

Tumors of the paranasal sinuses

Endoscopic Approaches

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**Klinik für Ohren-, Nasen-, Hals-
und Gesichtschirurgie**



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Educational objectives

Endoscopic approaches ...

- Definition & classification of approaches
 - transcribriform
 - expanded transsphenoidal
 - transclival
 - transpterygoid



Educational objectives

Endoscopic approaches ...

- Indication
 - small tumors
 - limited dural invasion
 - rather low-grade (?)

- Few data on outcome (i.e. comparative studies)

Overview

- Development of endoscopic approaches
- Classification
- Set-up & Equipment
- Indication for endoscopic approaches
- Craniofacial resection vs. endoscopic approach
→ consequences on outcome ?

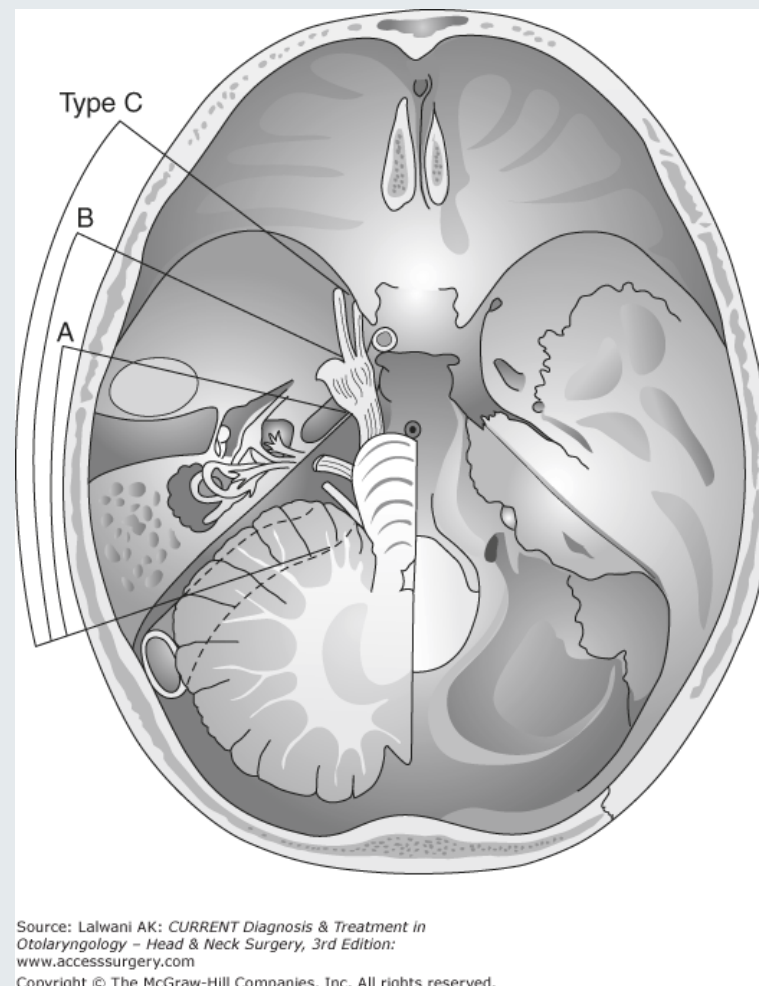
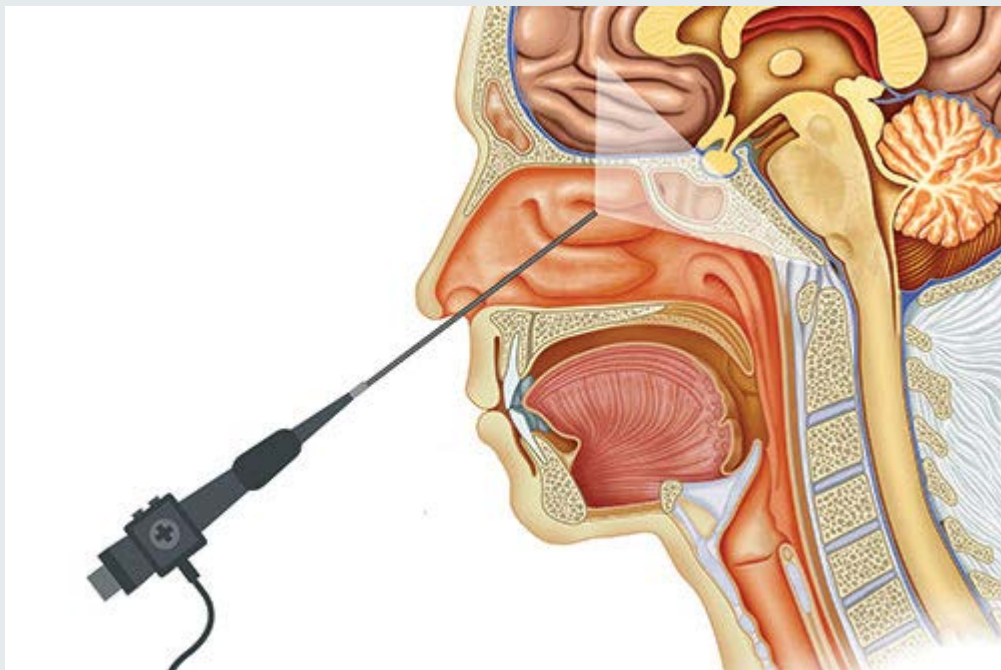


Development

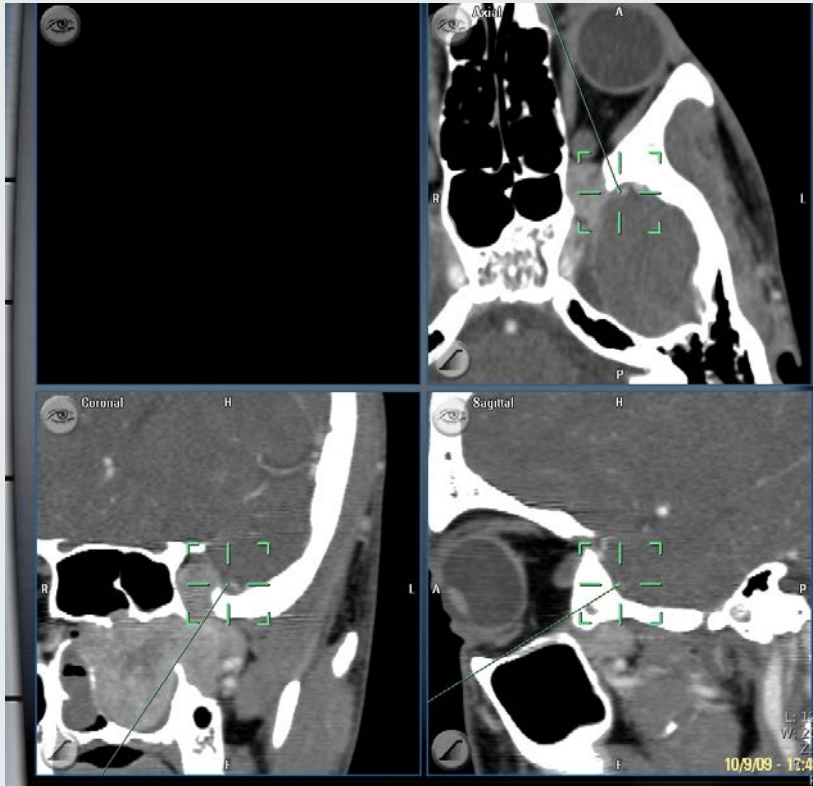
- Increasing experience
- Anatomy from a new perspective
- Step by step concept
- Facing challenging structures:
 - Dura (incl. middle fossa)
 - ICA



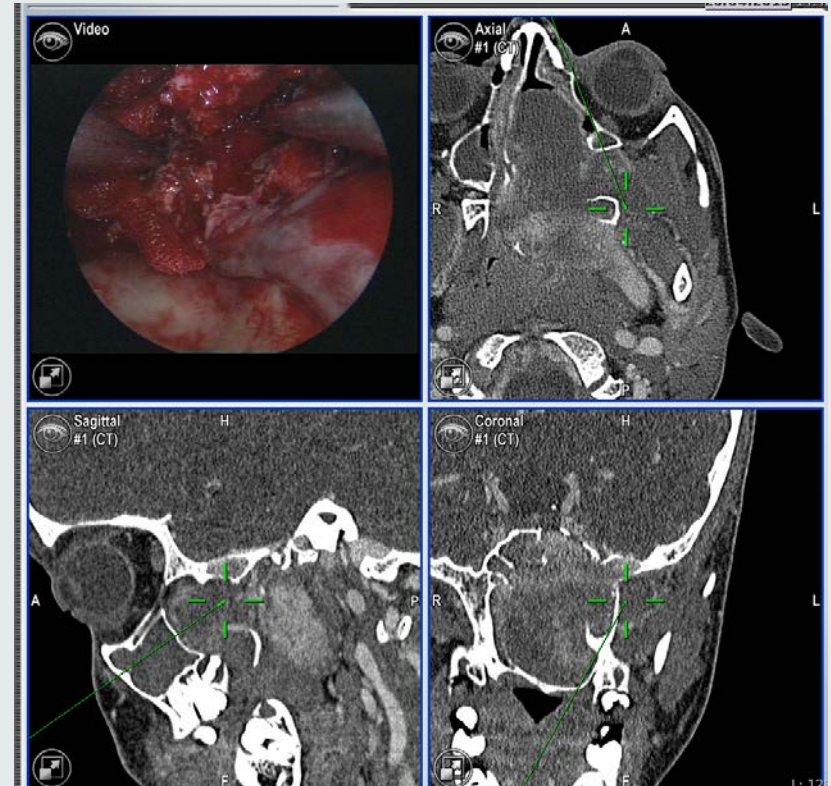
Cone or inverted cone principle ?



