Ρινική κοιλότητα, παραρρινιοι κόλποι και ενδοσκοπική εικόνα της ρινικής κοιλότητας

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ΕΘΝΙΚΟ ΚΑΠΟΔΙΣΤΡΙΑΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
ΙΑΤΡΙΚΗ ΣΧΟΛΗ
ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ
"ΕΦΑΡΜΟΣΜΕΝΗ ΝΕΥΡΟΑΝΑΤΟΜΙΑ"

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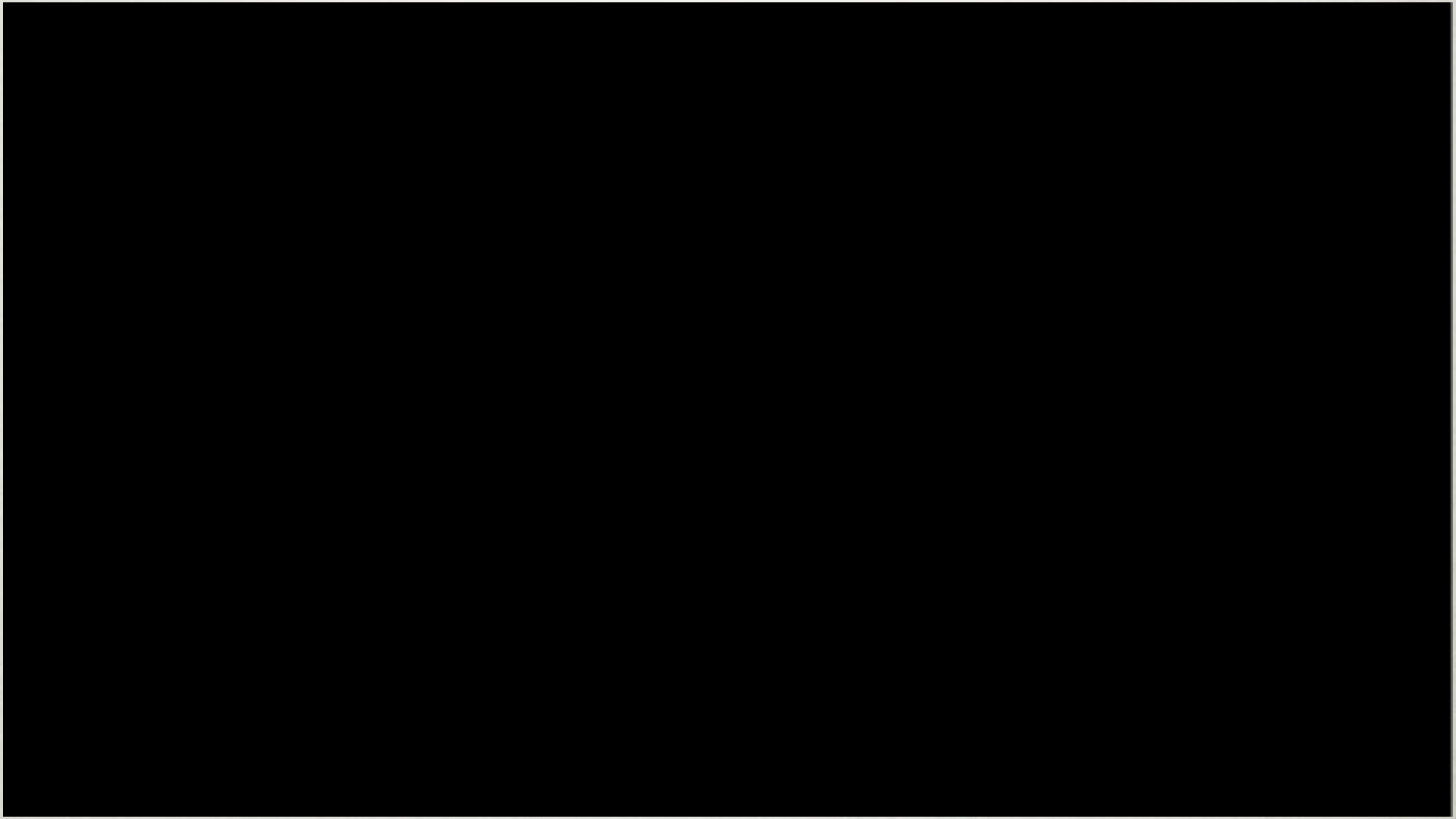
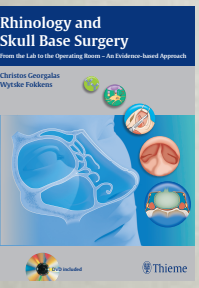




From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013

LUMC

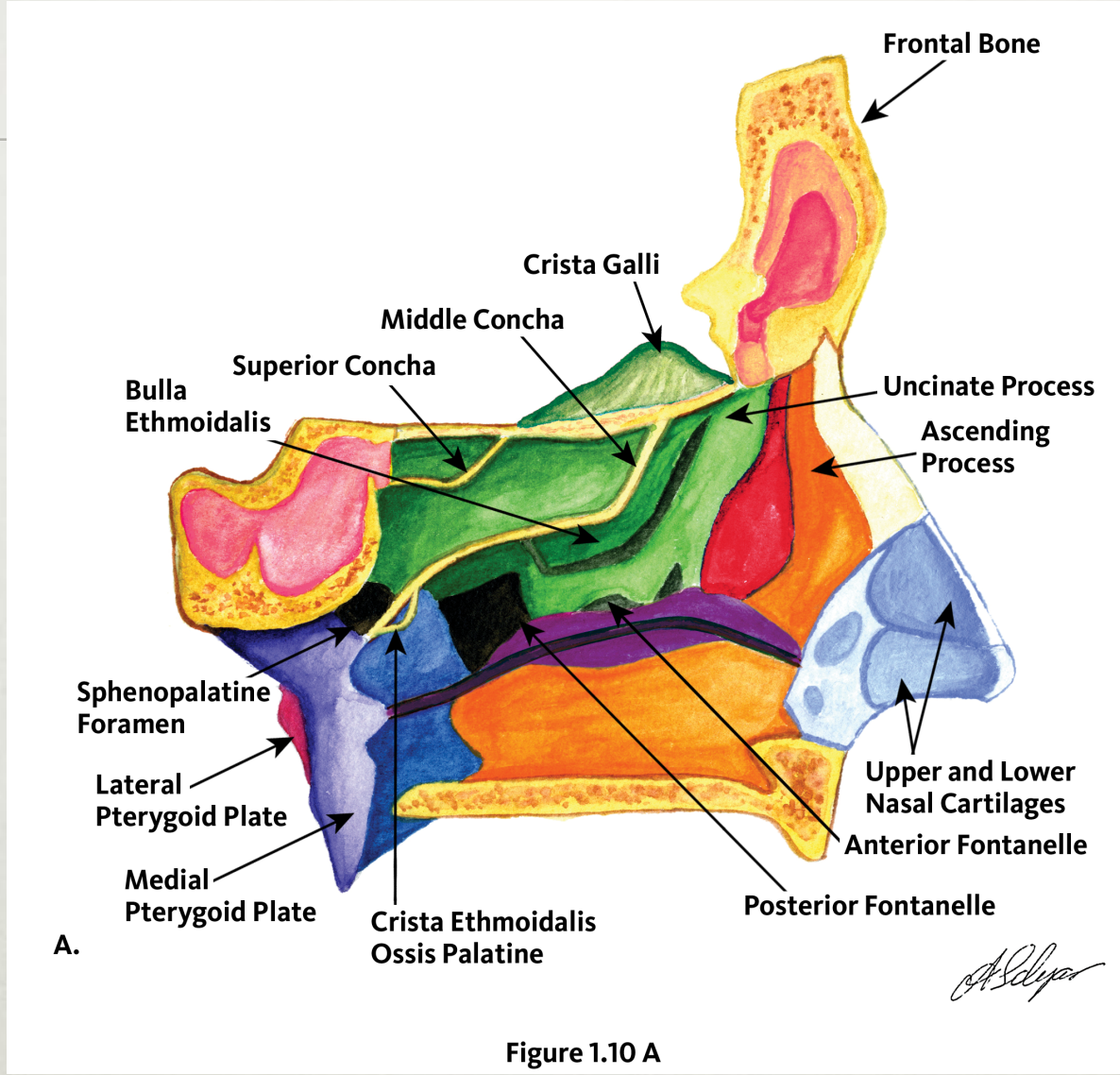
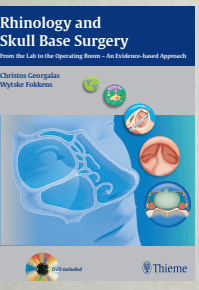


Figure 1.10 A



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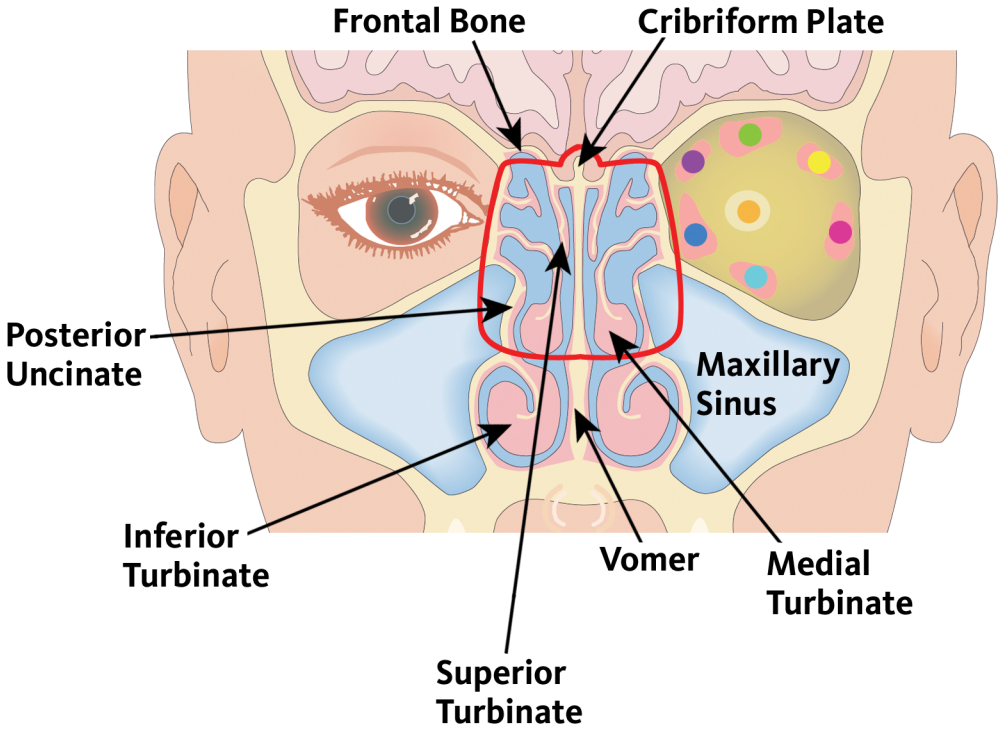
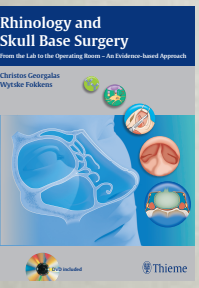
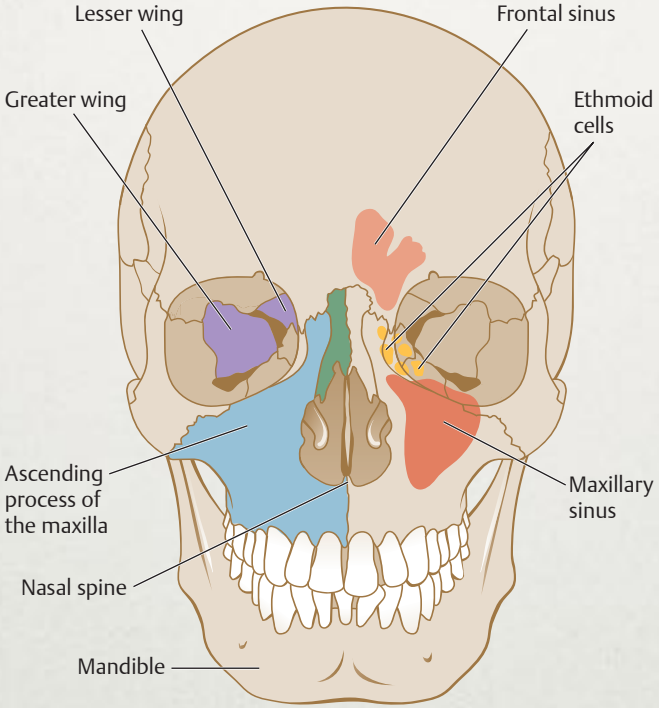


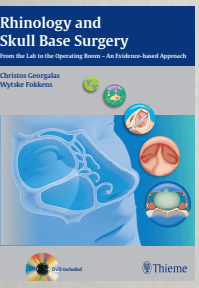
B.

Figure 1.10 B

From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013







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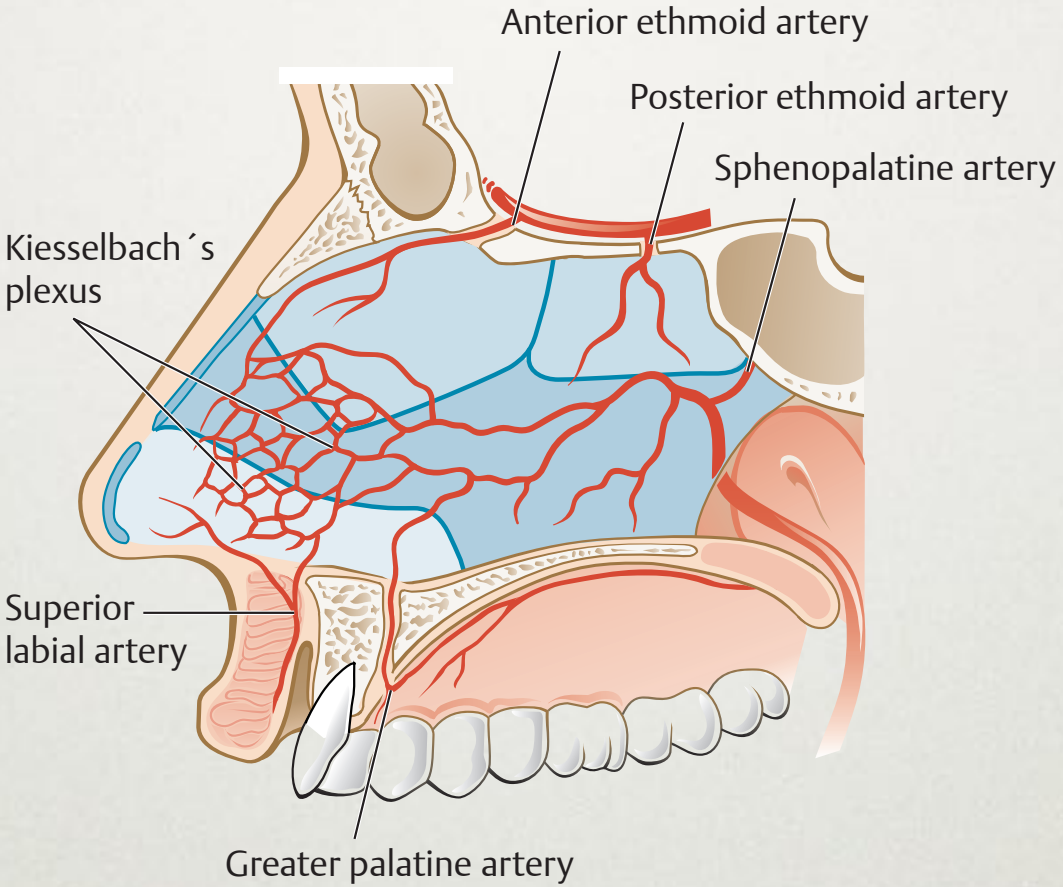

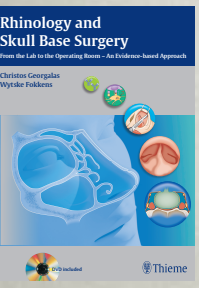

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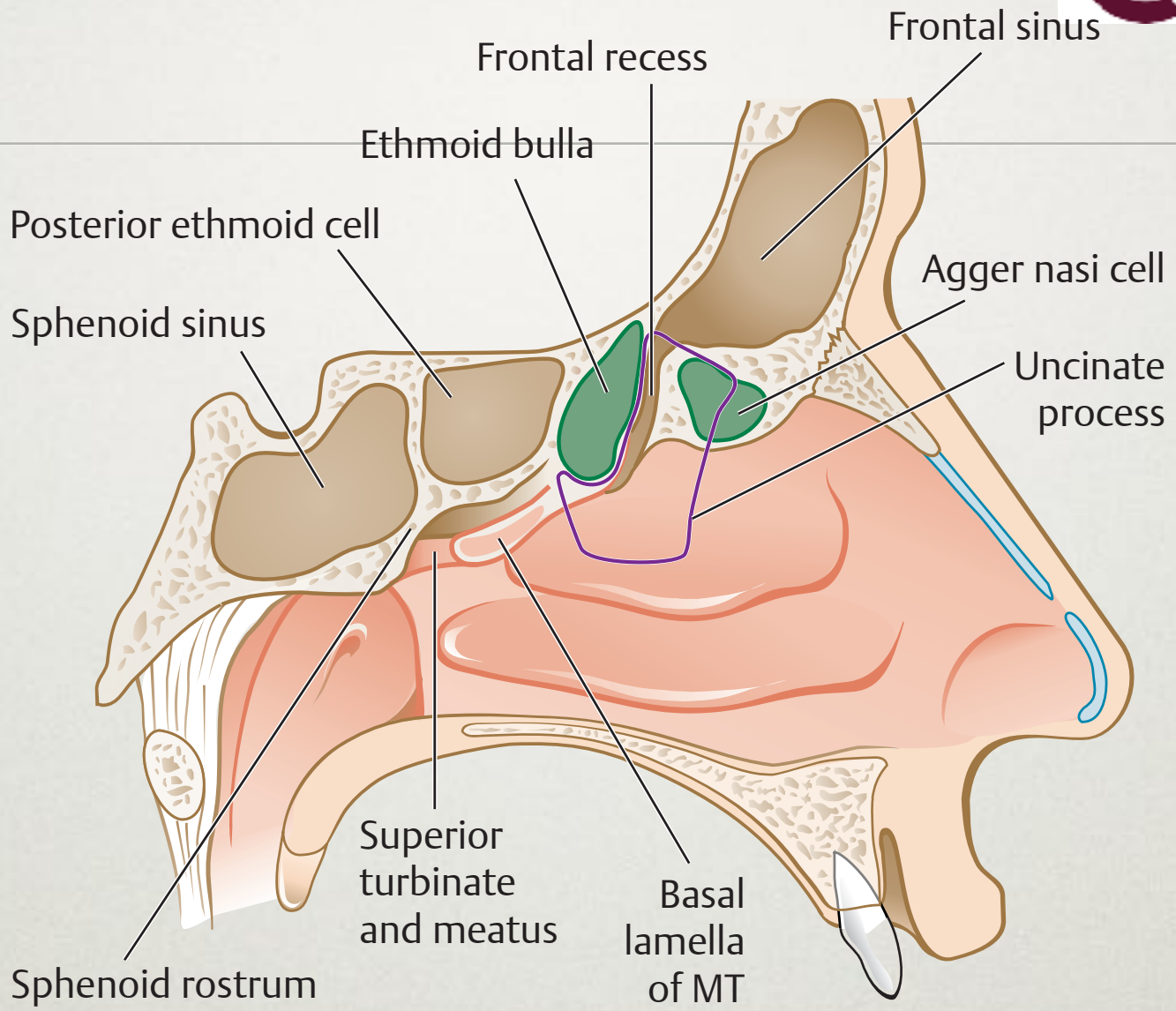

