTA if vascular involvement is suspected.