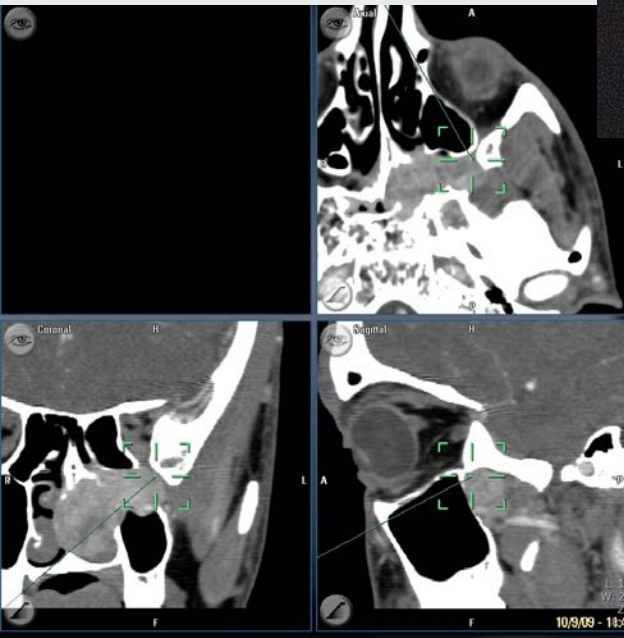
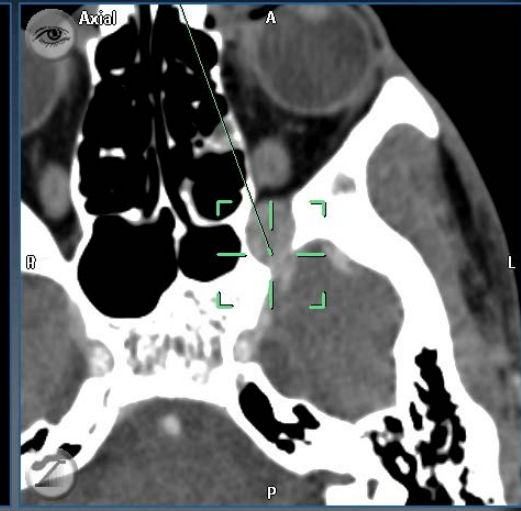
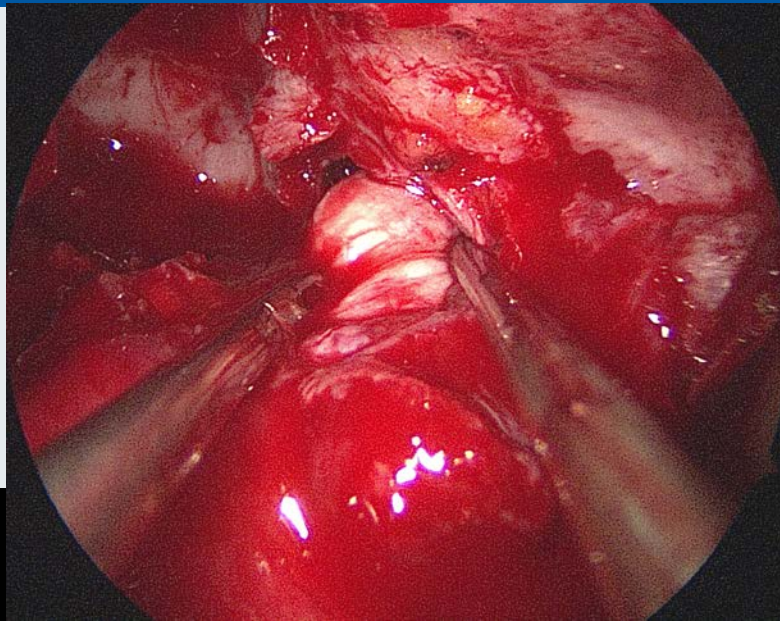
Target to reach/expose



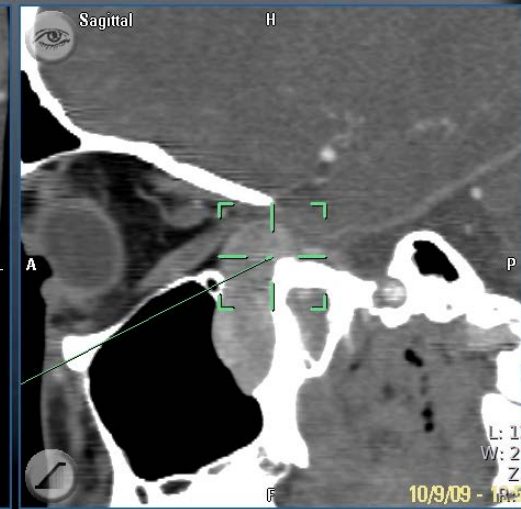
infratemporal



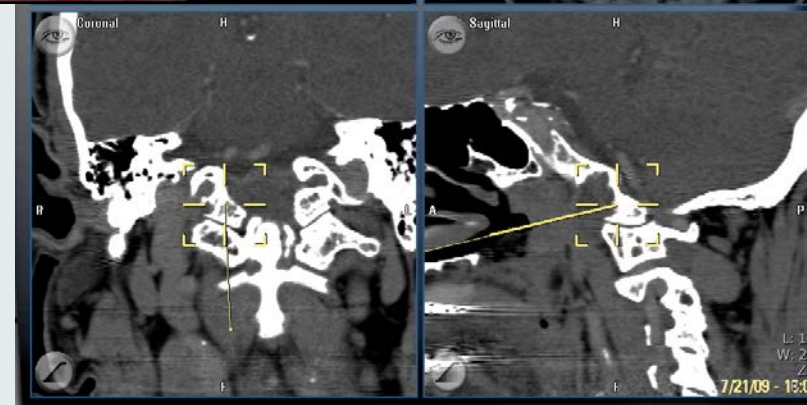
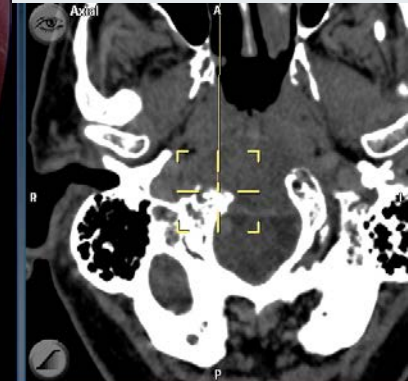
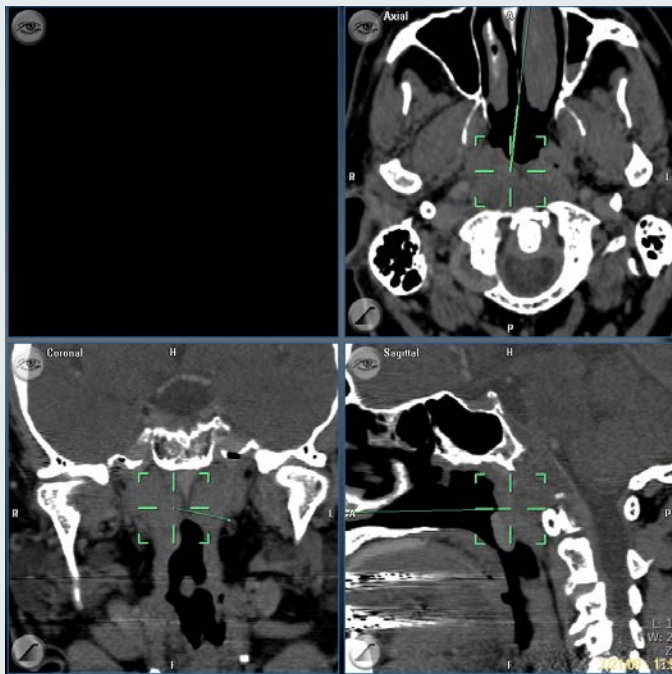
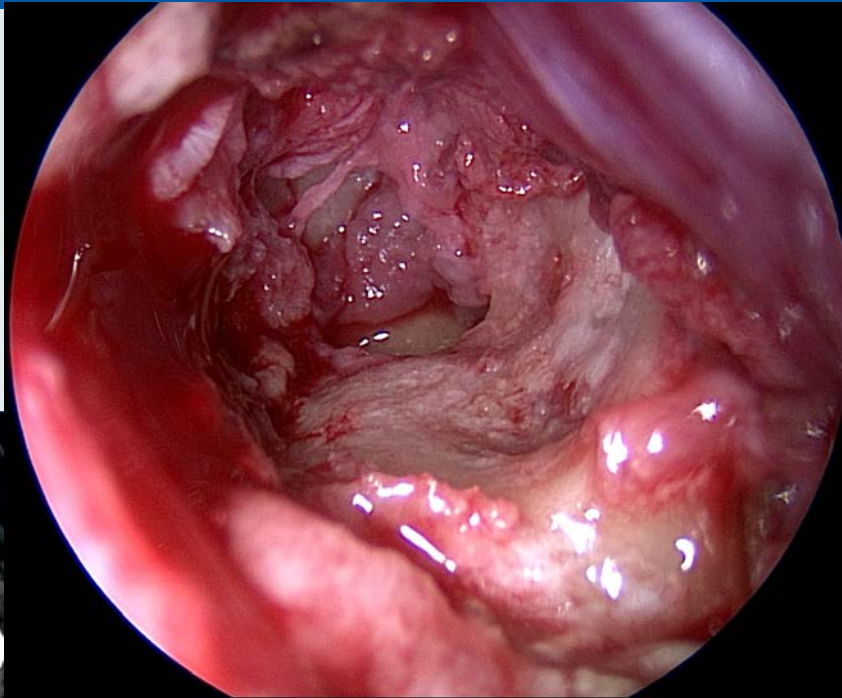
Far lateral