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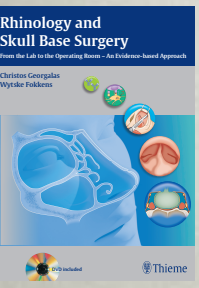
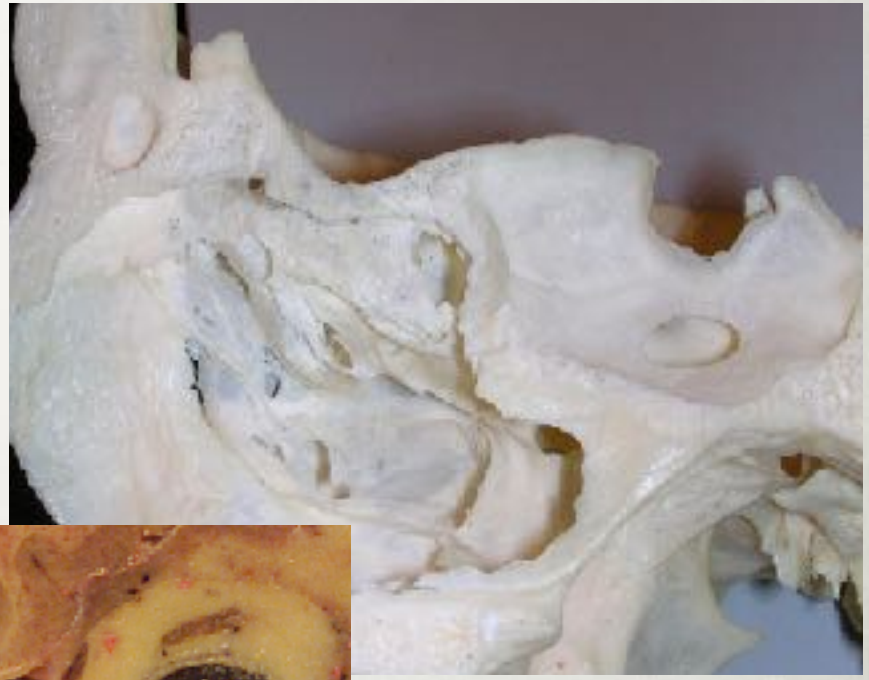
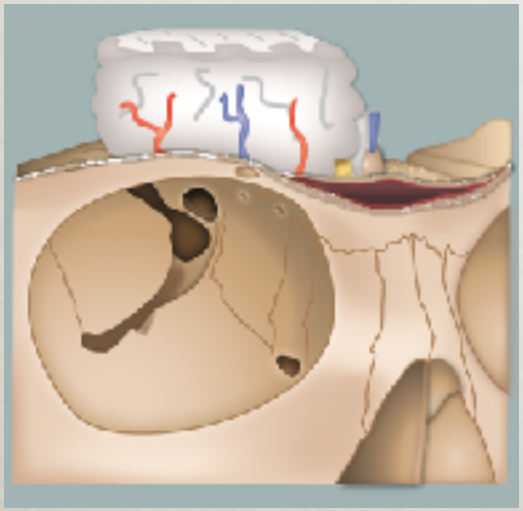


Sino-orbito-cranial interface



Thanks to Iacopo Dallan!

Sino-orbito-cranial interface



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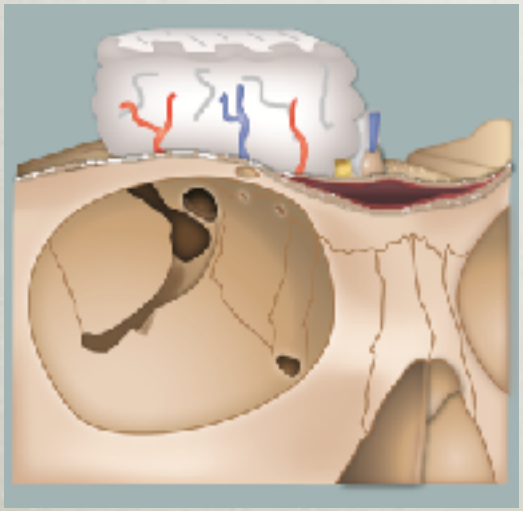

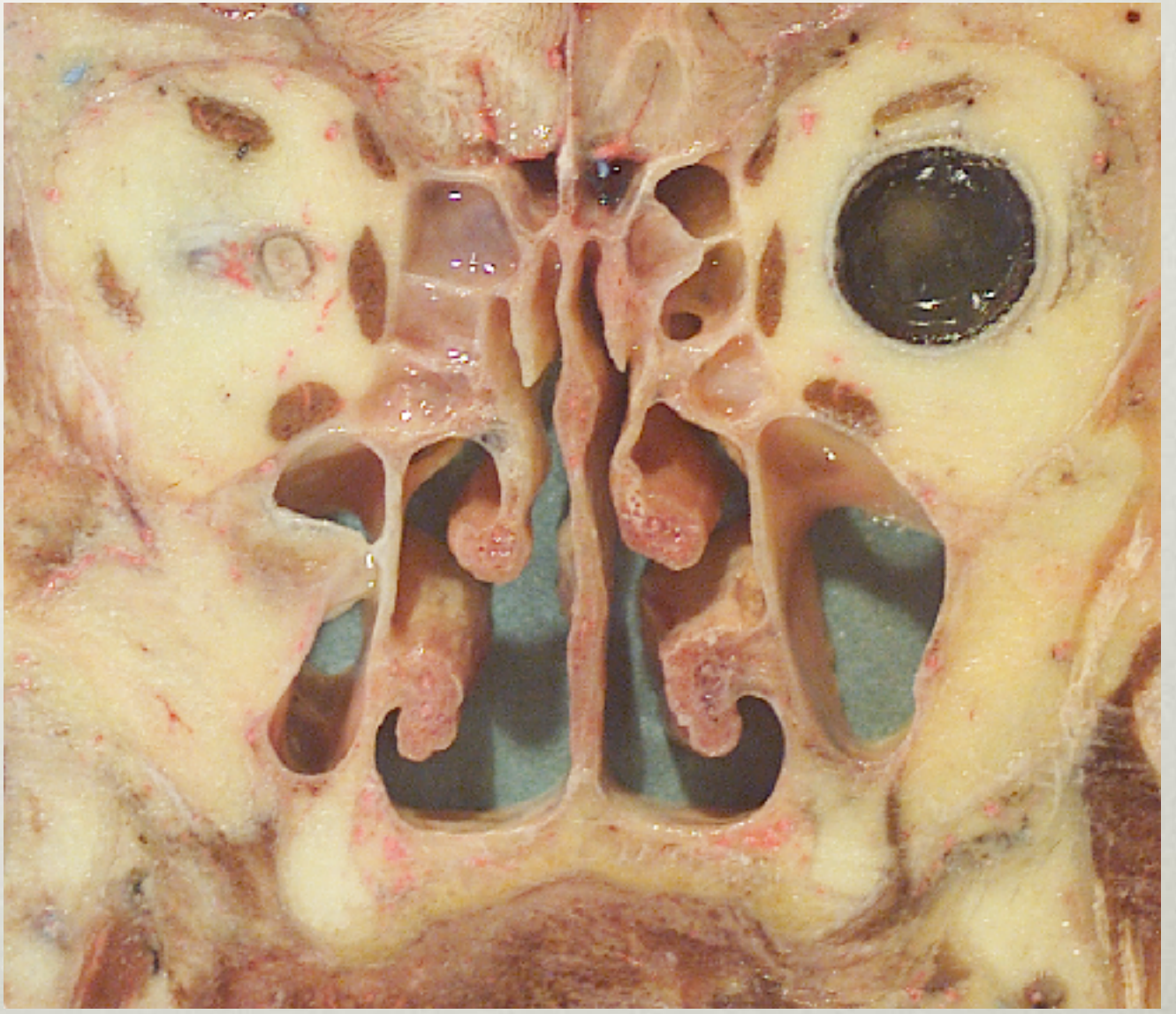

Sino-orbito-cranial interface

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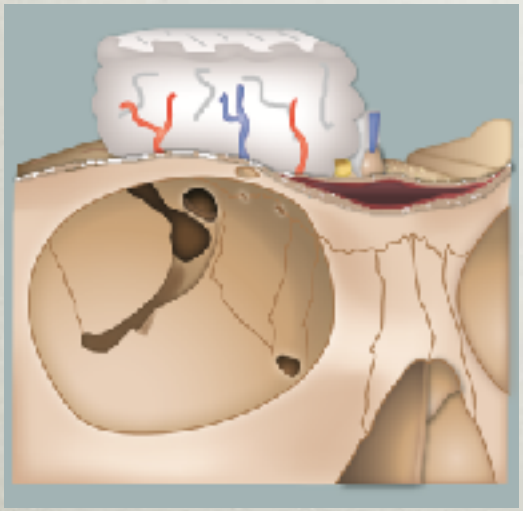
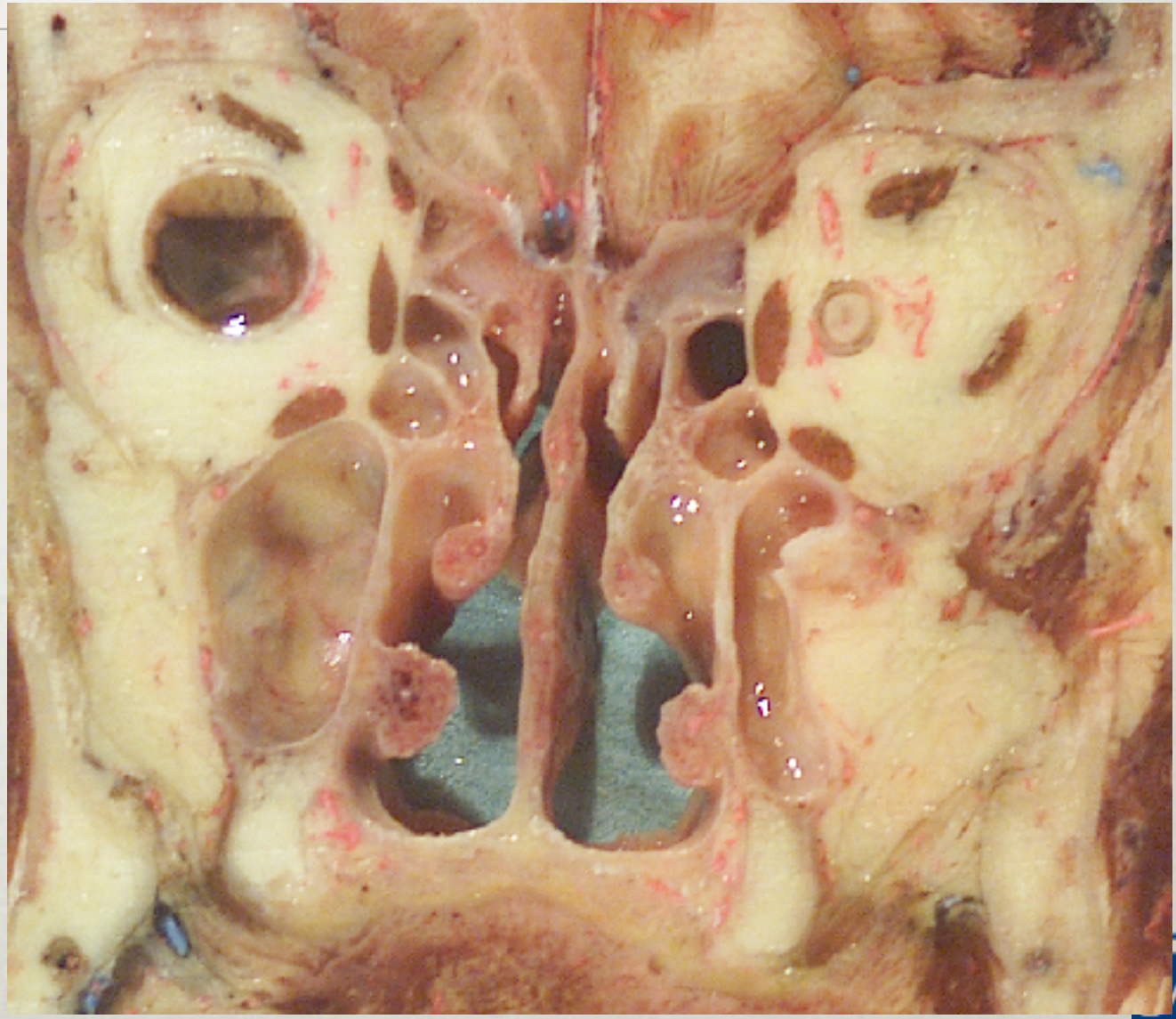
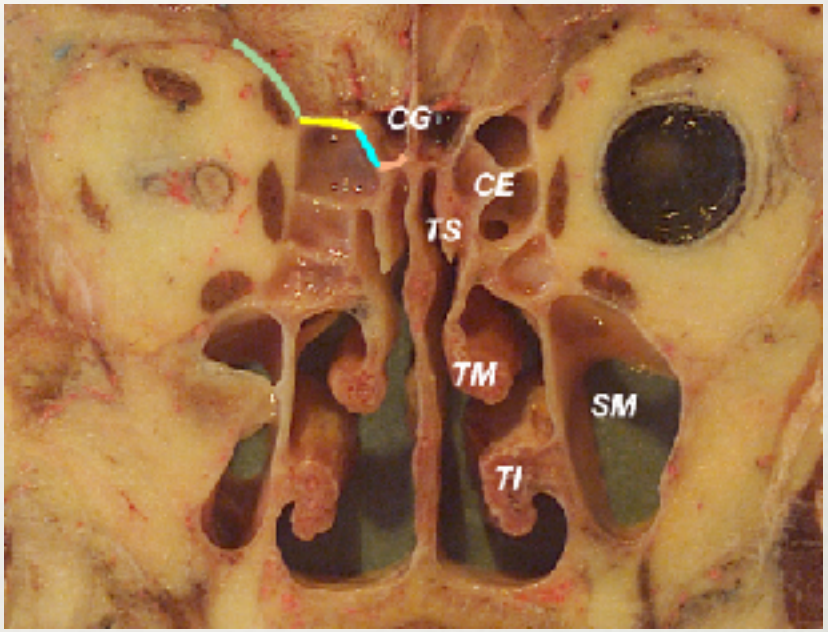
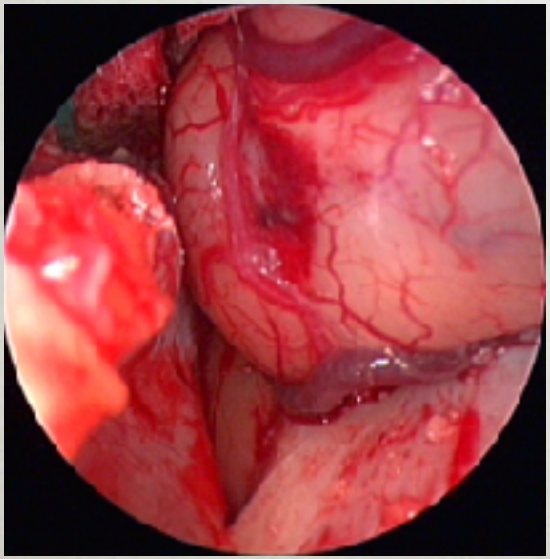
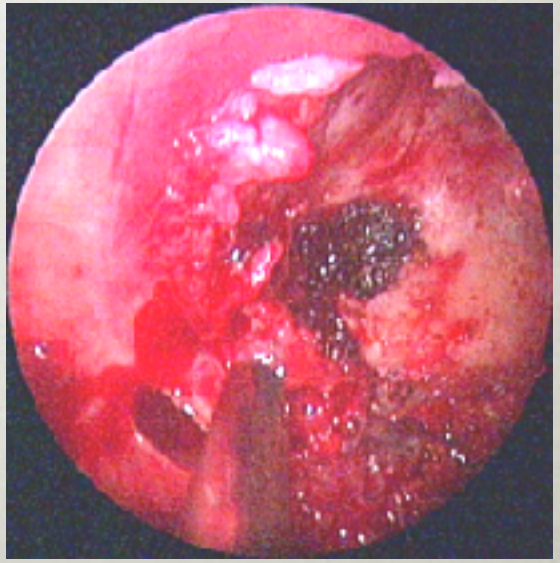