Infratemporal fossa



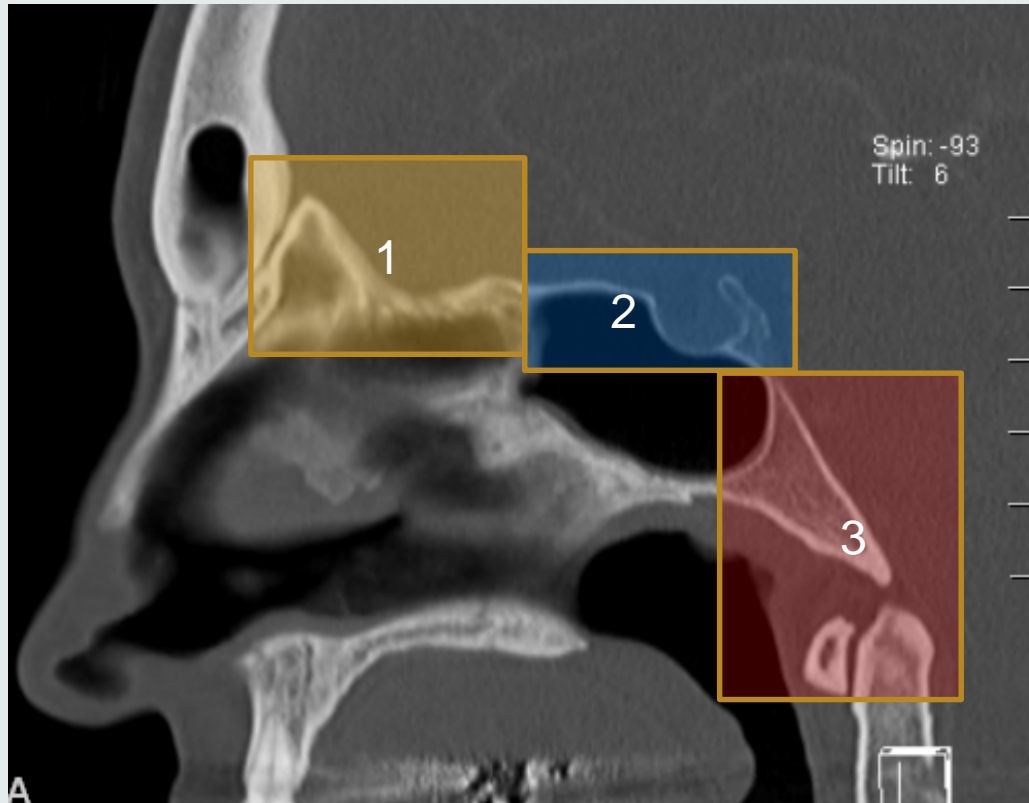
Cavernous sinus



Nasal floor → foramen magnum

Occipital condyle

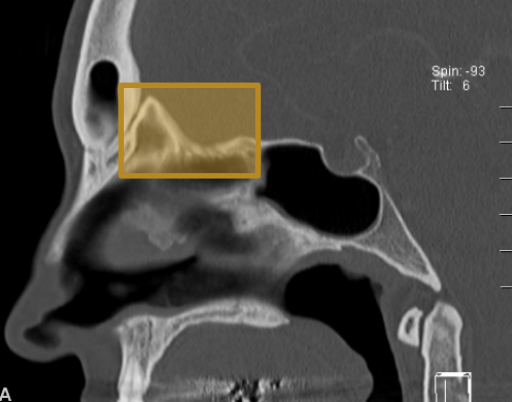
Definition & Classification



1. transcribriform

2. expanded
transsphenoidal

3. transclival

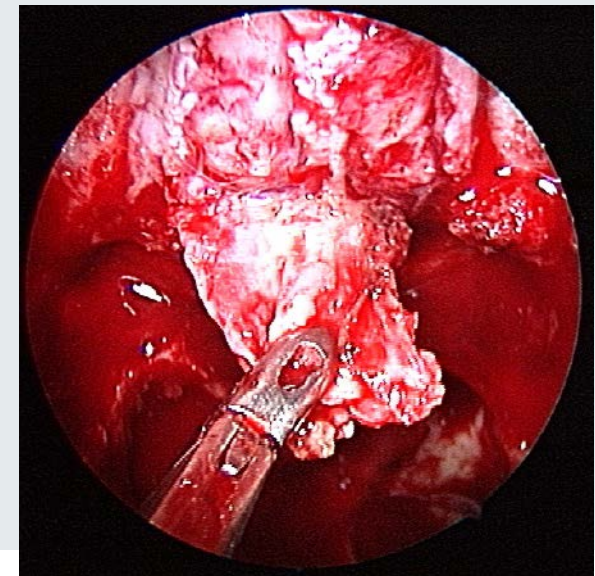
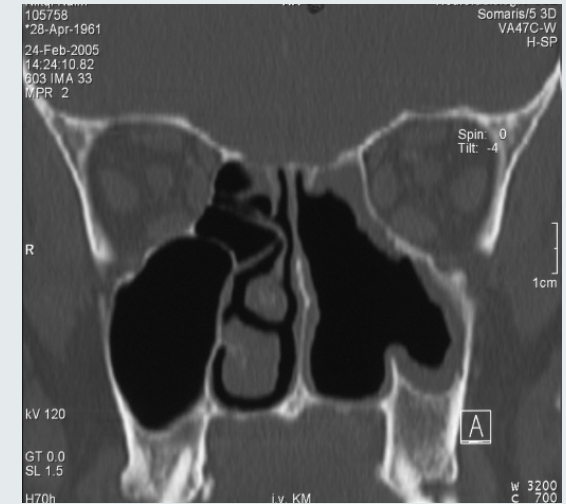


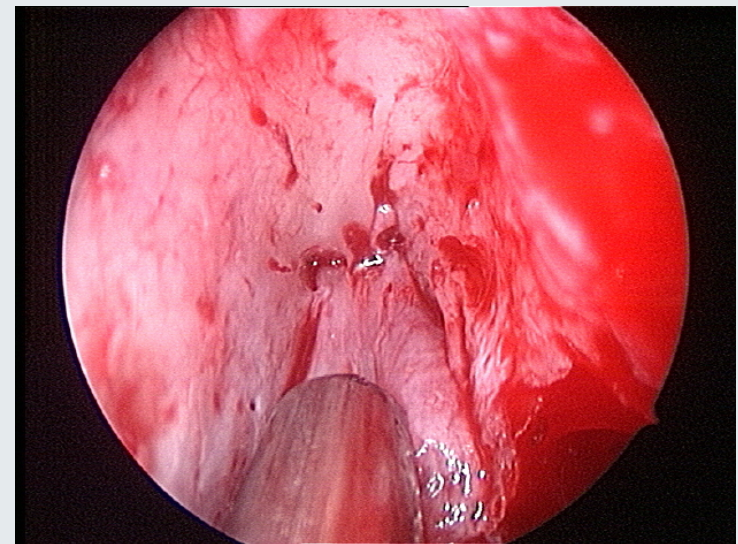
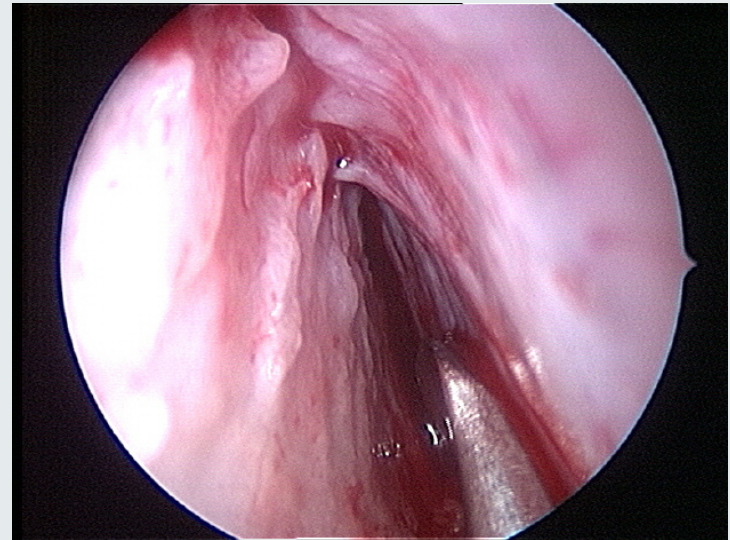
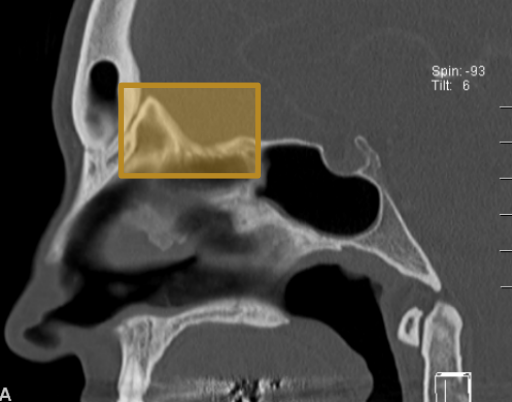
Transcribriform

F. Coecum → sphenoidal plain

1. Endonasal medial Maxillectomy¹
2. Cribriform plate
3. Fovea ethmoidalis
4. Dura

¹ Soyka M, Holzmann D *Am J Rhinol* 2005





Dural course along the olfactory fibres

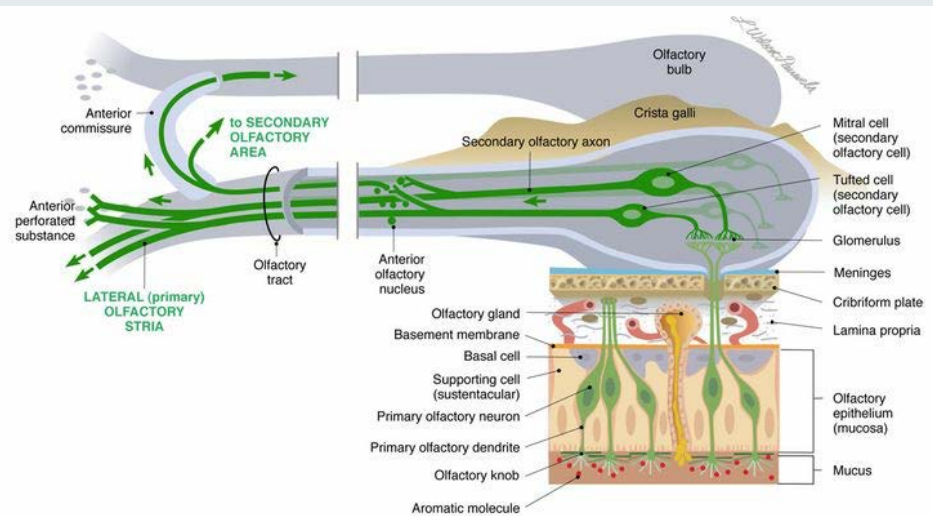
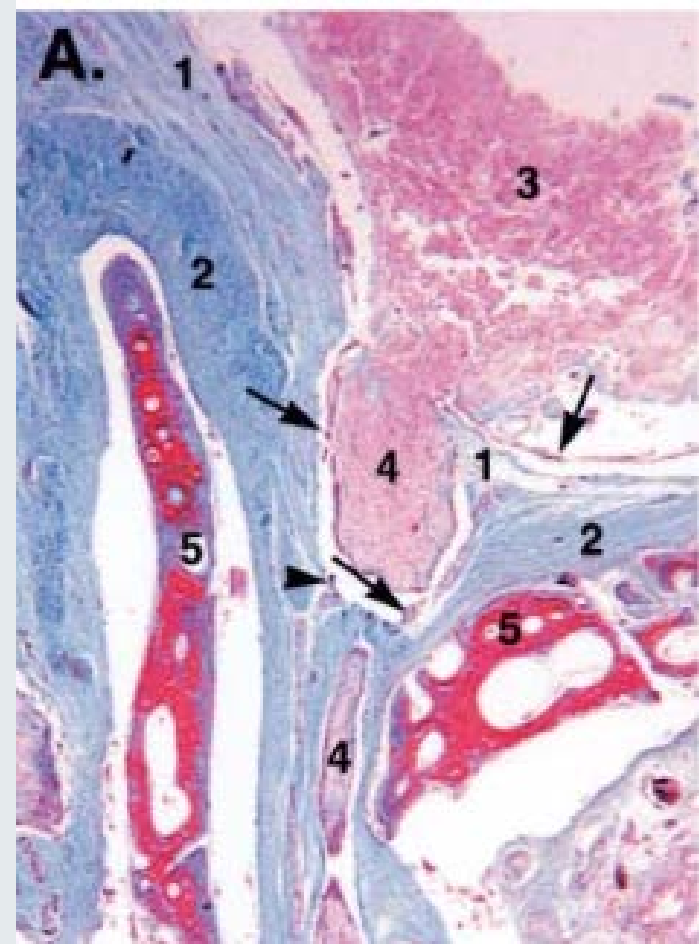
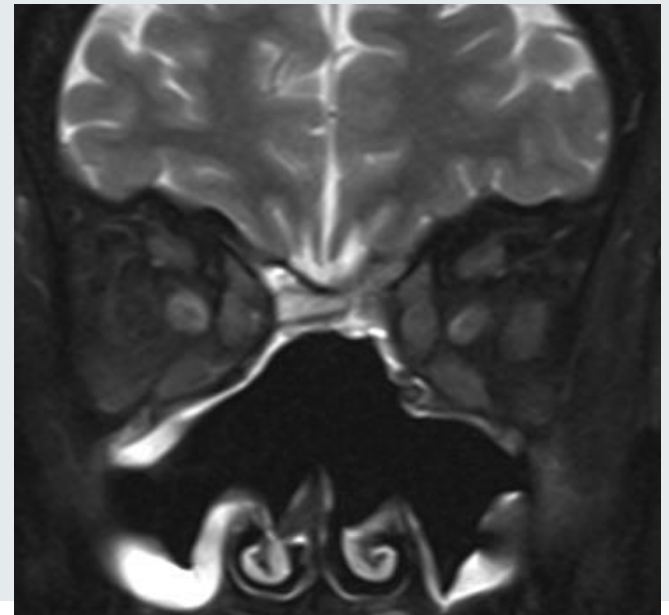
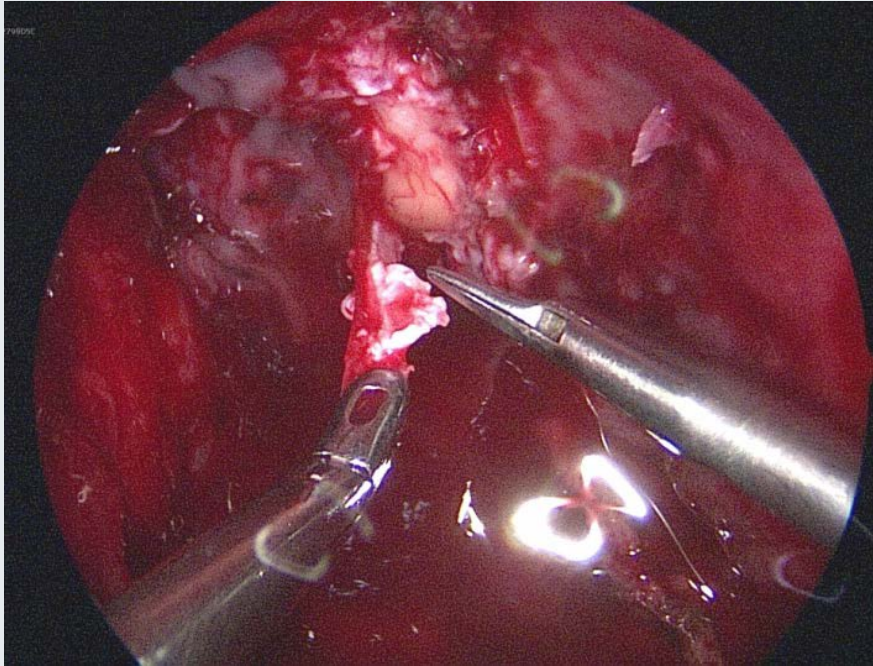


Figure 1-2 Olfactory epithelium, bulb, and tracts (structures are enlarged for clarity).

From Cranial Nerves 3rd Ed. ©2010 Wilson-Pauwels, Stewart, Akesson, Spacey, PMPH-USA

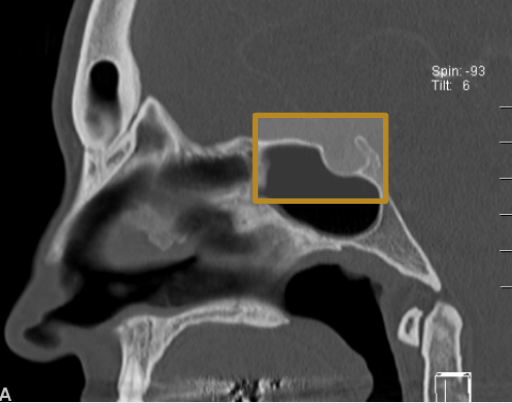


Dare AO et al J Neurosurg 2003



Indications:

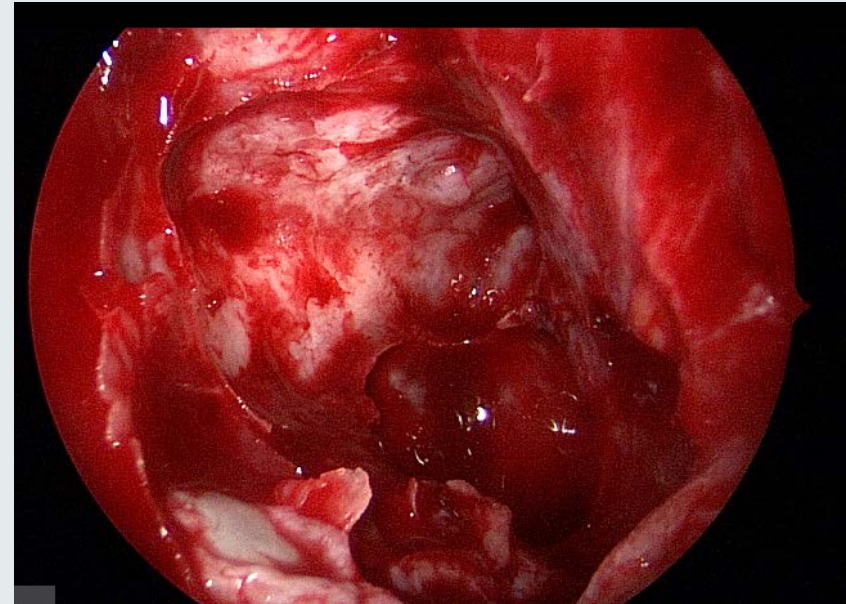
- Squamous cell carcinoma
- Adenocarcinoma
- Olfactory neuroblastoma



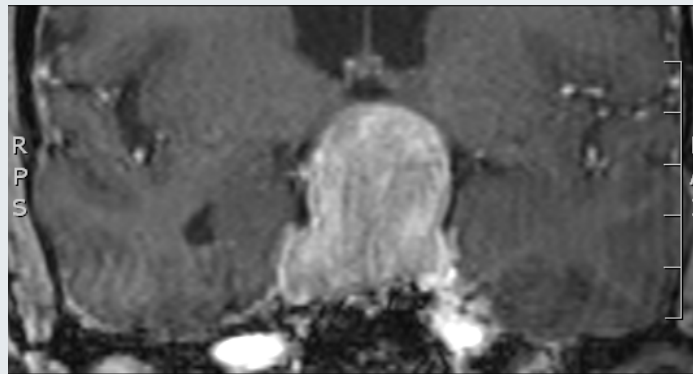
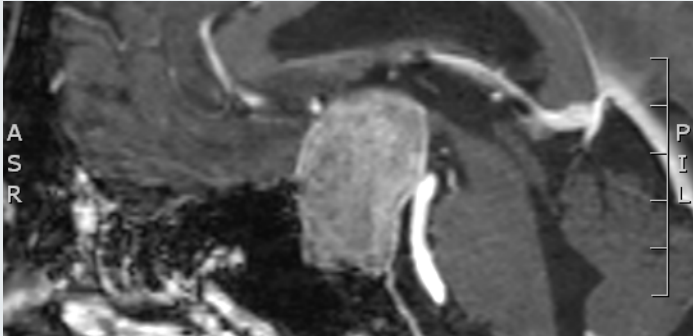
Expanded transsphenoidal