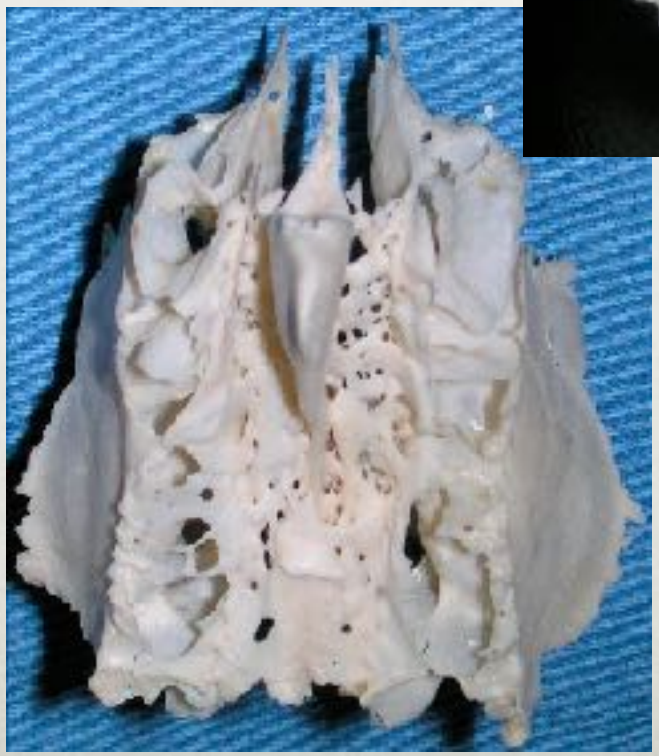
Sino-orbito-cranial interface



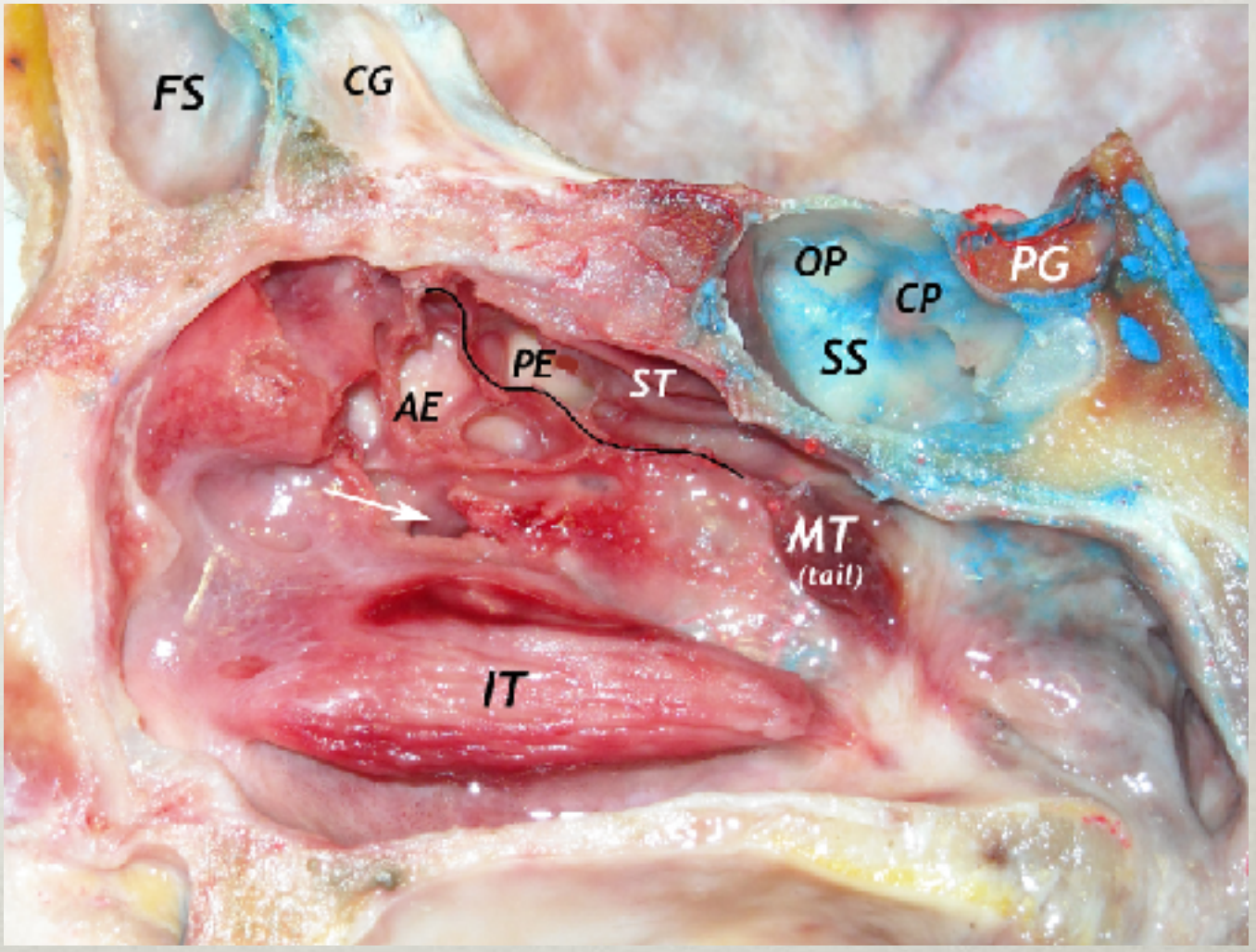




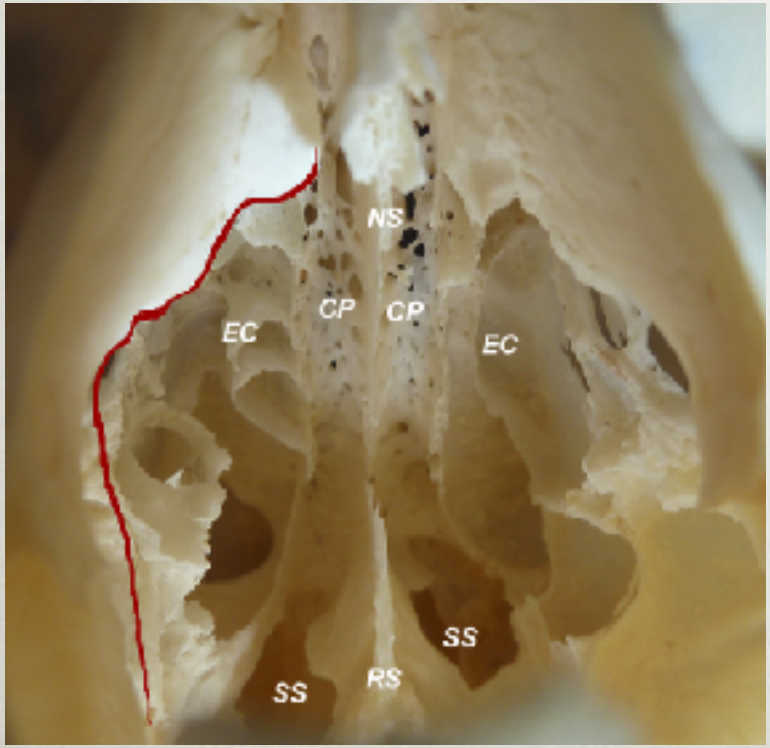
Ethmoidal box

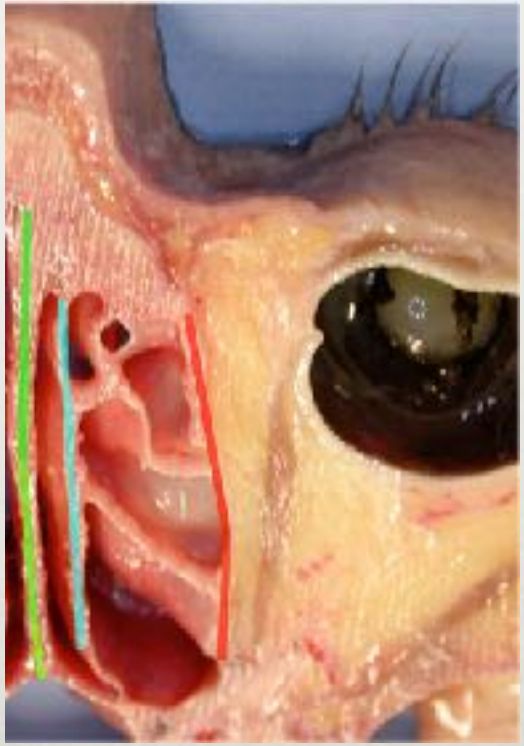


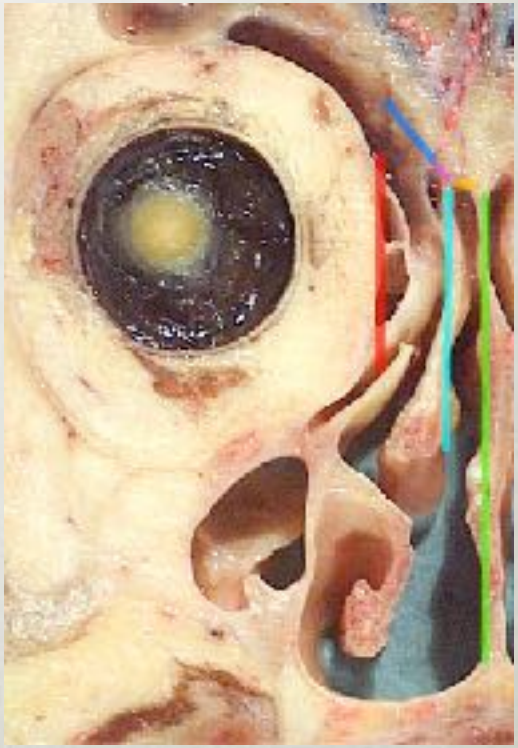
Ethmoidal complex
Anterior vs Posterior



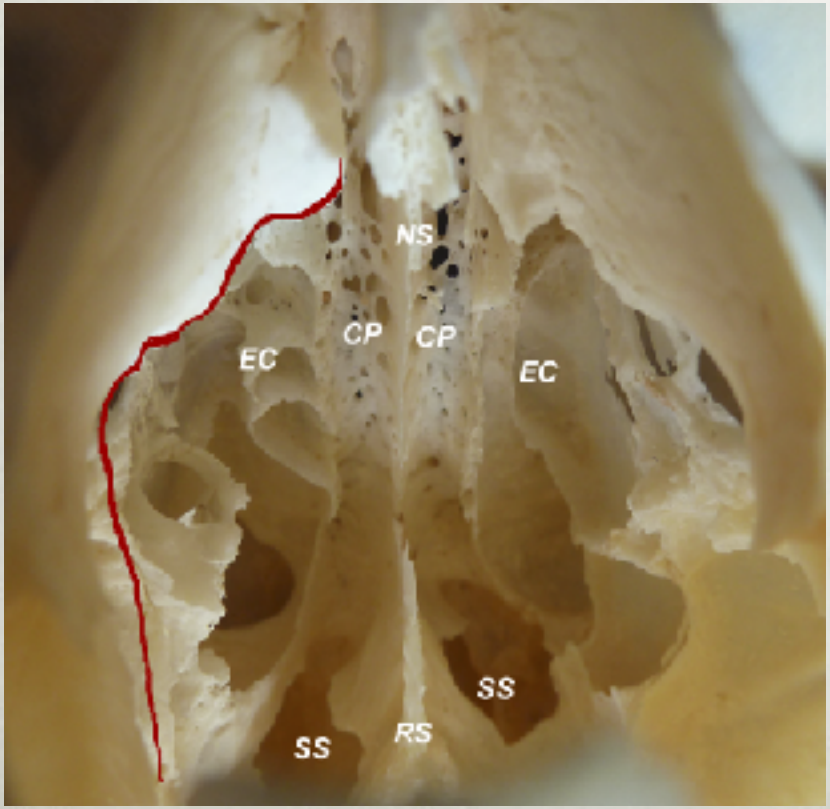
Olfactory fossa & ethmoidal cells

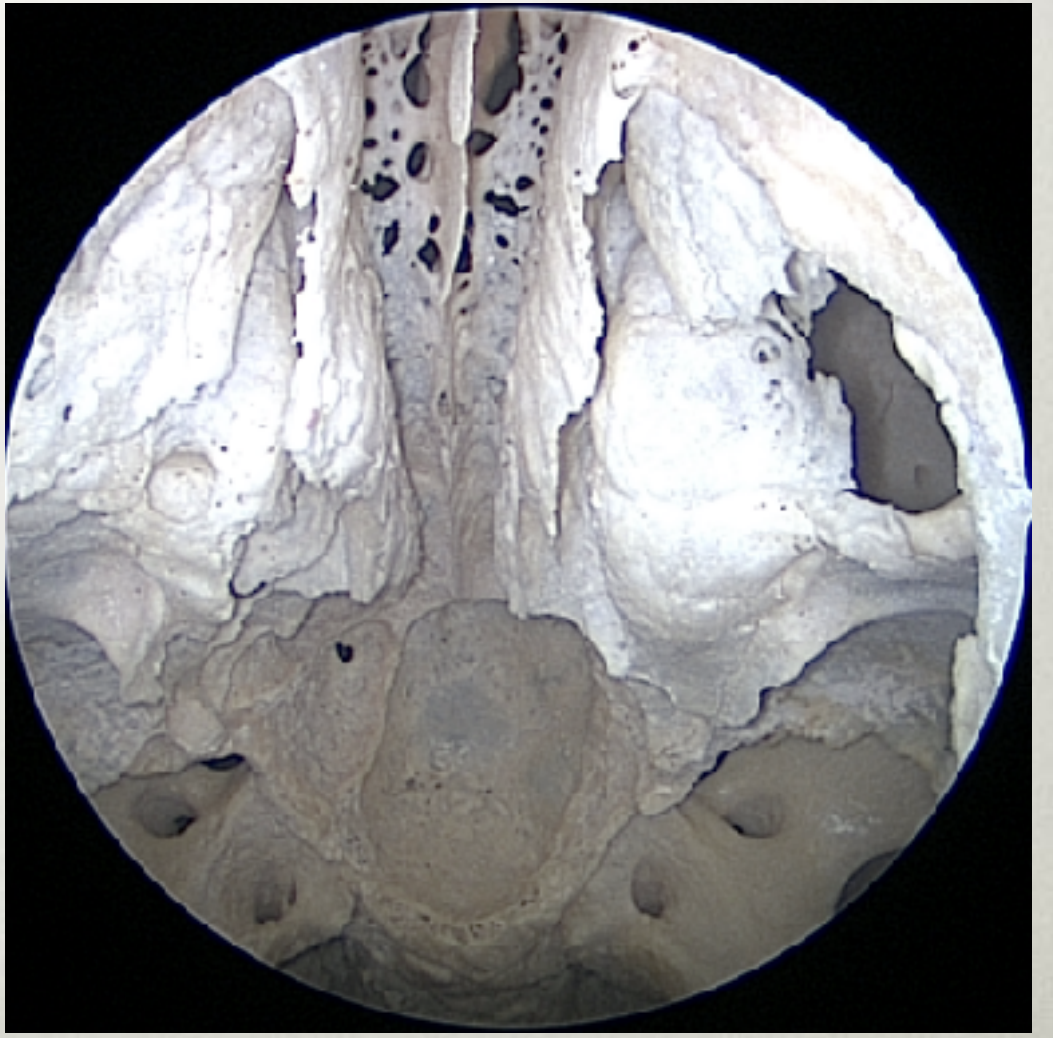






Cribriform plate & ethmoidal cells

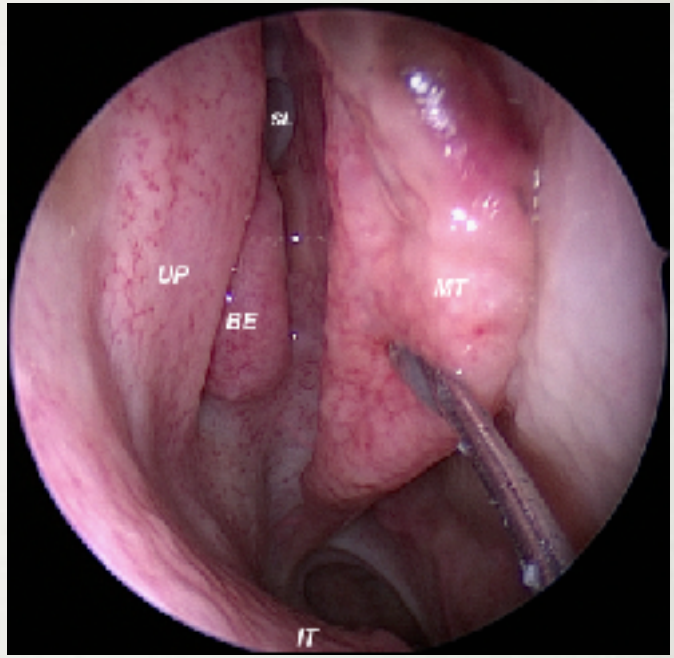


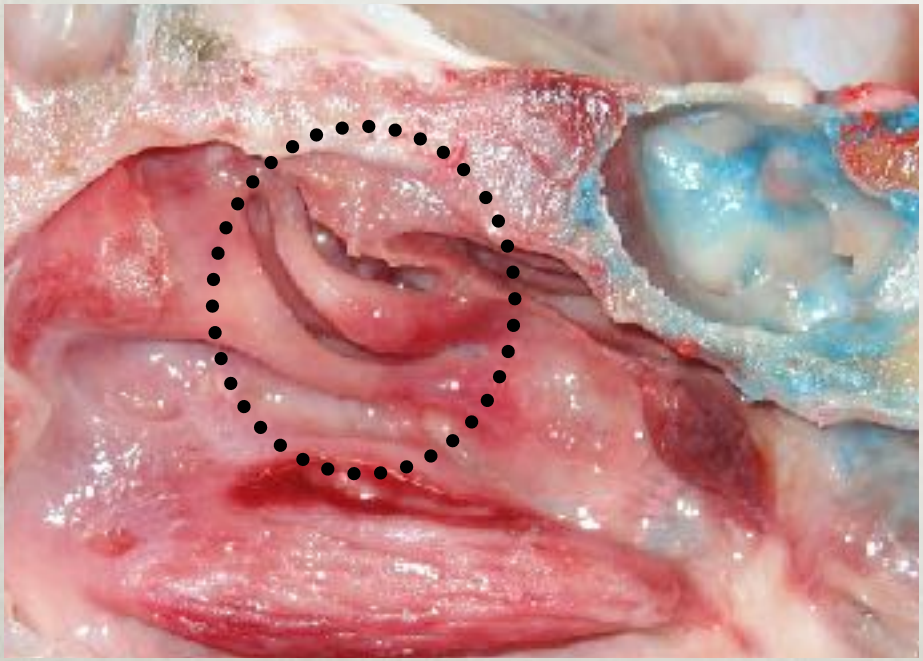


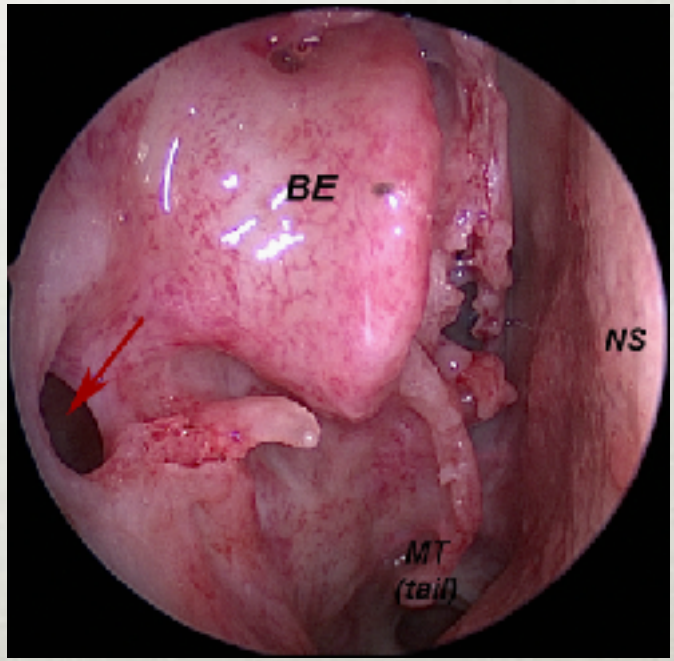
Lateral nasal wall

osteology

Uncinate process and Bulla ethmoidalis

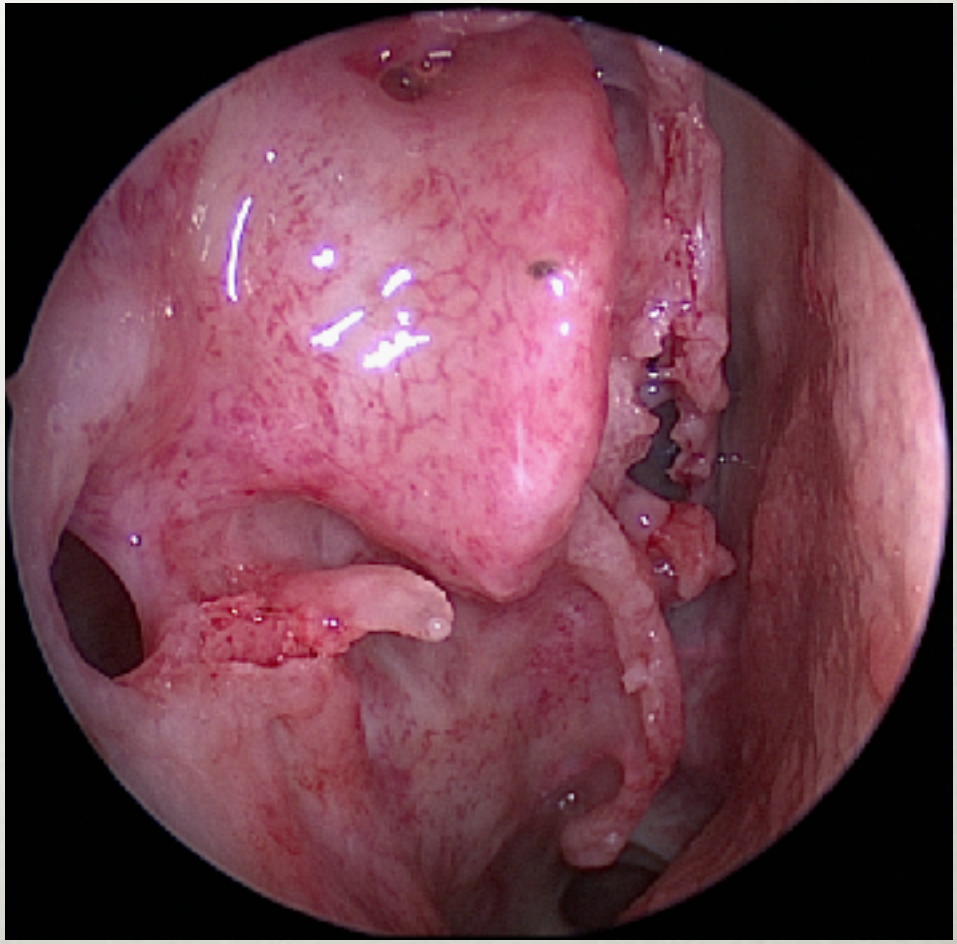