Sphenoid plain → Sella floor

1. Sphenoidectomy
2. Vomer base
3. Opticocarotid recess
4. Ev. sphenoidectomy
5. Ev. nasoseptal Flap

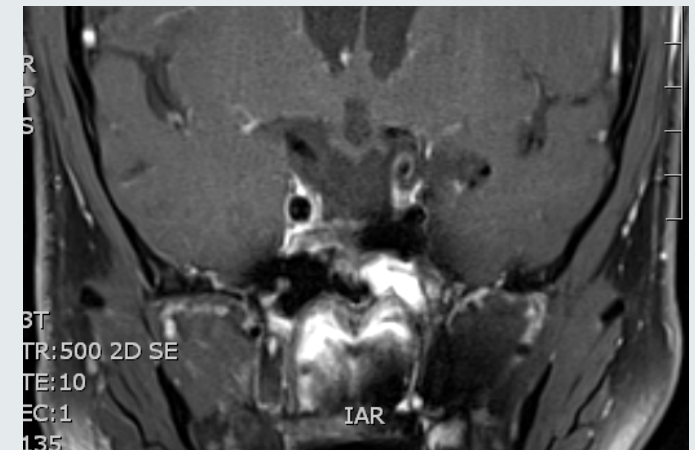
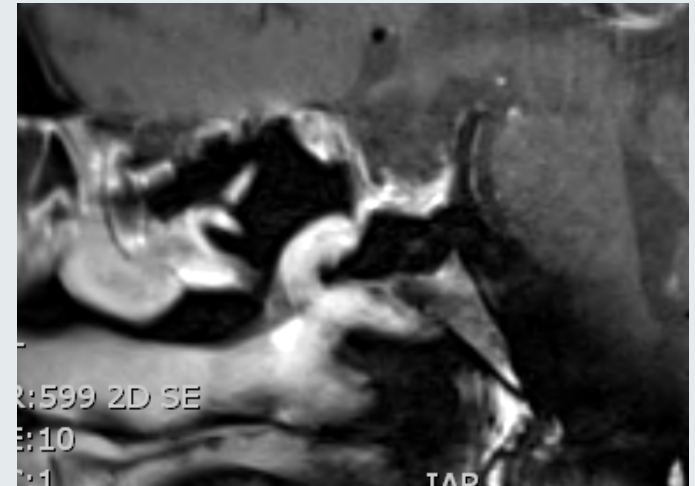


Expanded transsphenoidal



Indications:

- Pituitary adenoma,
- craniopharyngeoma

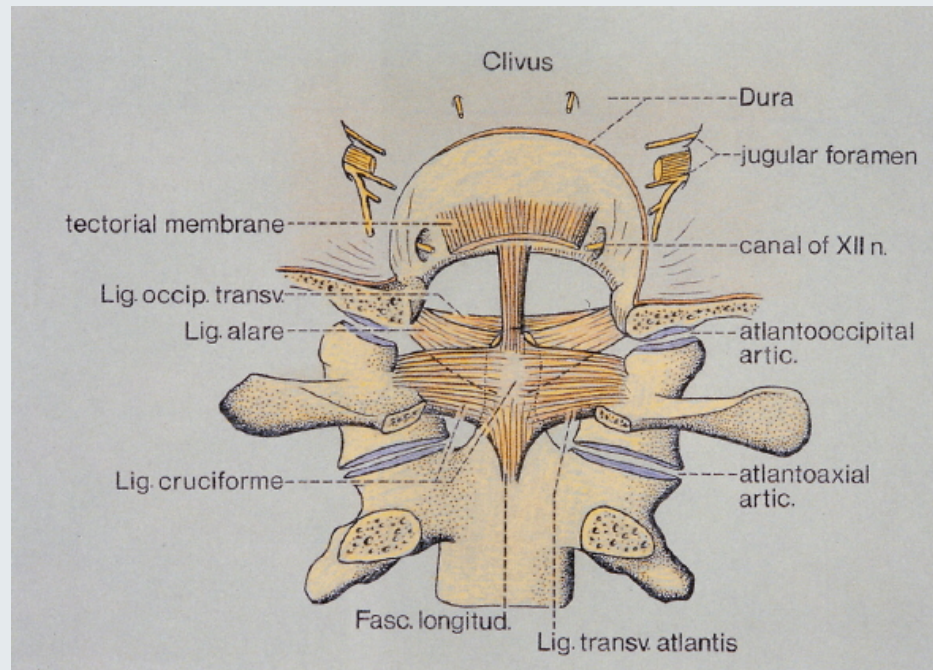




Transclival

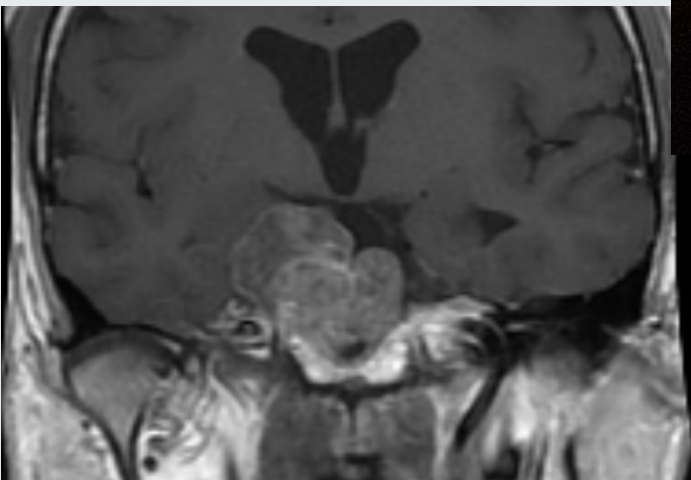
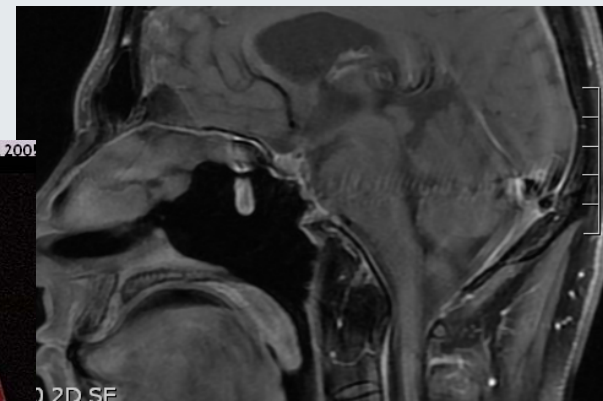
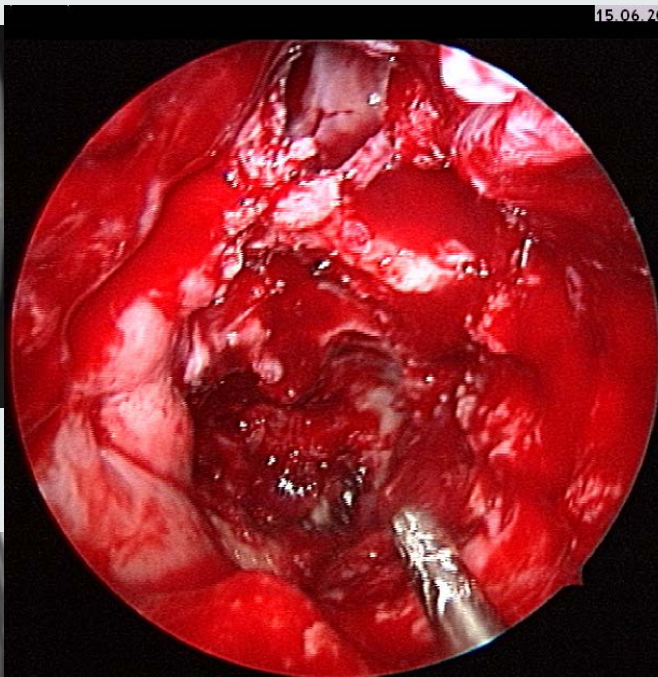
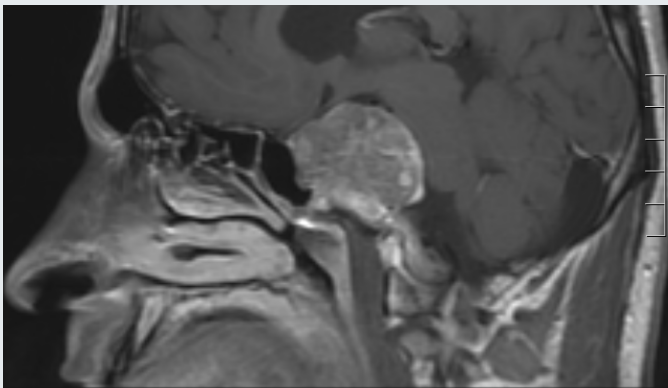
Sella floor → odontoid

1. Sphenoidectomy (bilateral)
2. cruciforme ligament/ tectorian membrane
3. C1 / C2 (odontoid)
4. Brain stem dura

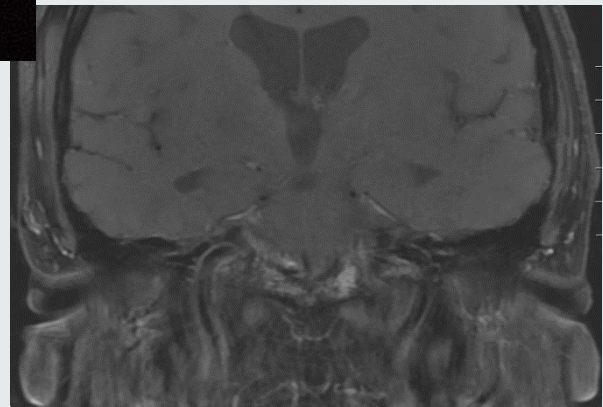


Holzmann D, Kraysenbühl N, Reisch R, Bernays RL *Min Invas Neurosurg* 2010

Transclival



Indications:
Chordoma
Chondrosarcoma



Holzmann D, Kraysenbühl N, Reisch R, Bernays RL *Min Invas Neurosurg* 2010



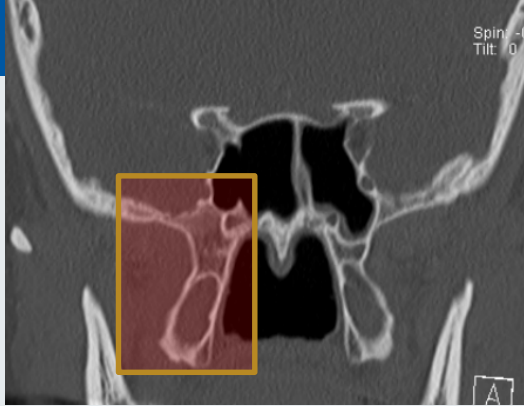
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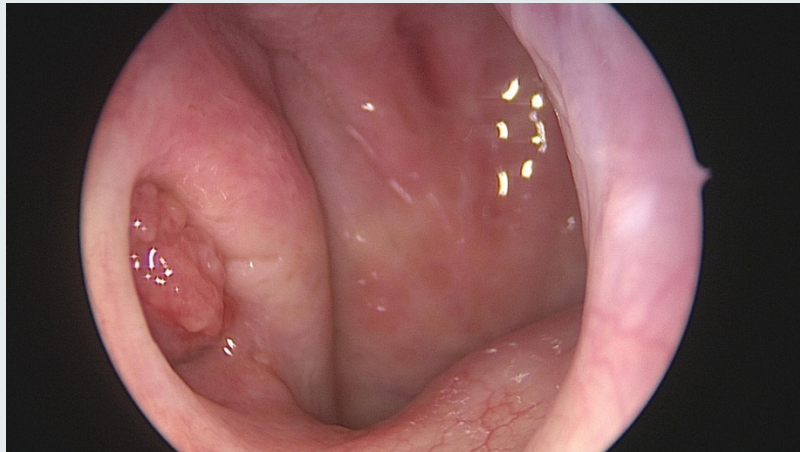