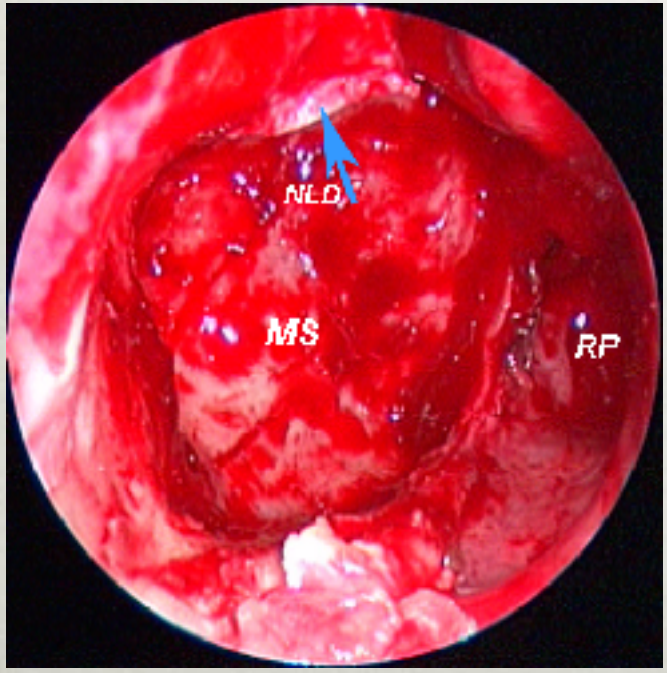


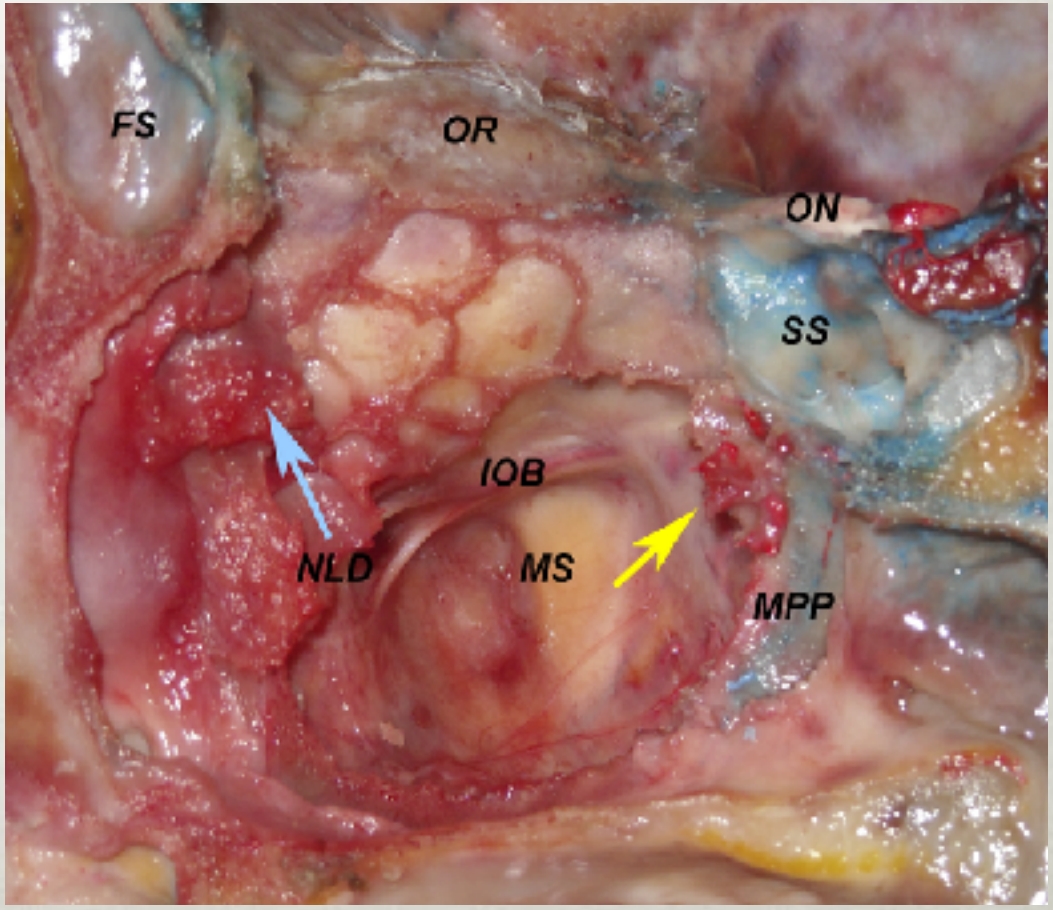
Ethmoidal work

Identification of maxillary ostium

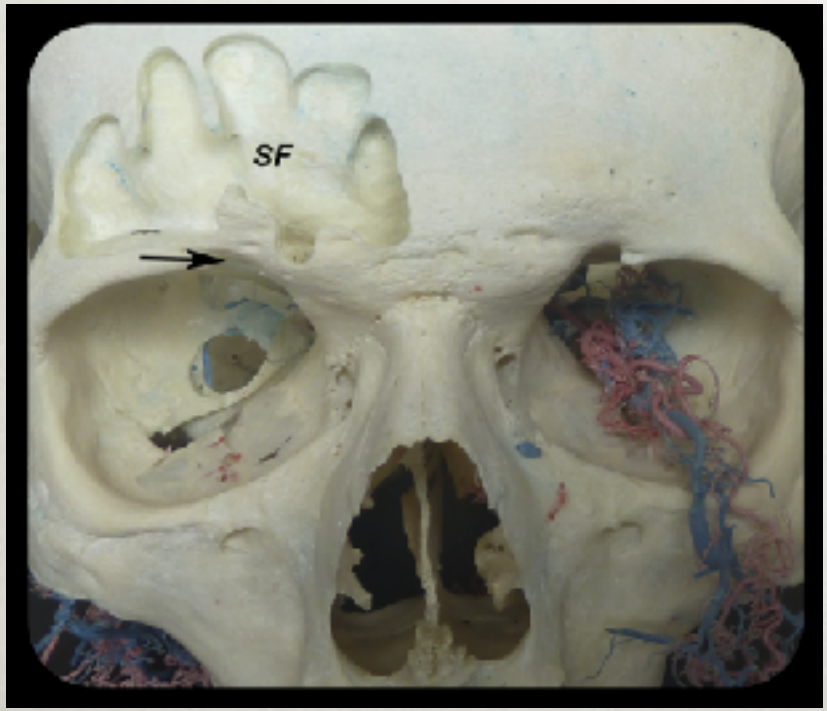


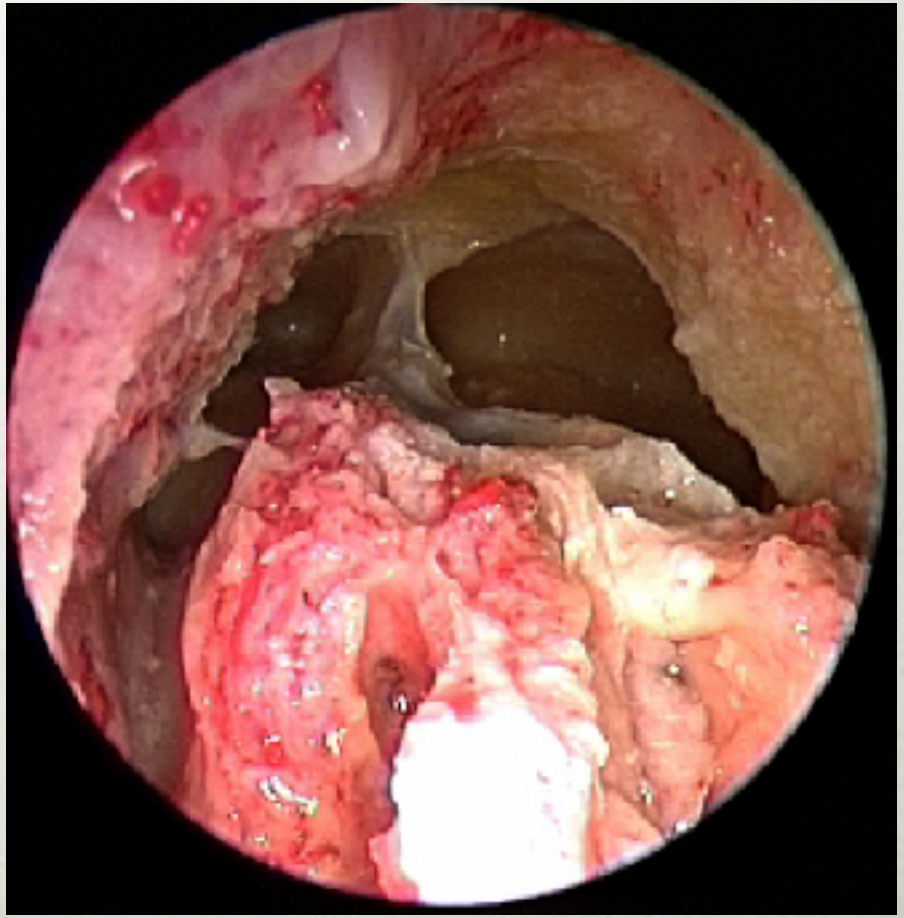
Maxillary sinus
Relationship with
lacrimal pathways and orbit



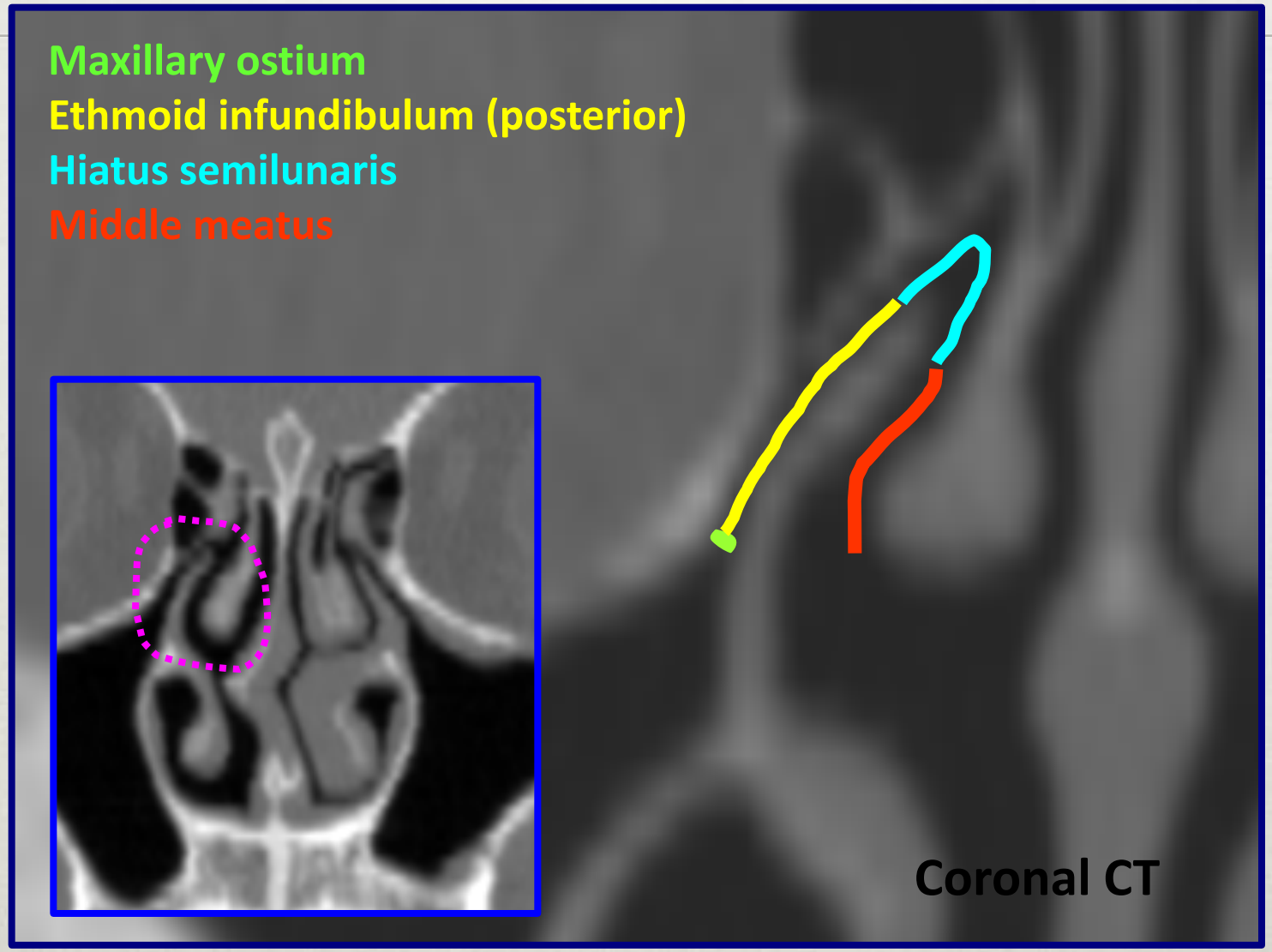


Frontal sinusosotomy
Draf 3



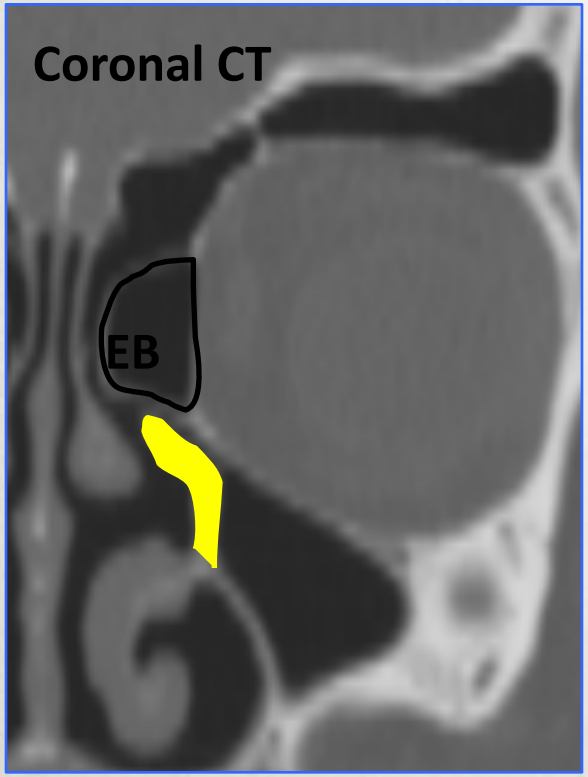


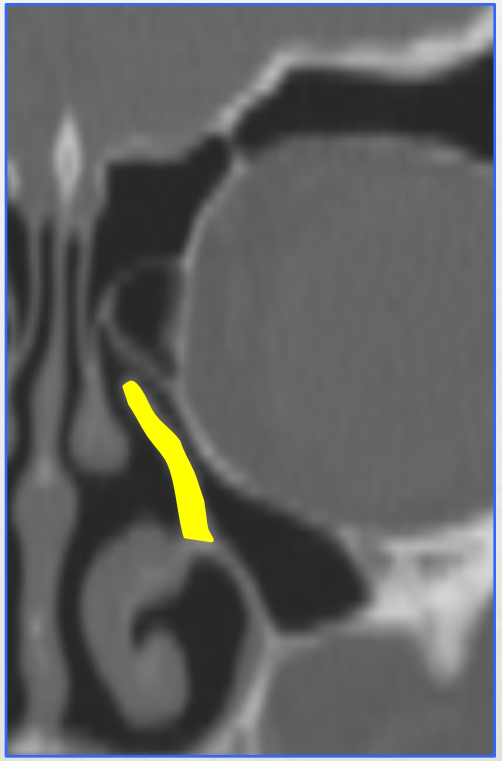
Note : Ostio-meatal unit

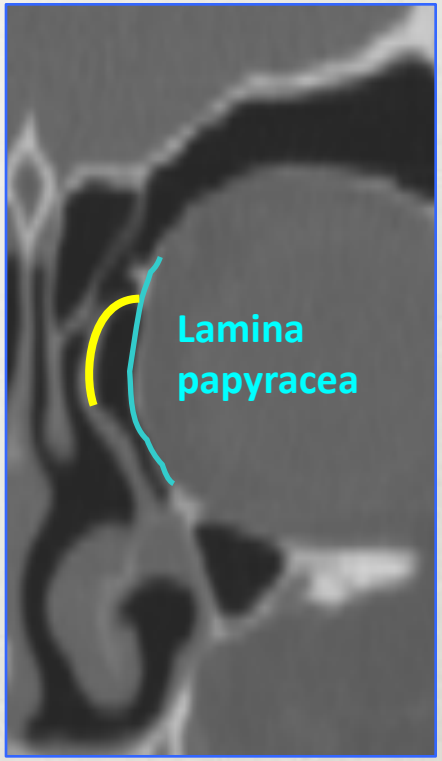


Uncinate process

Thin-curved bony lamina of variable height from the lateral side of the ethmoid labyrinth, that forms a portion of the lateral nasal wall.



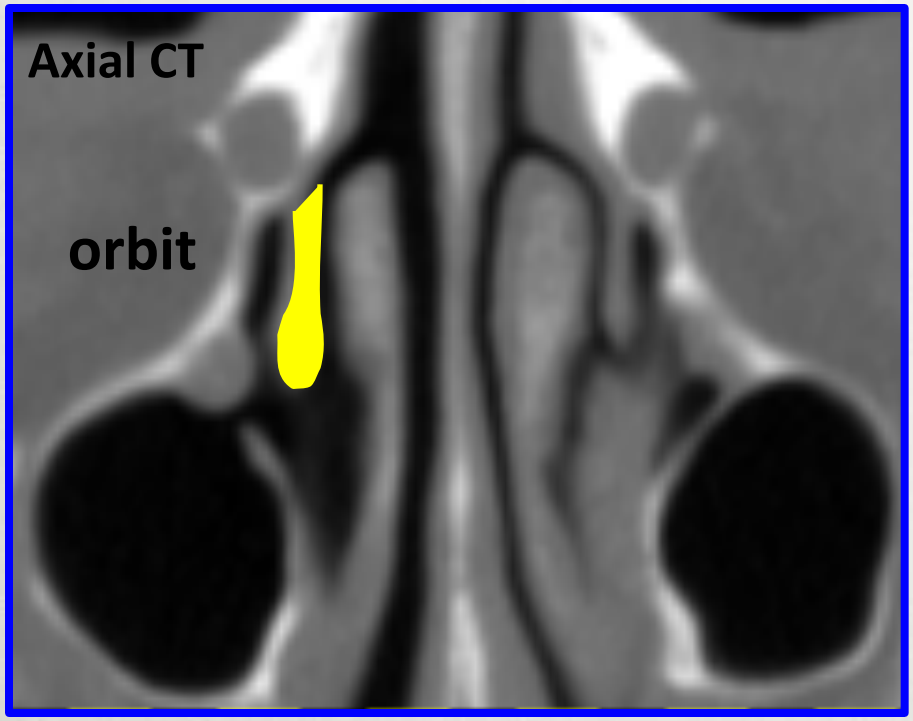


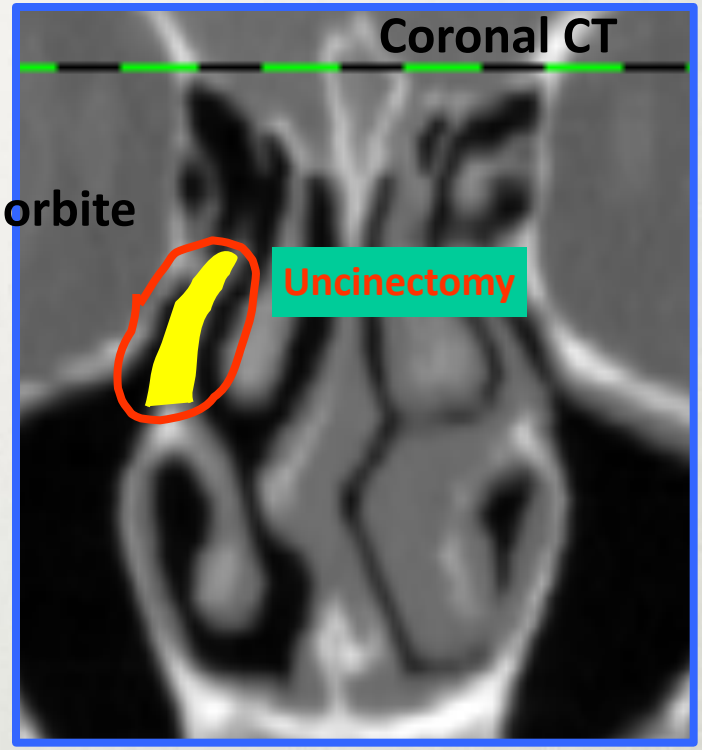


Inferior attachment to the neck of the inferior turbinate

Supero-anterior attachment to lamina papyracea in 50%

Vulnerability of the orbit





Uncinate process is very close to infero-medial orbit wall.
They can be merged.

Vulnerability of the orbit

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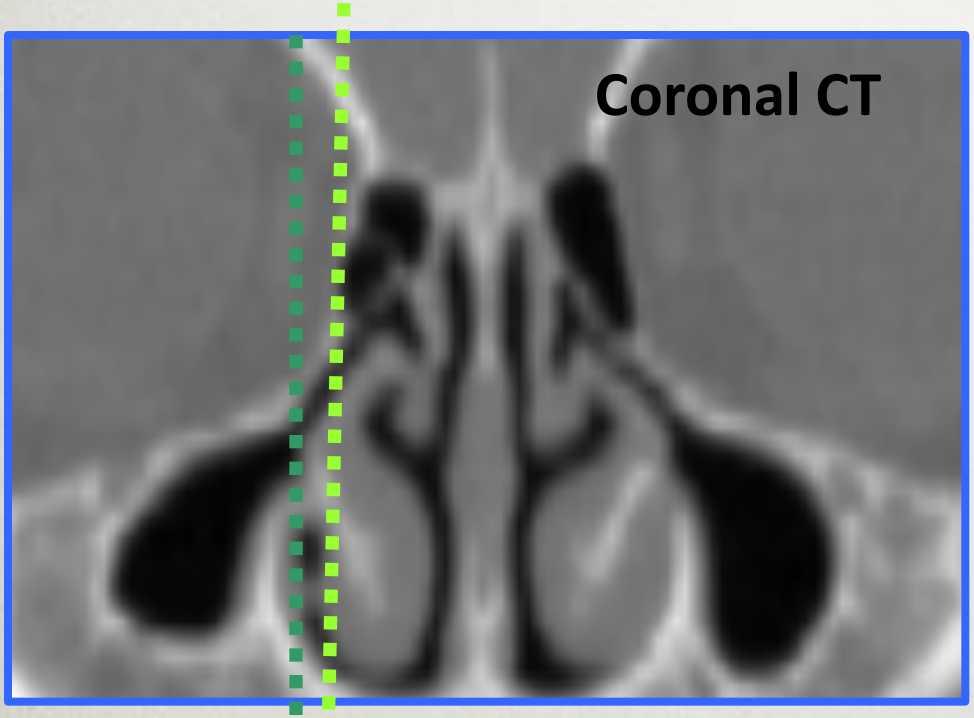
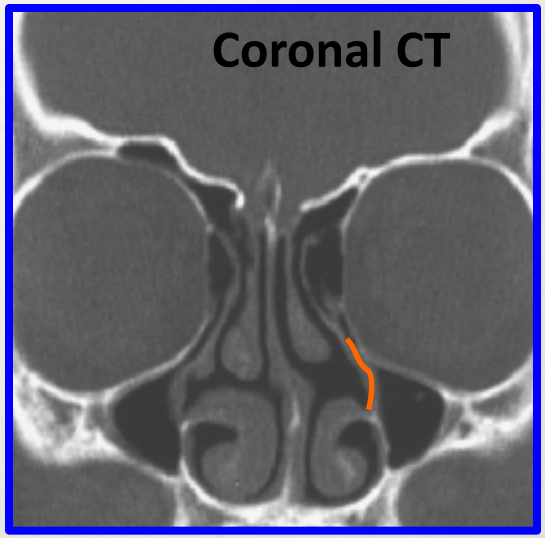
Lamina papyracea localized medial to the maxillary sinus ostium



(Ex :maxillary sinus hypoplasia;reduced ethmoid transverse diameter;children)



Fusion of the uncinate process to the medial orbital wall

(usually associated with ipsilateral hypoplastic maxillary sinus)

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Vulnerability of the orbit

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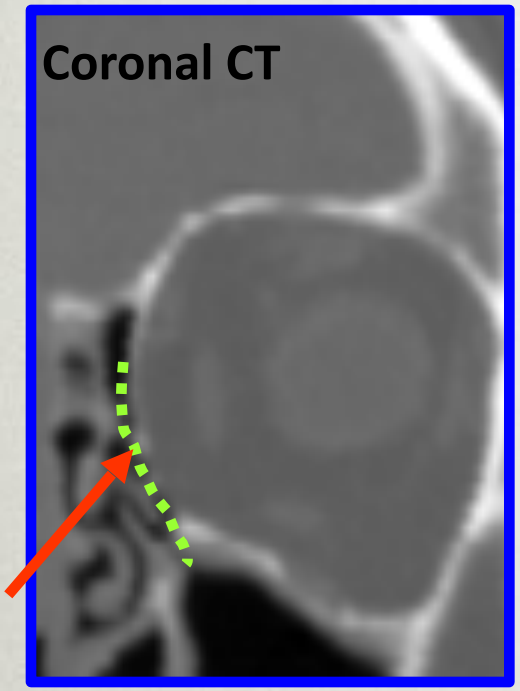
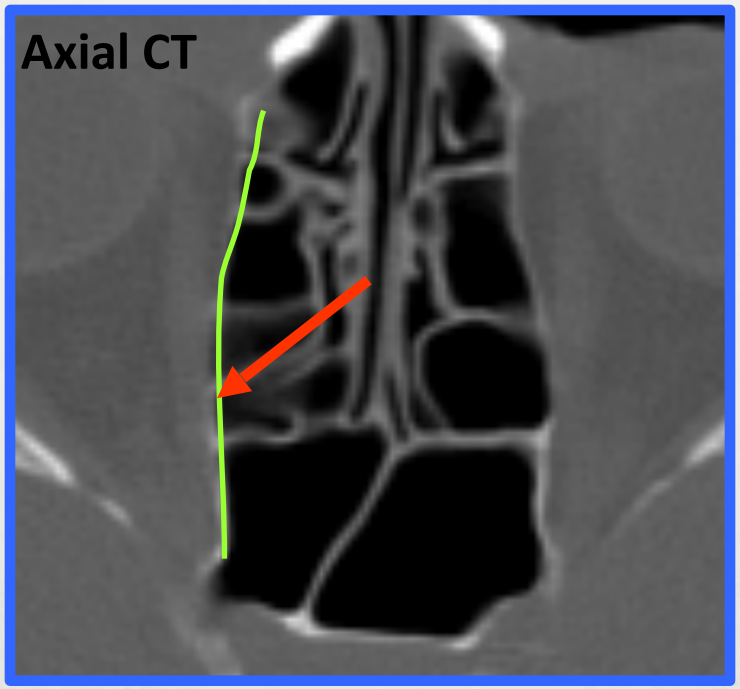
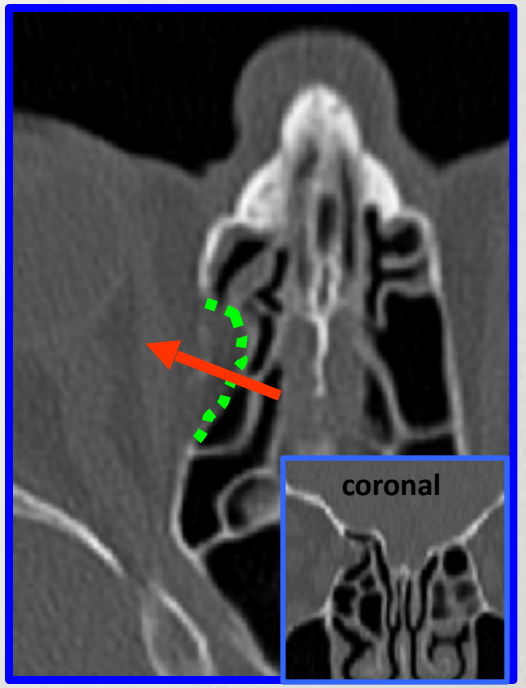


Dehiscent lamina papyracea



Thin medial orbital wall (lamina papyracea)



Dehiscent lamina papyracea

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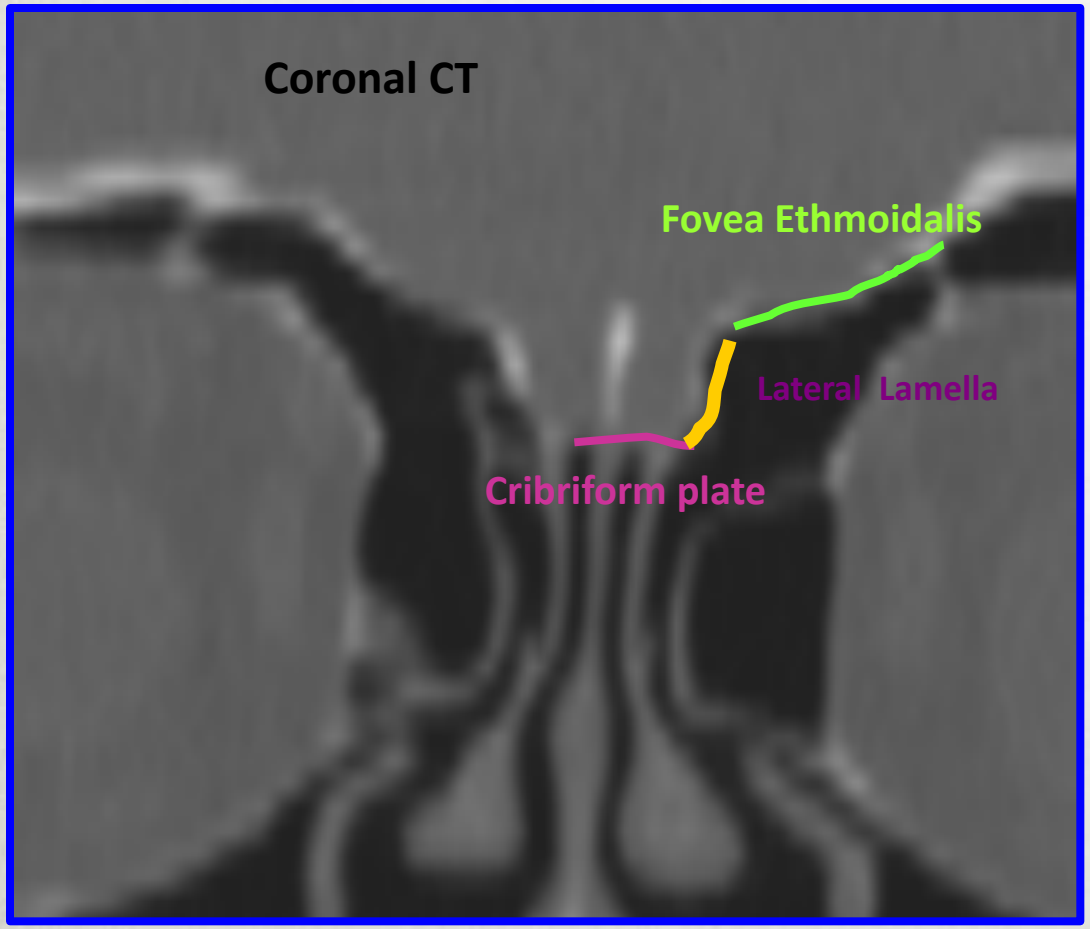
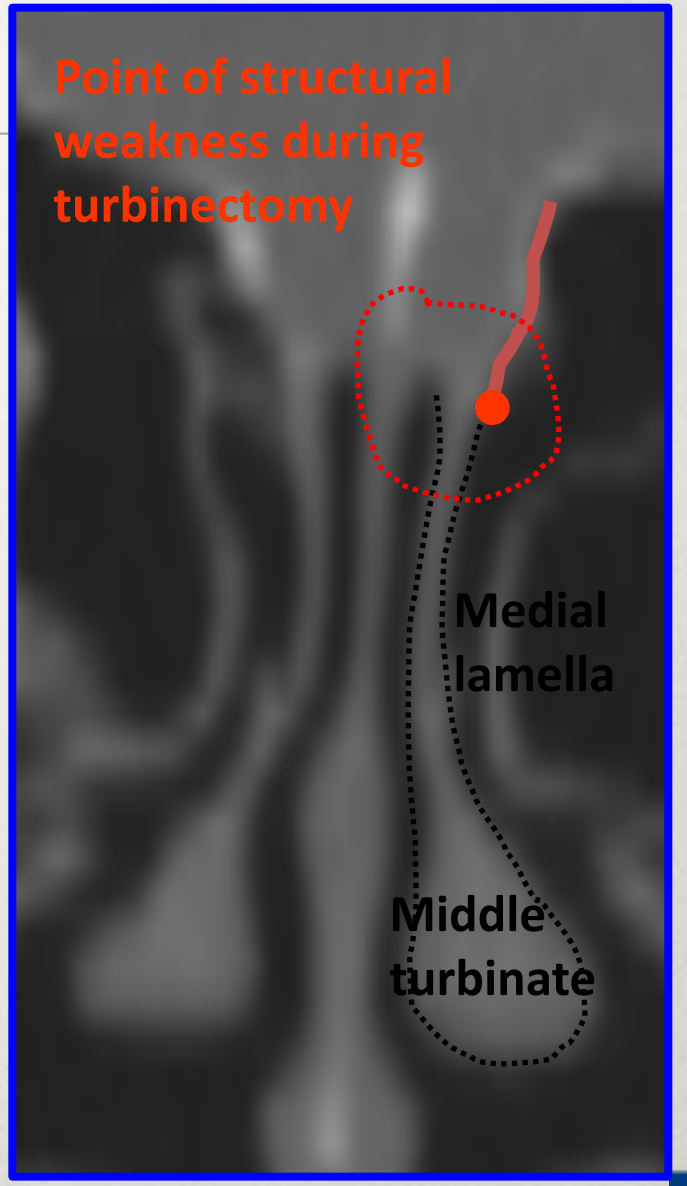
Lateral lamella

(point of structural weakness in the anterior skull base)





Lateral Lamella: 1-16 mm length

Dehiscent in 15% of specimens

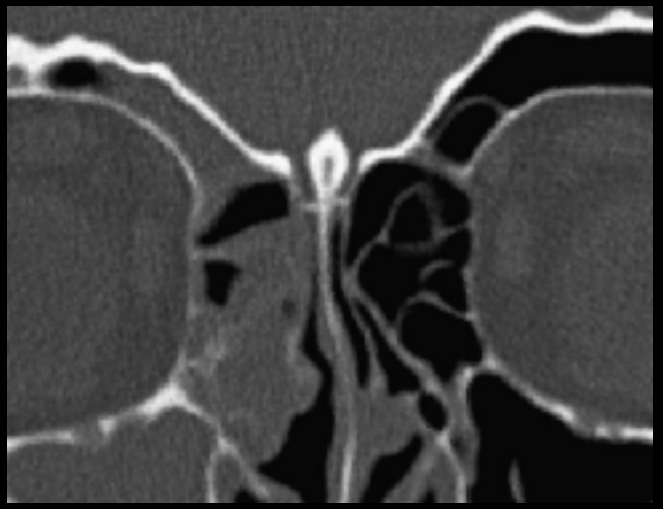
● Anterior ethmoidal artery

Keros classification

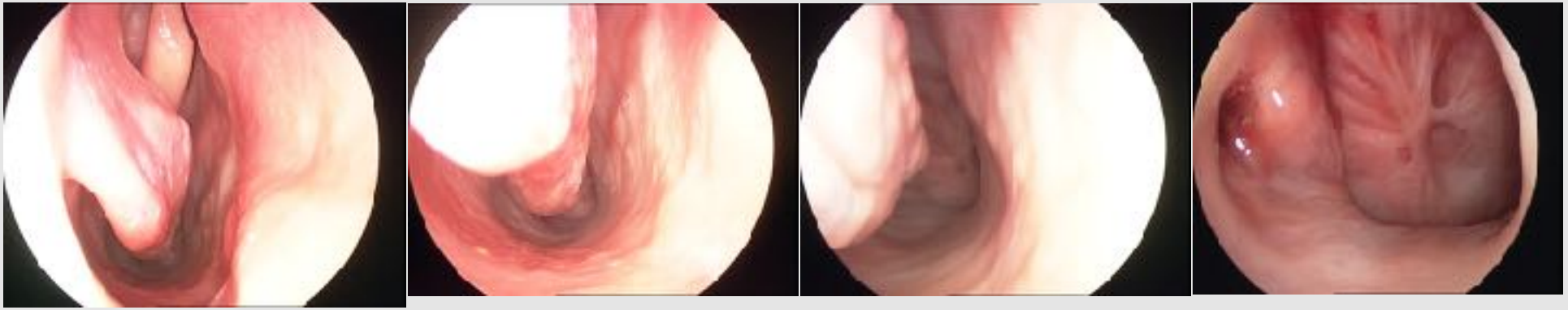
Type I: olfactory fossa is 1-3 mm deep, lateral lamella is nearly nonexistent;

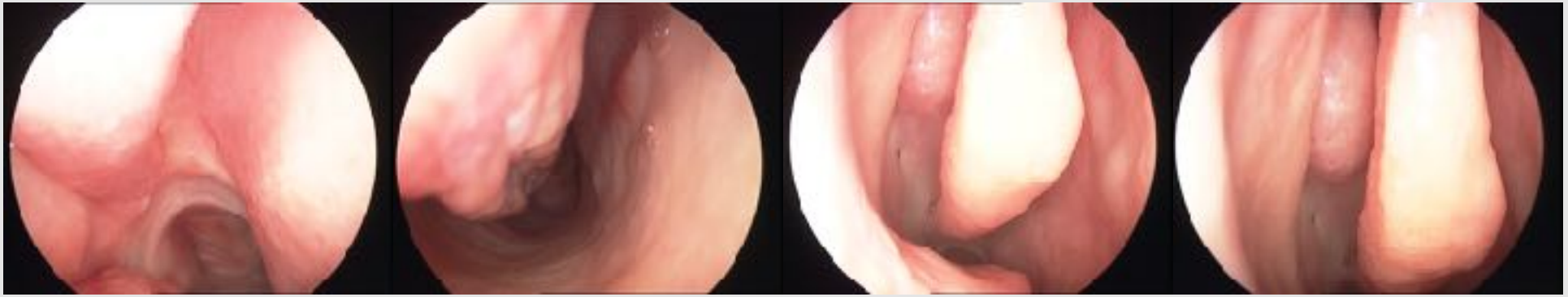
Type II: olfactory fossa is 4-7 mm deep; and