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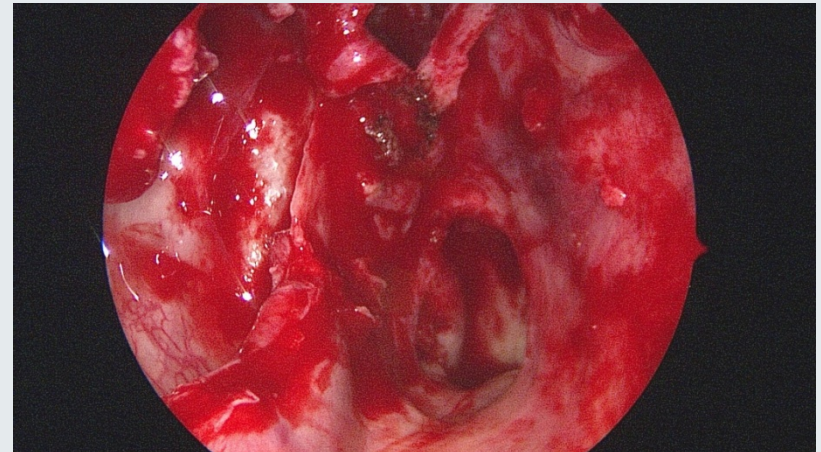
Transpterygoid



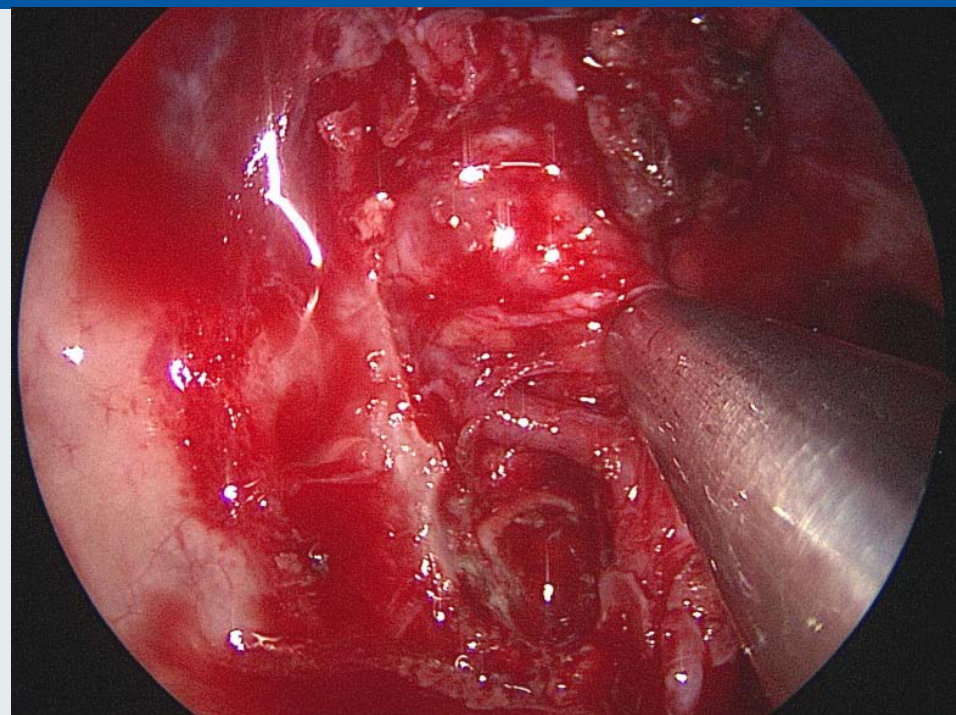
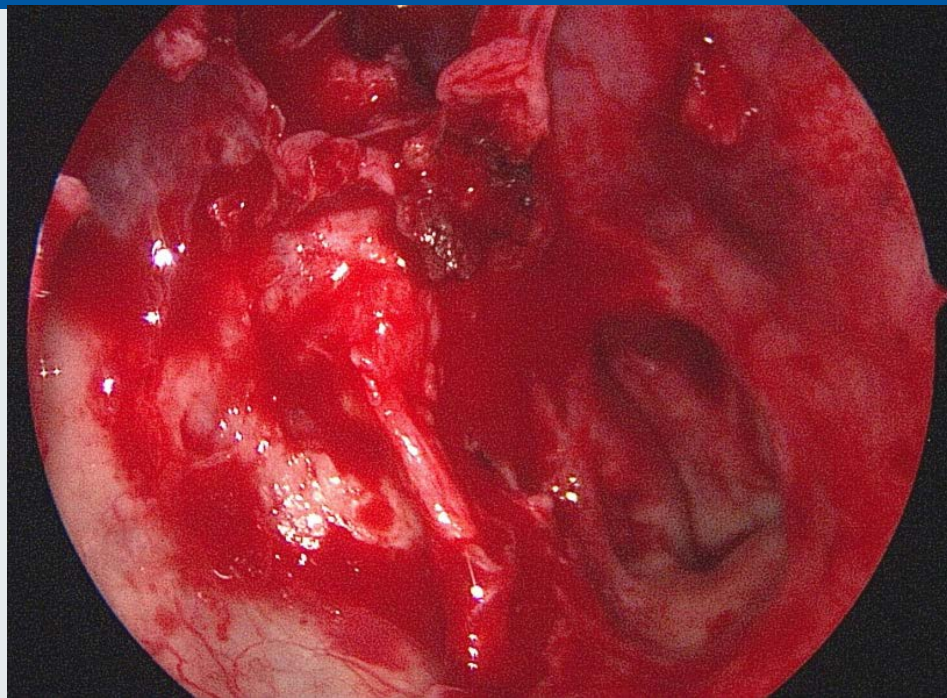
Proc. Pterygoideus → F. ovale