Type III: olfactory fossa is 8-16 mm deep

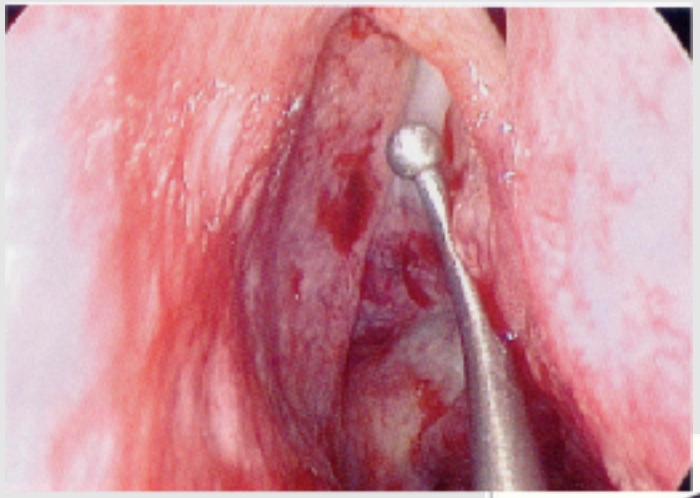


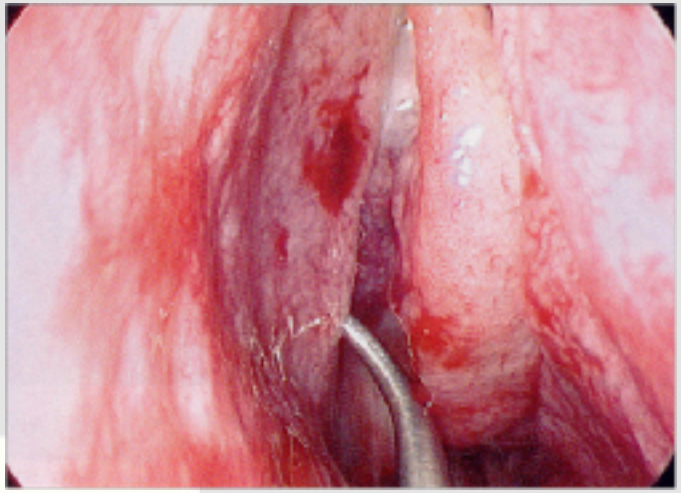
Nasal endoscopy

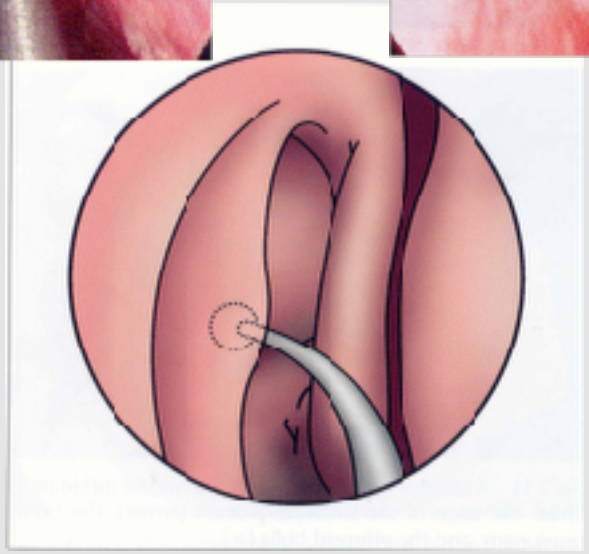




Free edge of uncinate process







Simmen Manual of endoscopic sinus surgery

Uncinate process attachment

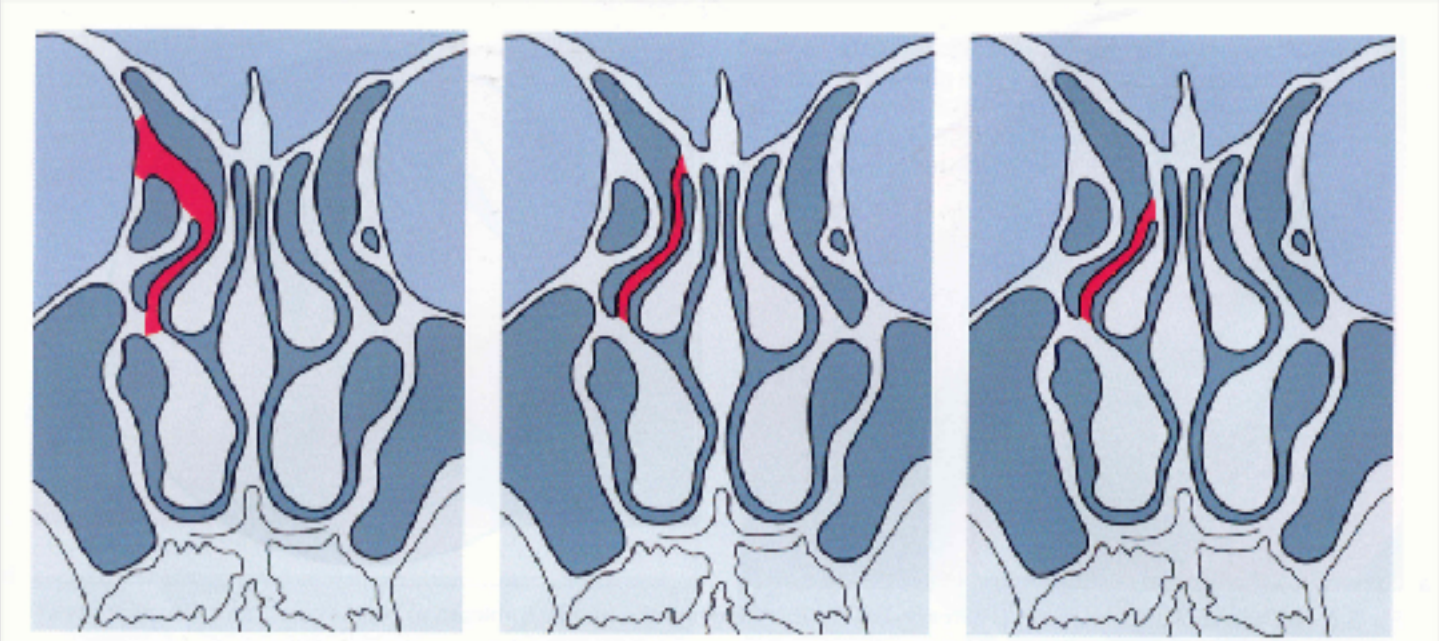
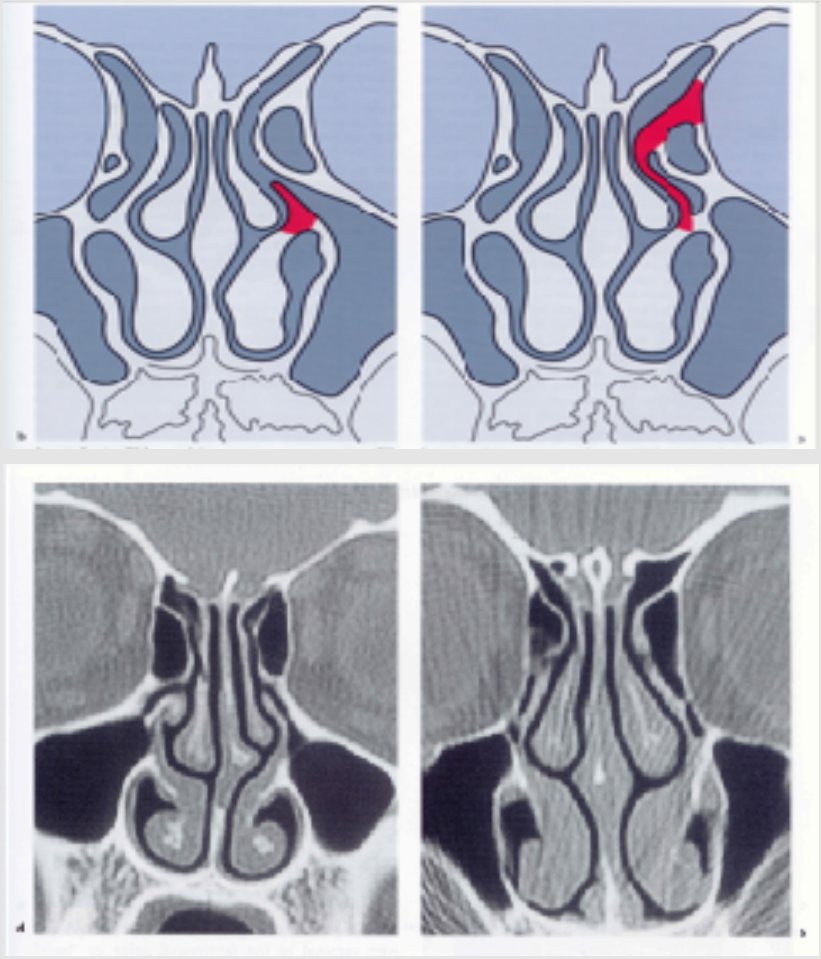
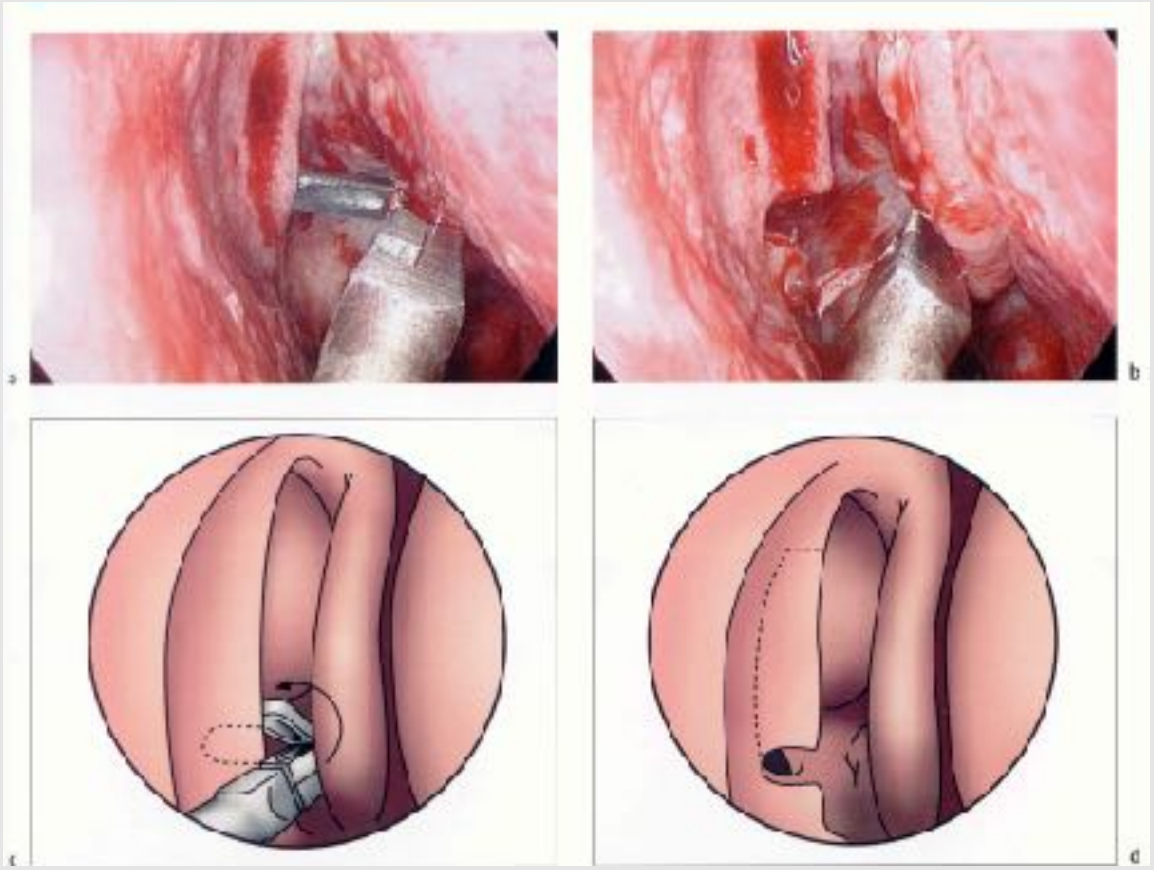


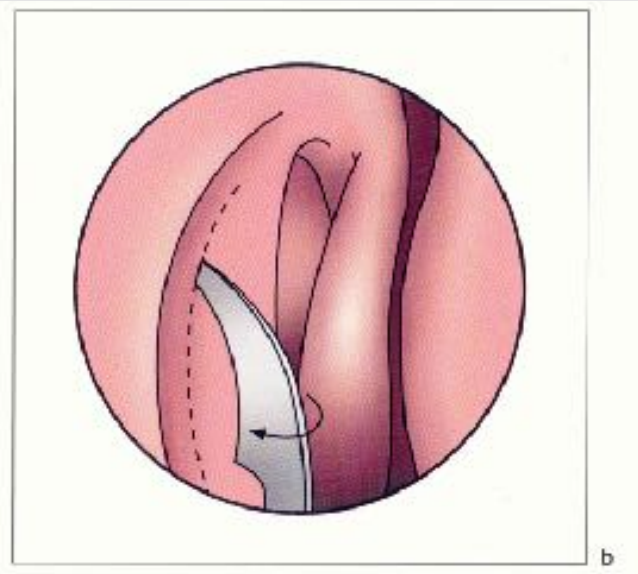
Fig. 5.12 This shows a type A uncinate process (left), where the frontal sinus drains directly into the middle meatus, and types B1 (center),where the uncinate process attaches to the skull base, and B2 (right), where the uncinate process attaches to the middle turbinate. Both B1 and B2 have the frontal sinus draining into the infundibulum ethmoidale.

Simmen Manual of endoscopic sinus surgery





uncinectomy



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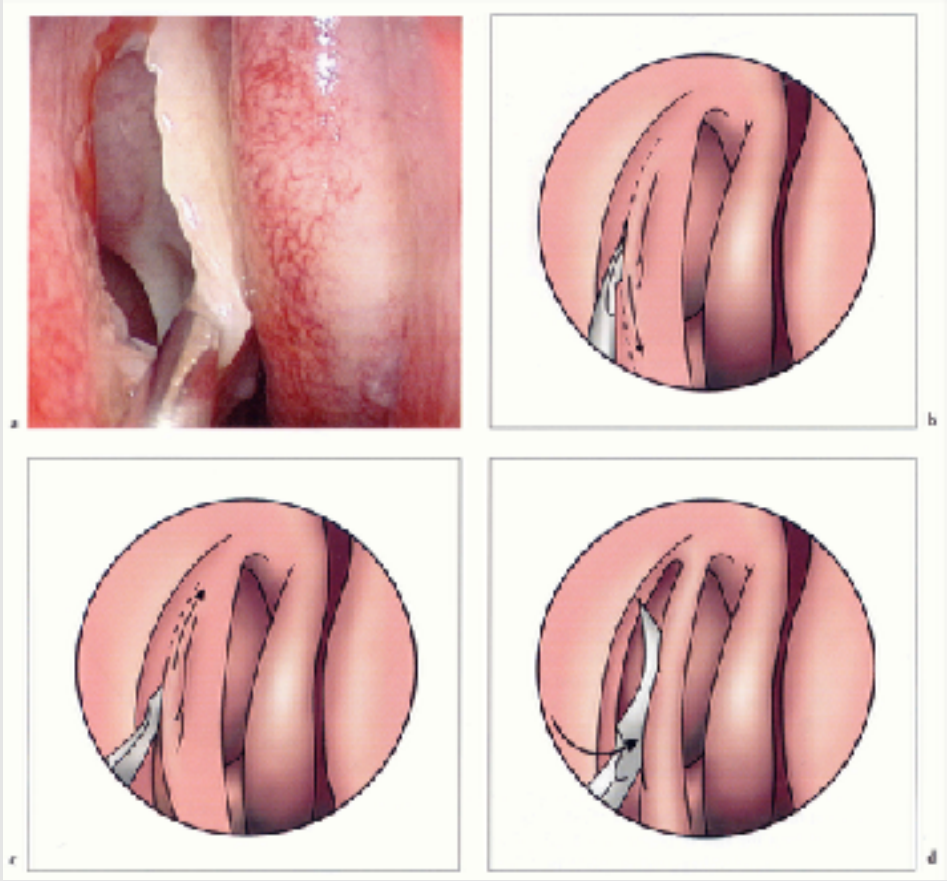
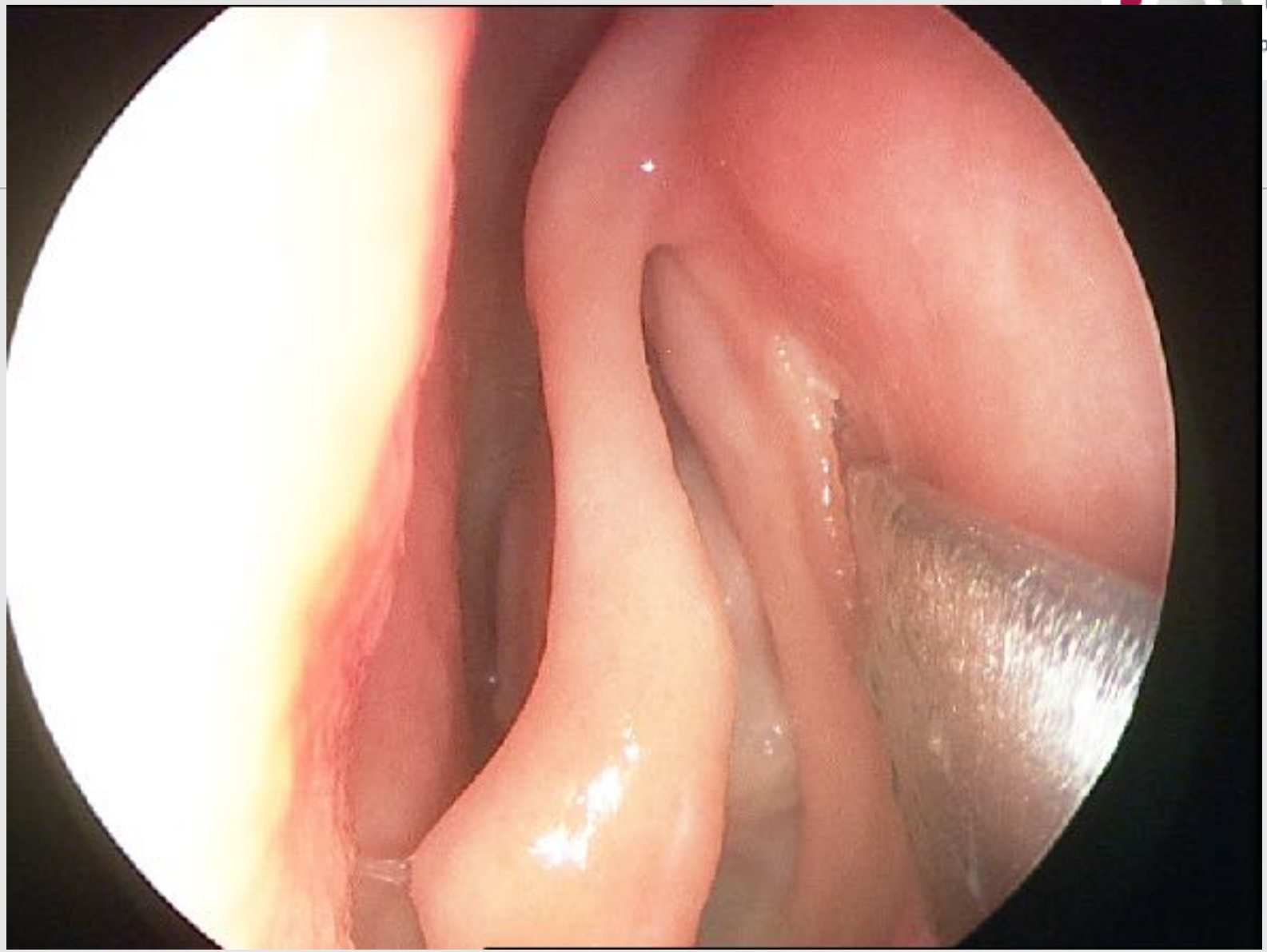
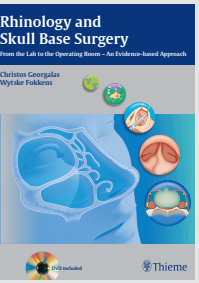
uncinectomy



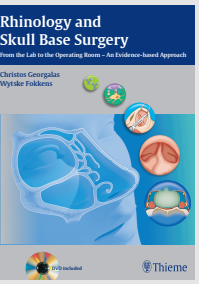
Simmen Manual of endoscopic sinus surgery





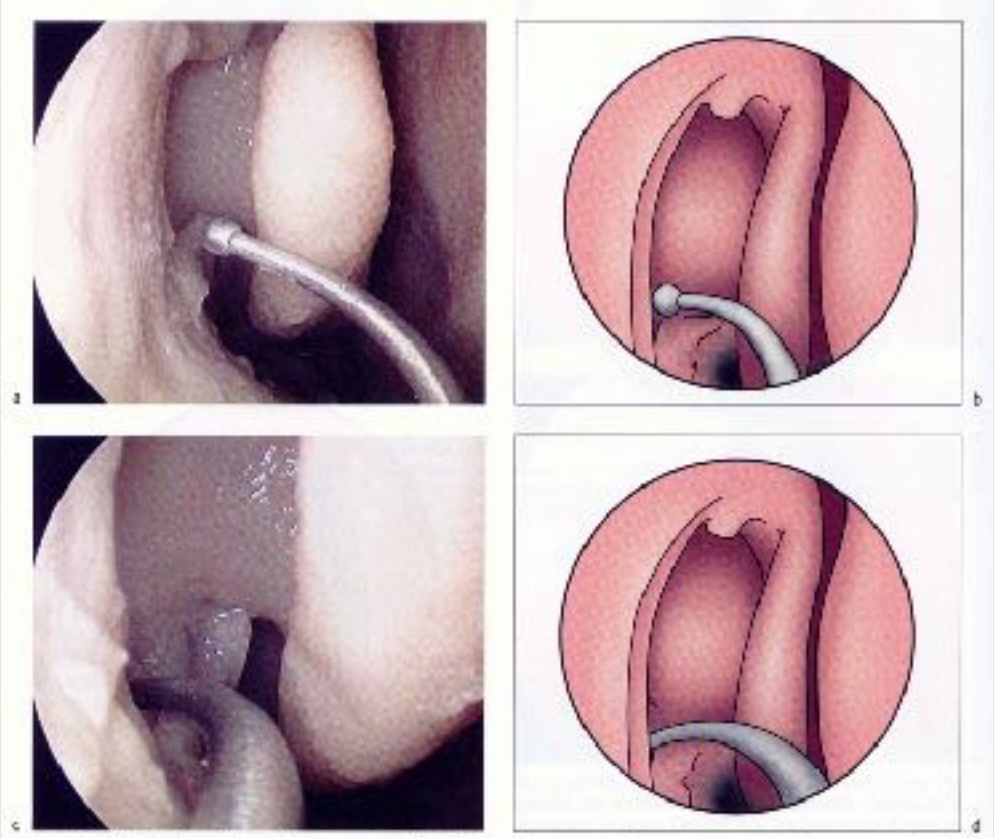
From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013

LUMC

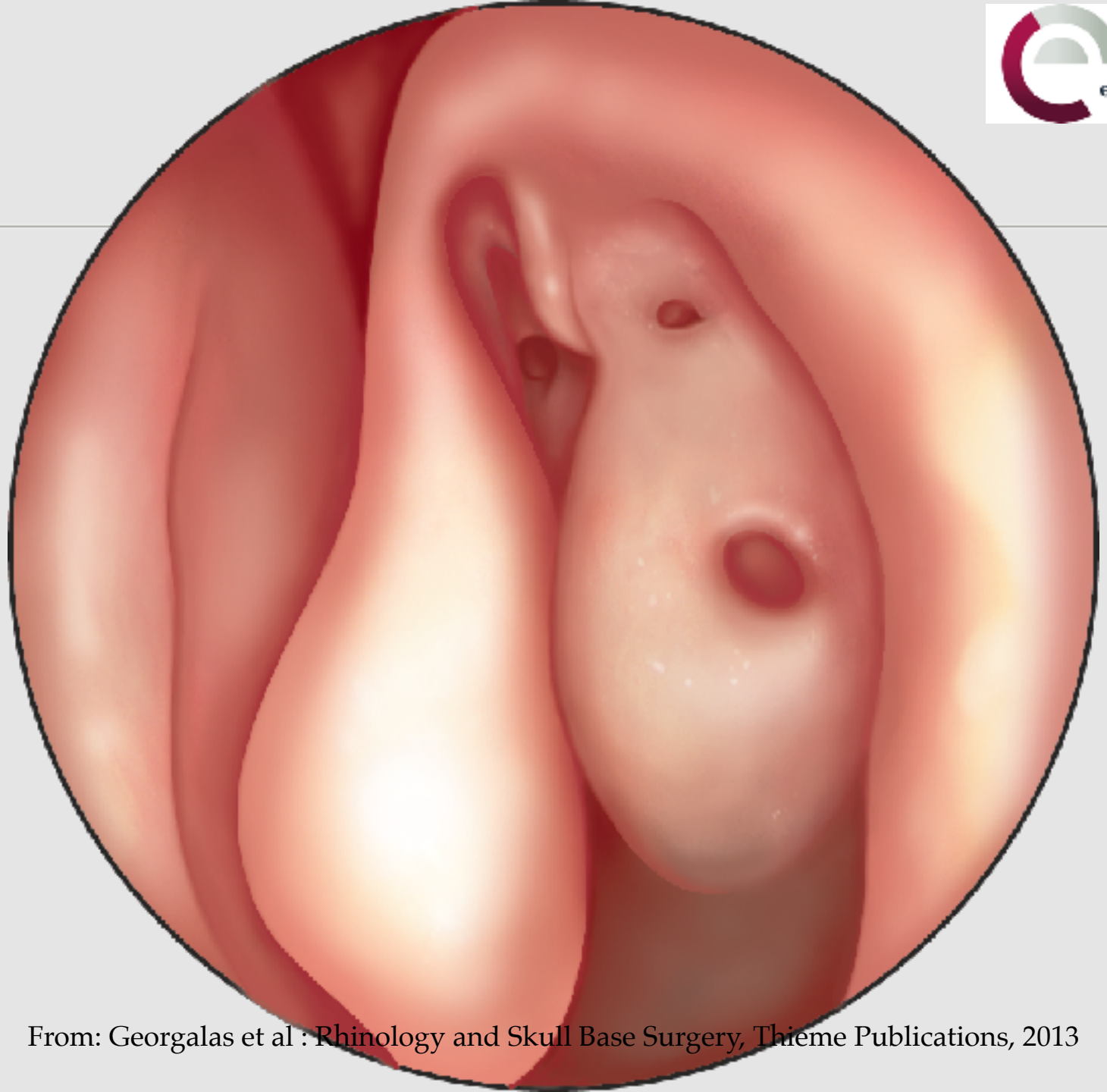


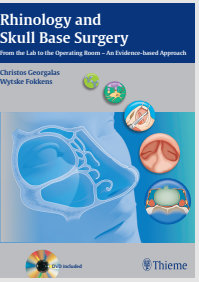
From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013

Finding the ostium



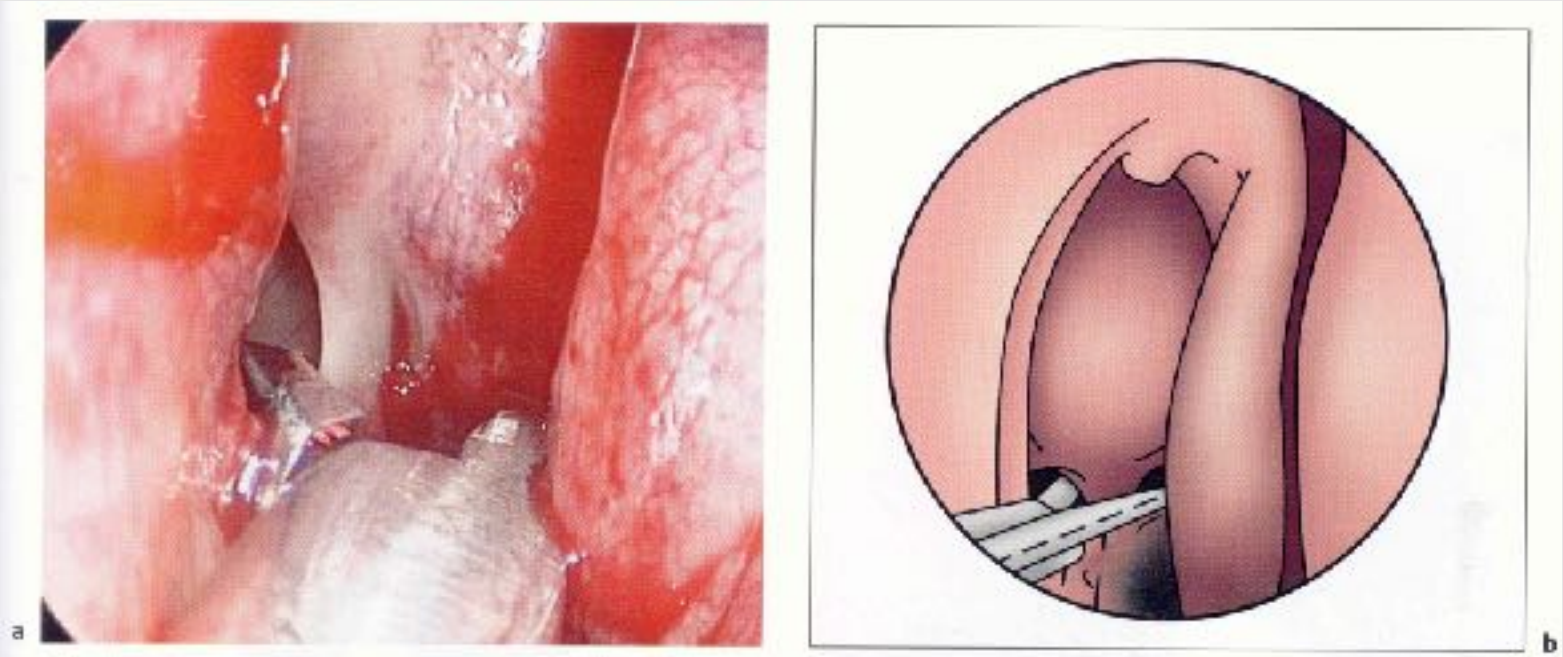
Simmen Manual of endoscopic sinus surgery





From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013

Enlargement ostium



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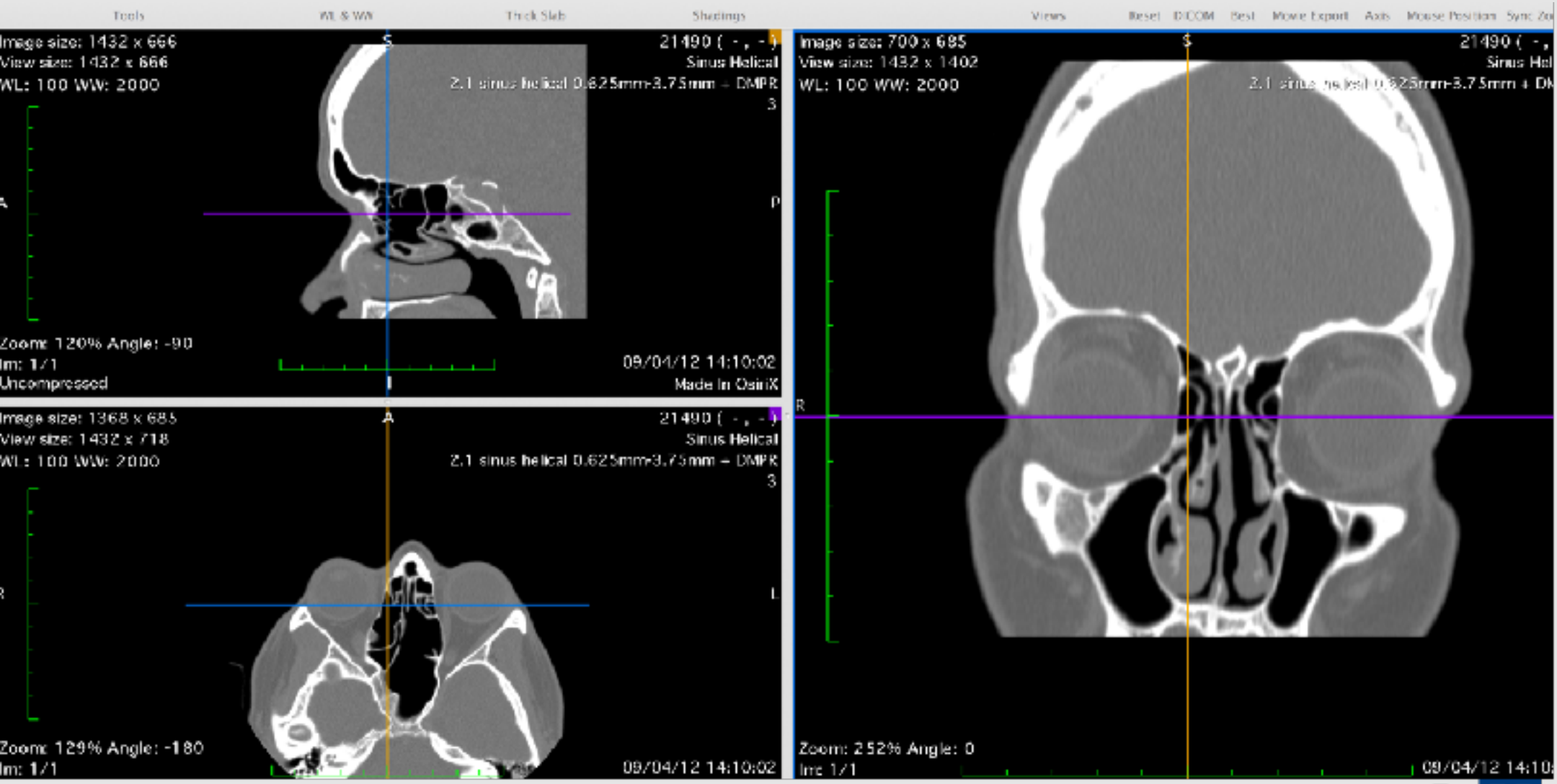
Anterior ethmoidectomy

- Remove remaining anterior ethmoid cells anterior to ground lamella
- (Not that many!)
- Stay lateral to the attachment of middle turbinate: Often attached to medial part of cribriform plate / lamella lateralis!

Map of bulla etmoidalis

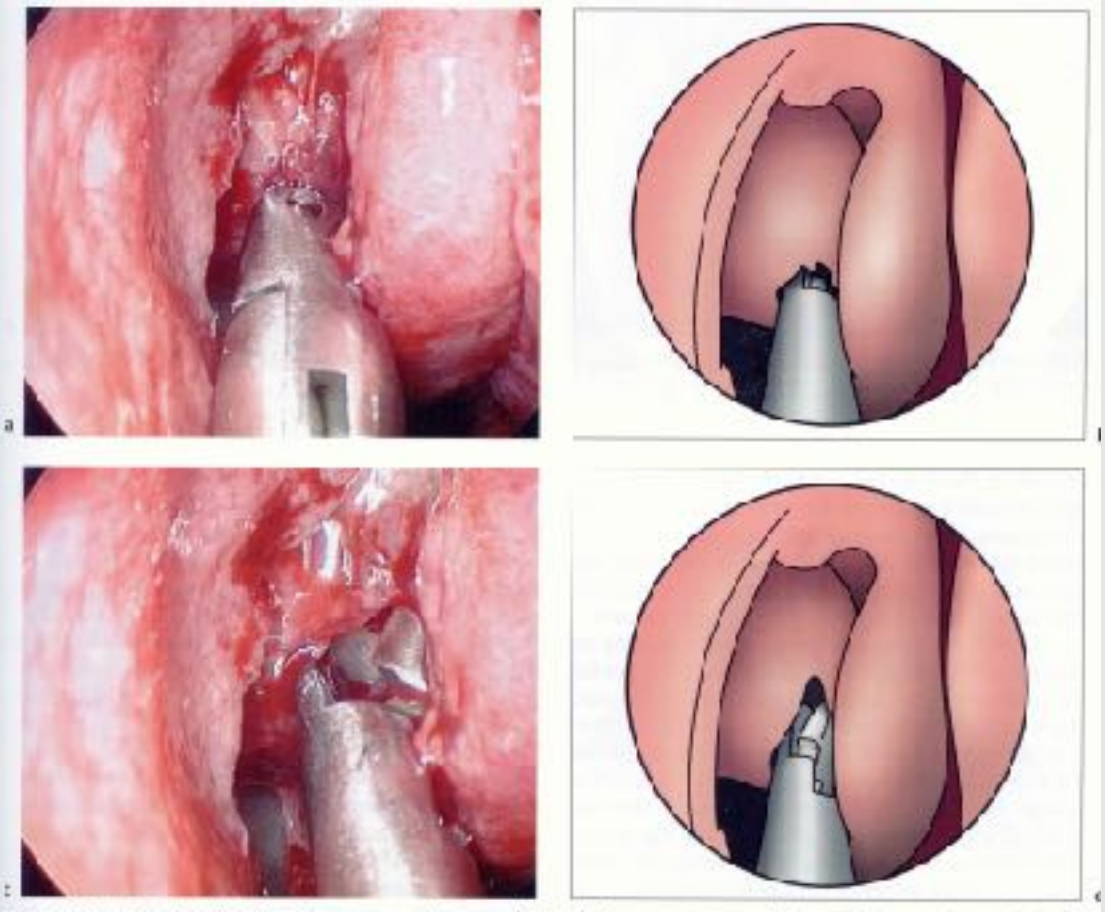
- P (basa
- M
- S se or s
  o ss
- A fronta
  suprabullar cells
- Anterior- inferiorly: Infundibulum