Mucoepidermoid Ca

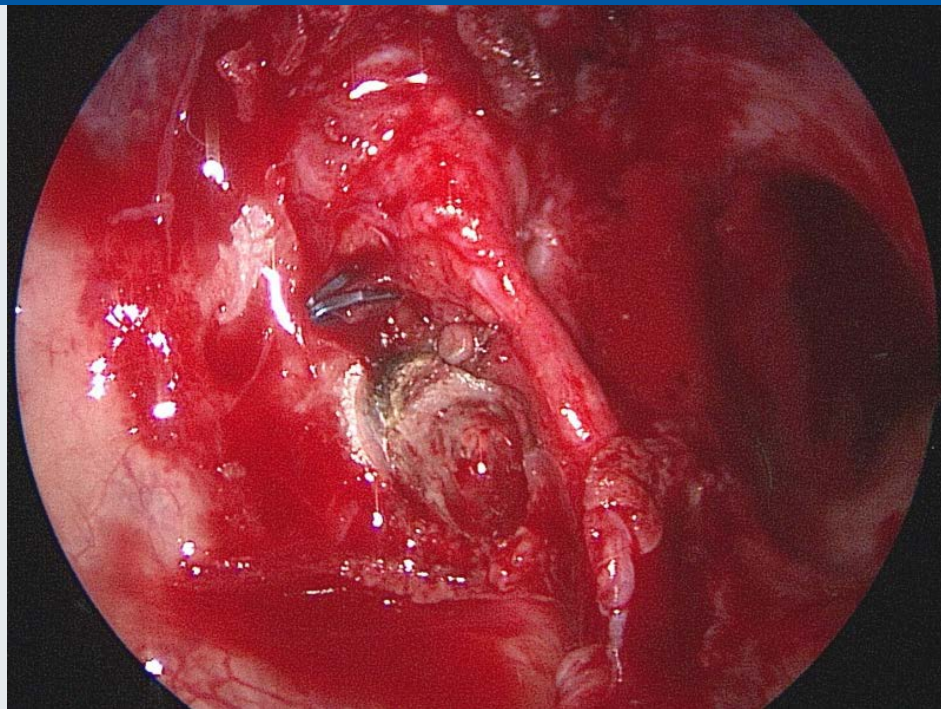


Sphenoethmoidectomy

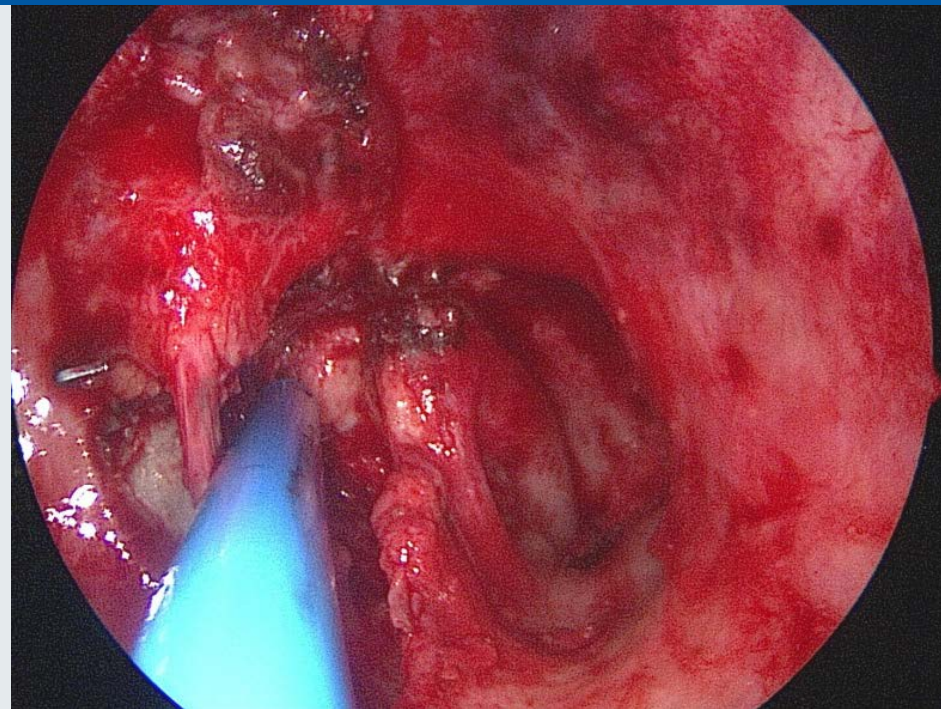


- Backwall maxillary sinus
- Pterygopalatine ganglion
- Greater palatine nerve

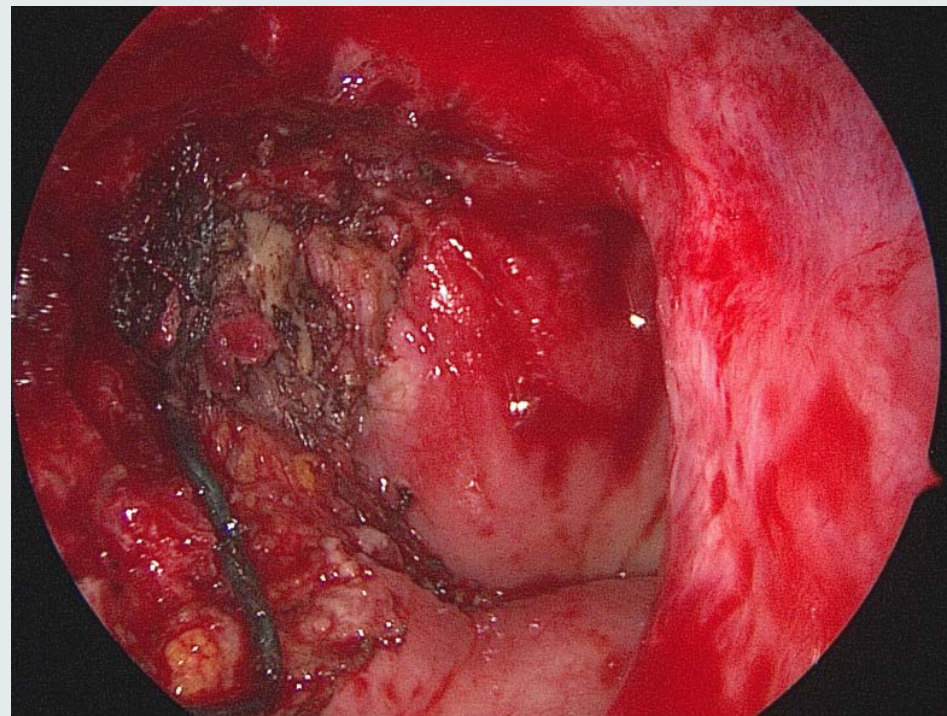
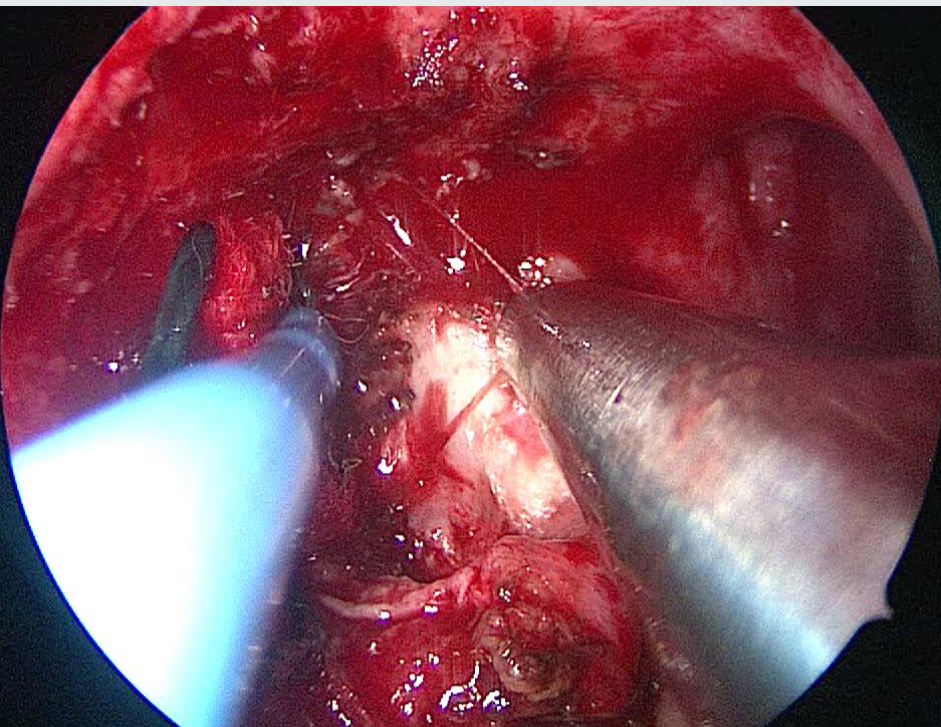
- Maxillary artery



Cut/clip ... the IMA



Drill the pterygoid process

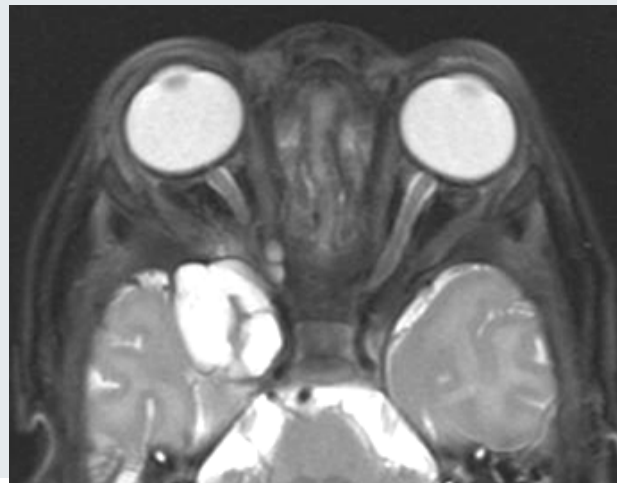
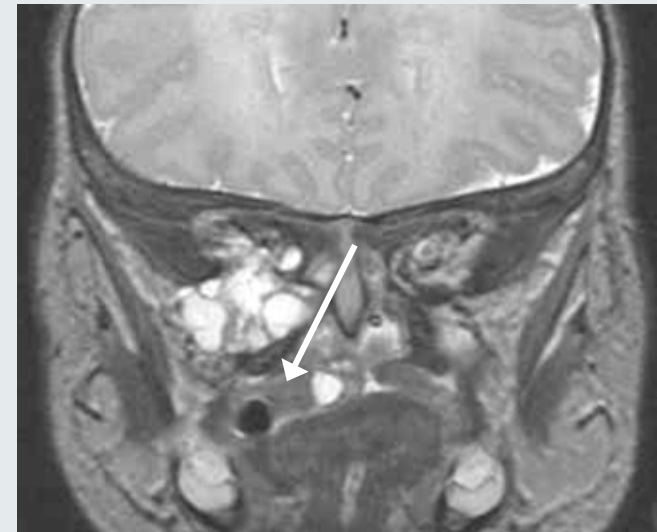
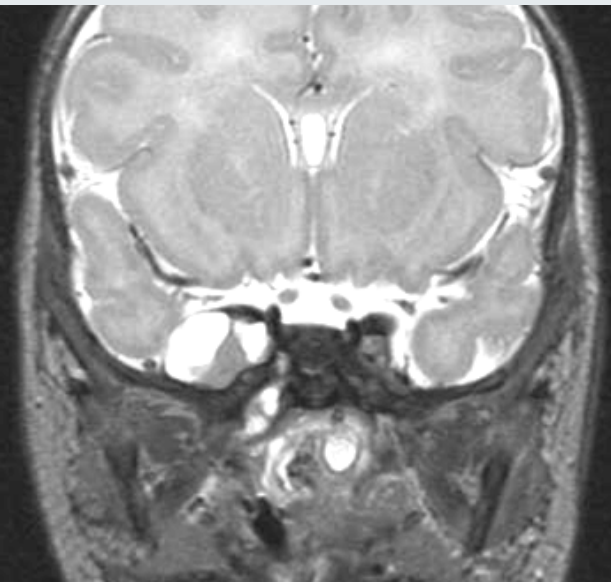


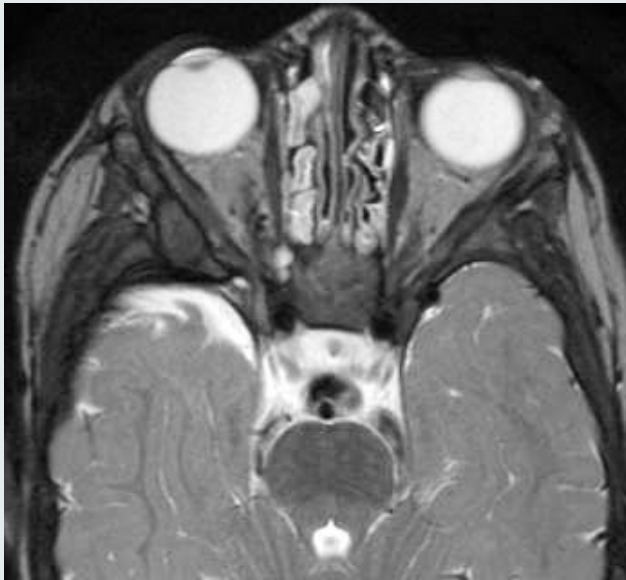
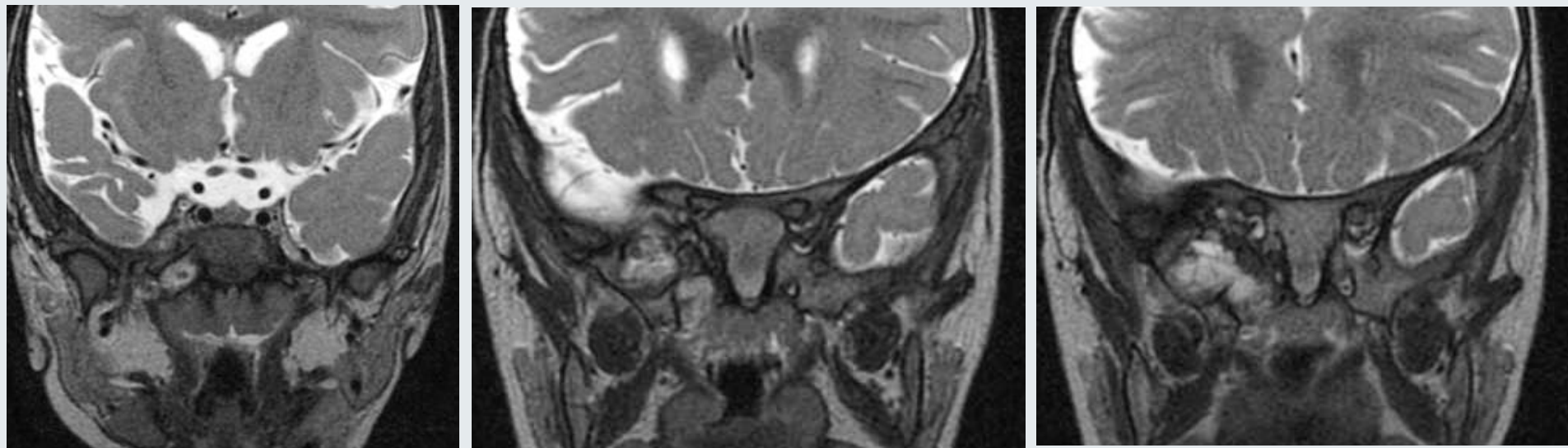
Remove the cartilaginous portion of the E.T.

Exposure:

- lateral: F. ovale
- superior: petrous segment of ICA
- inferior: soft palate

Newborn with theratoma afferent deficit right eye





Indications:

- Angiofibroma
- Adenoidcystic carcinoma
- Tumors along the Eustachian tube
- Tumors in masticator space

Holzmann D, Bozinov O, Kranyenbühl N *JNS* 2012



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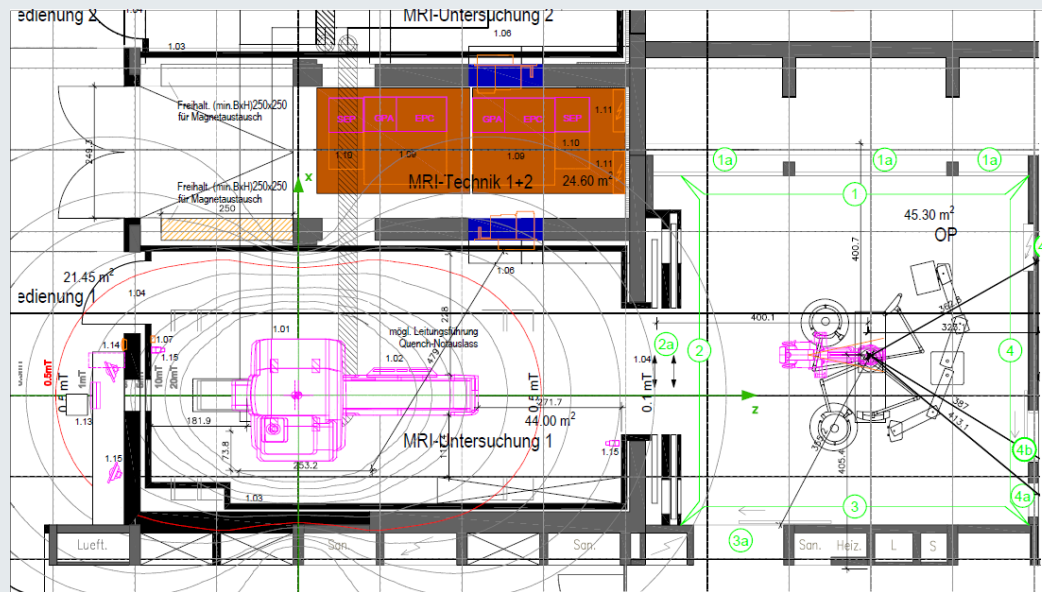
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Set-up & technical equipment

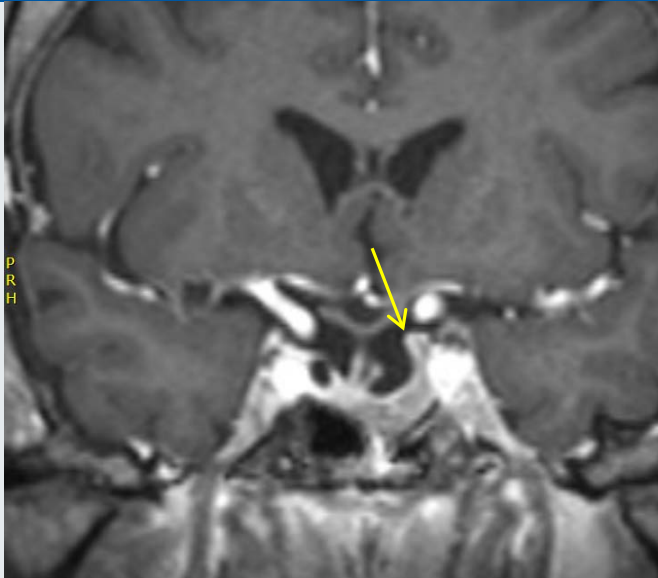
- Image guidance
- instrumentation



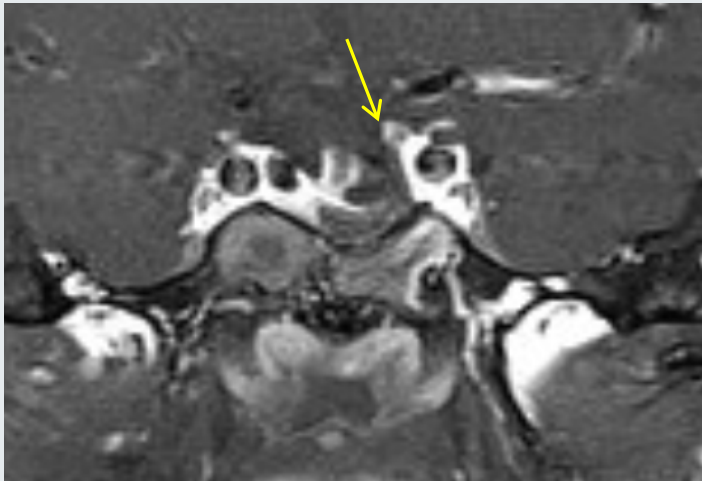
Intraoperative MRI:



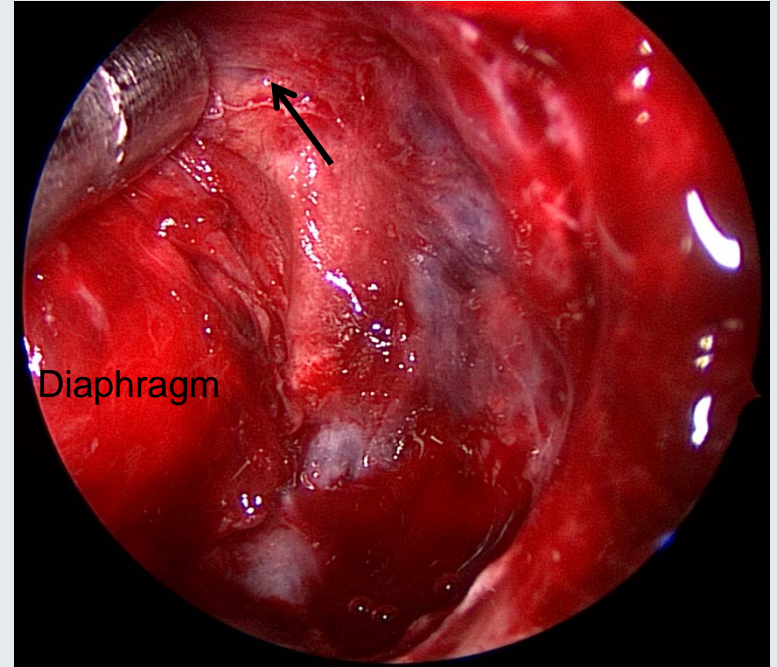
Dinevski N et al World Neurosurg 2017
Serra C et al Neurosurg Focus 2016



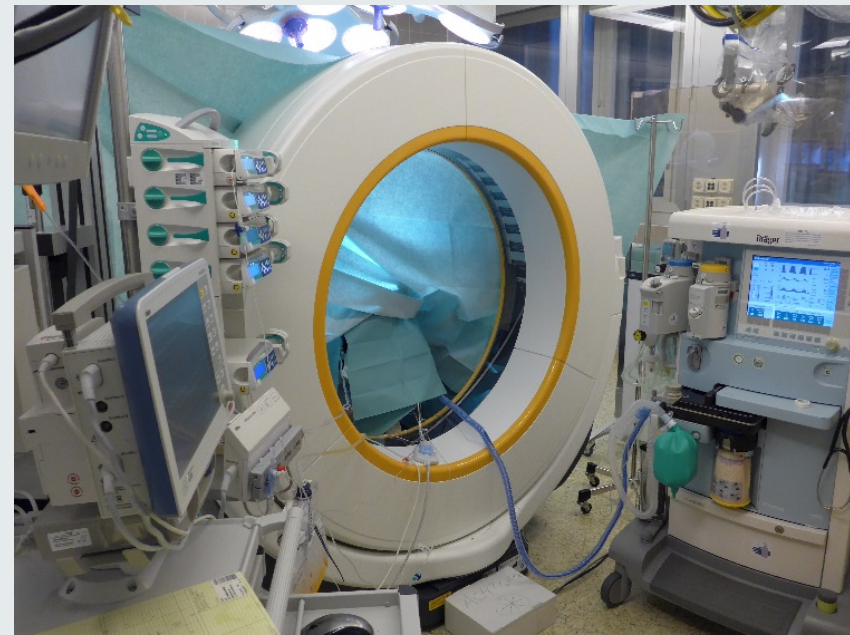
preop. MRI



intraop. MRI



Intraoperative CT:



Summary of current studies

Endoscopic approaches ...

- ... less morbidity
- ... helps to stem rising healthcare costs (hospital stay)
- ... no comparative outcome studies

Summary of current studies

No proved influence on the outcome

➤ ... working through the tumor

➤ ... piecemeal resection

(exception: Sarcomas)



Basic principle

Every novel treatment

has to provide

similar or better results

before it can be considered as standard of care



Despite the feasibility ...

... we need more data

Thank you for your attention