esa
endoscopic skull base athens

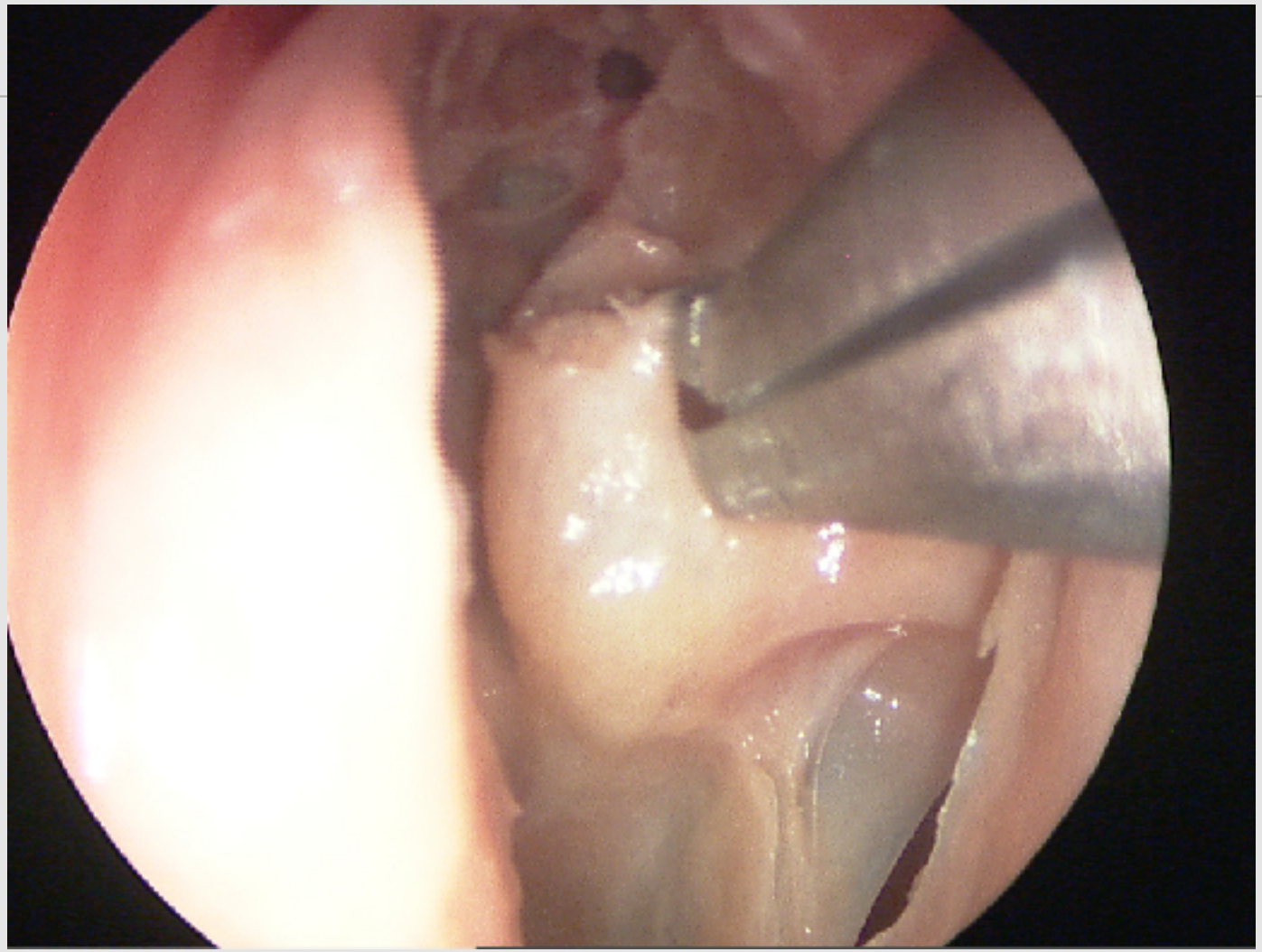


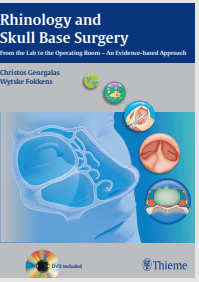
LUMC

Opening of bulla



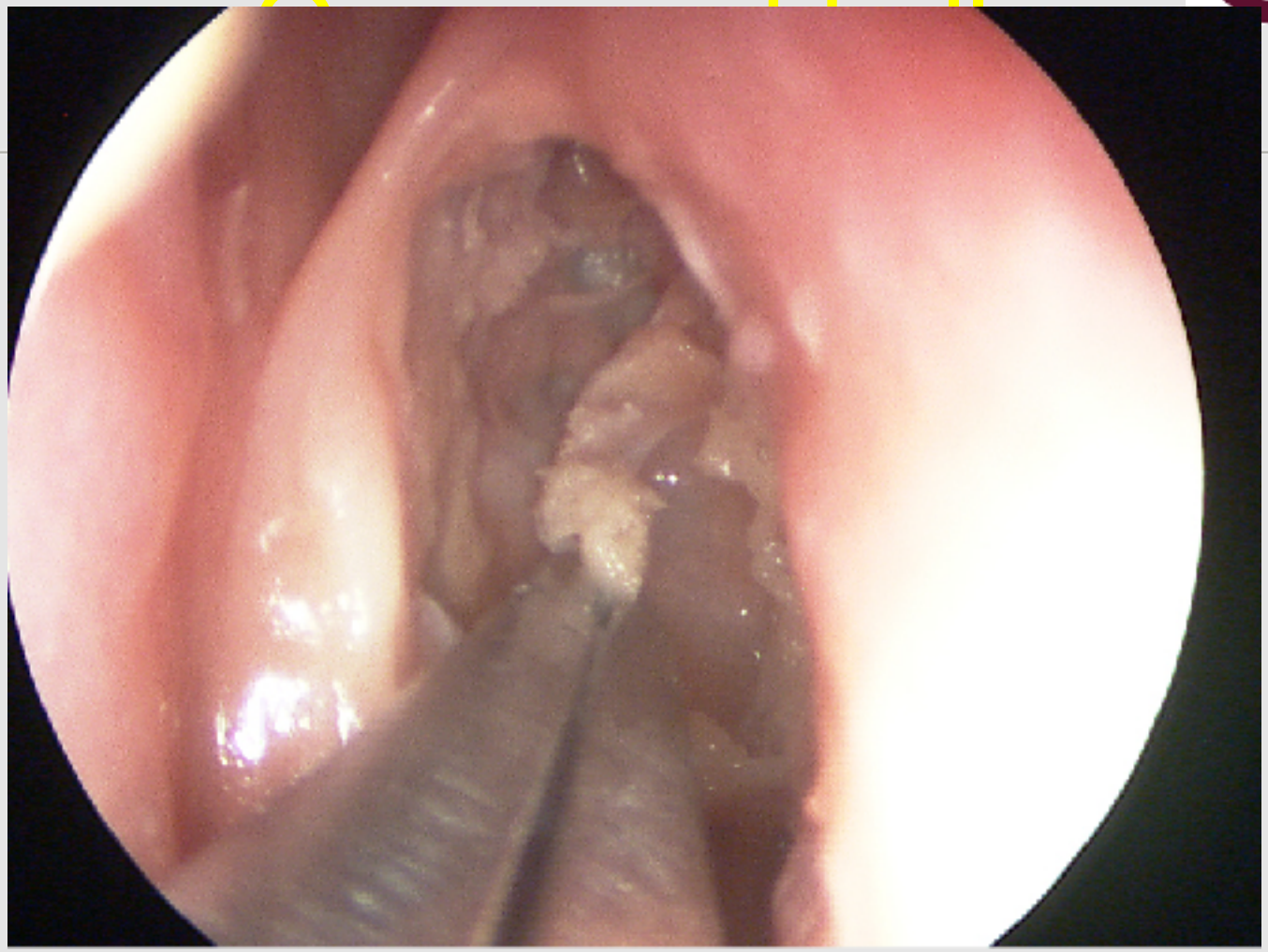
Simmen Manual of endoscopic sinus surgery

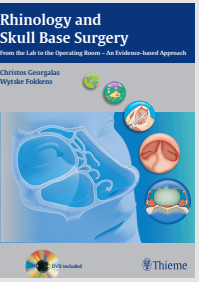




From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013

esa
endoscopic skull base athens

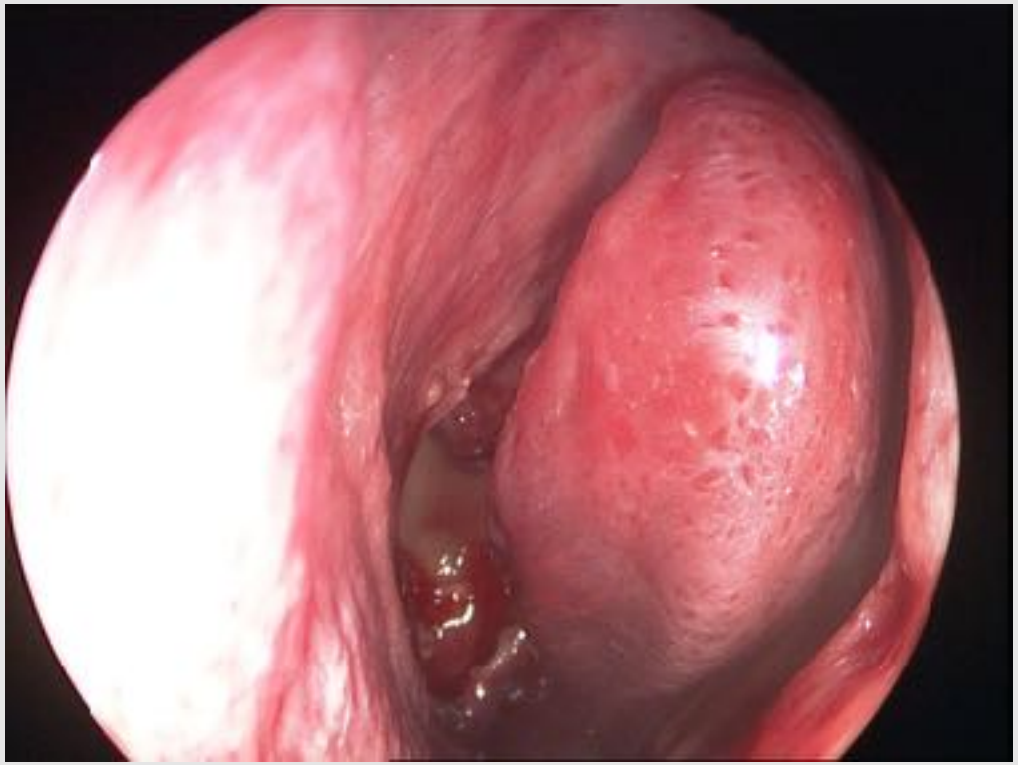




From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013

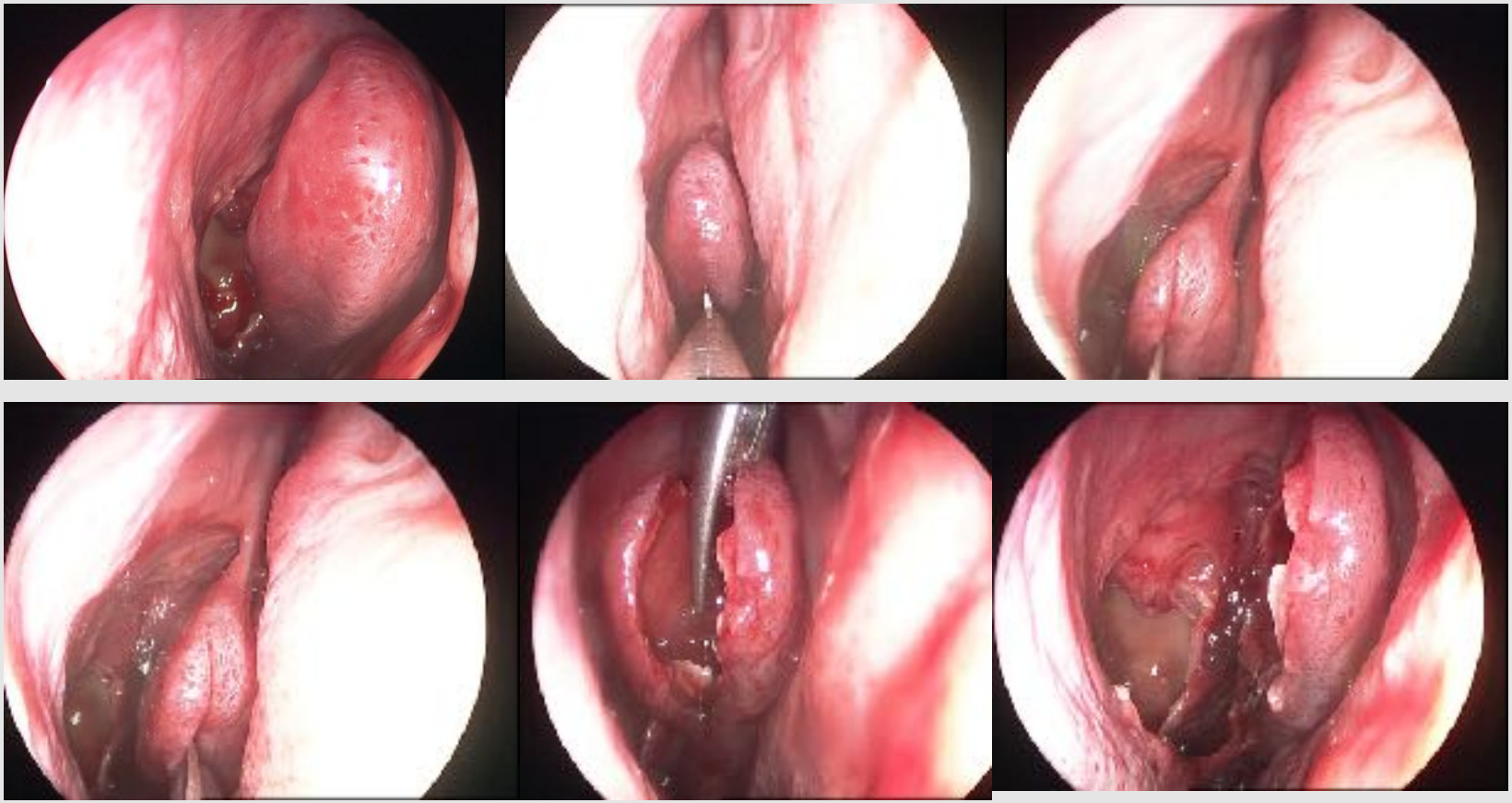
LUMC

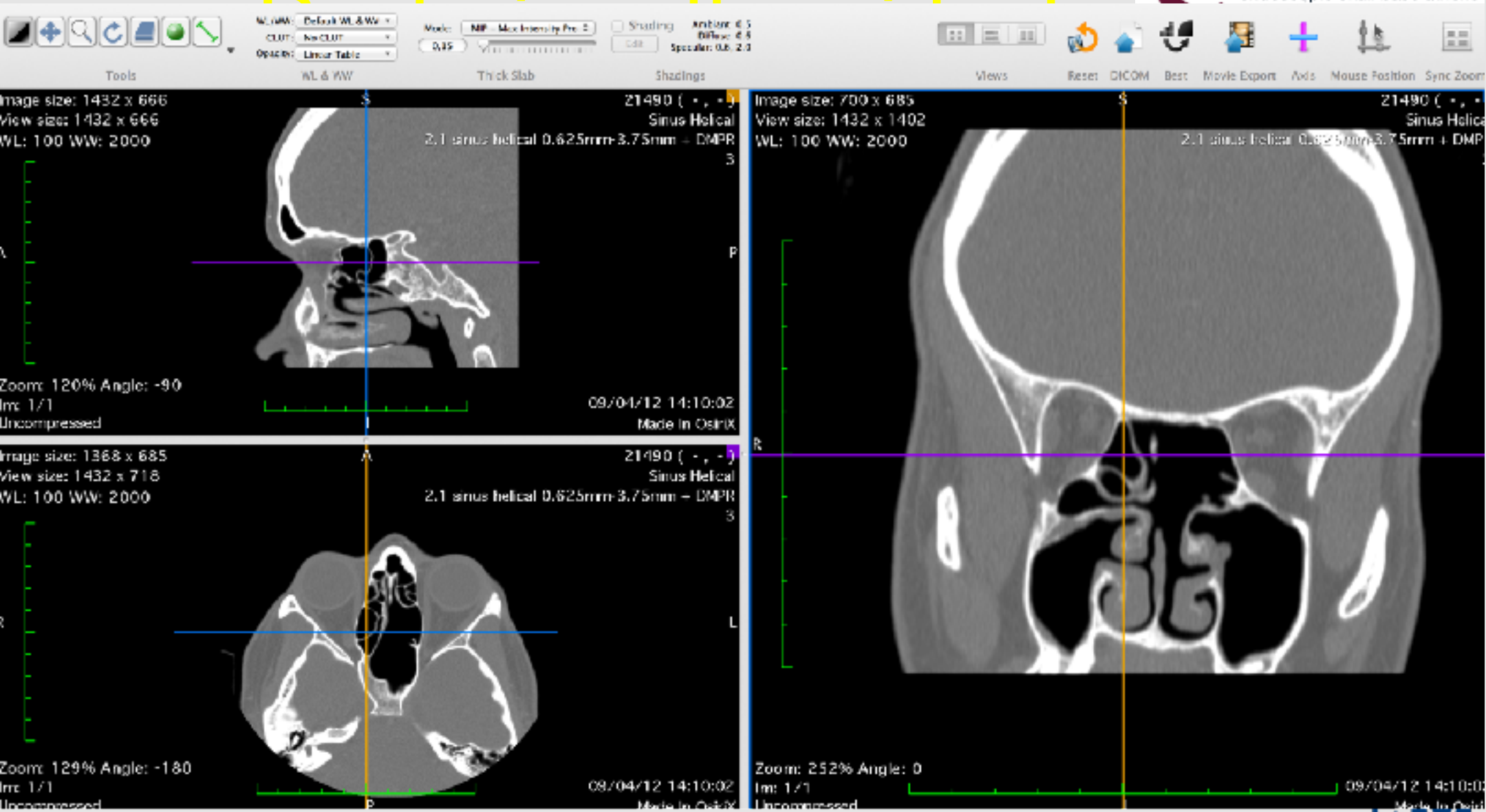
Reducing concha bullosa (pneumatised middle turbinate)



esa
endoscopic skull base athens

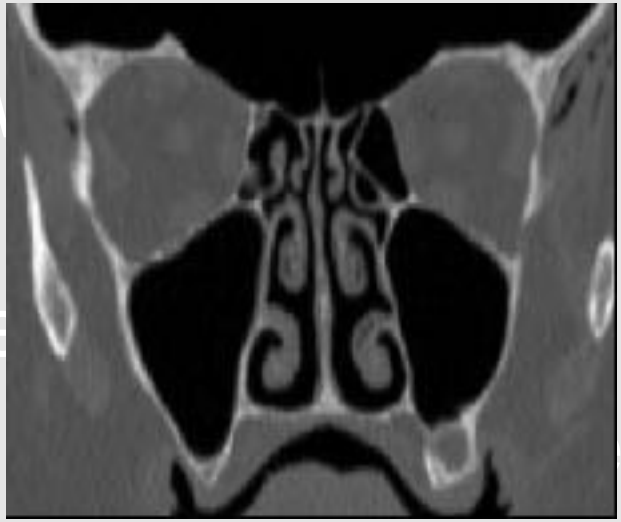
Reducing concha bullosa (pneumatised middle turbinate)





Posterior ethmoidectomy

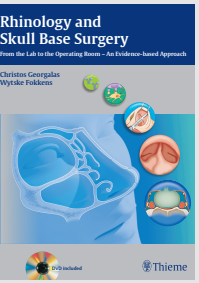
e posterior w
lla
osterior / infe
e larger and



d

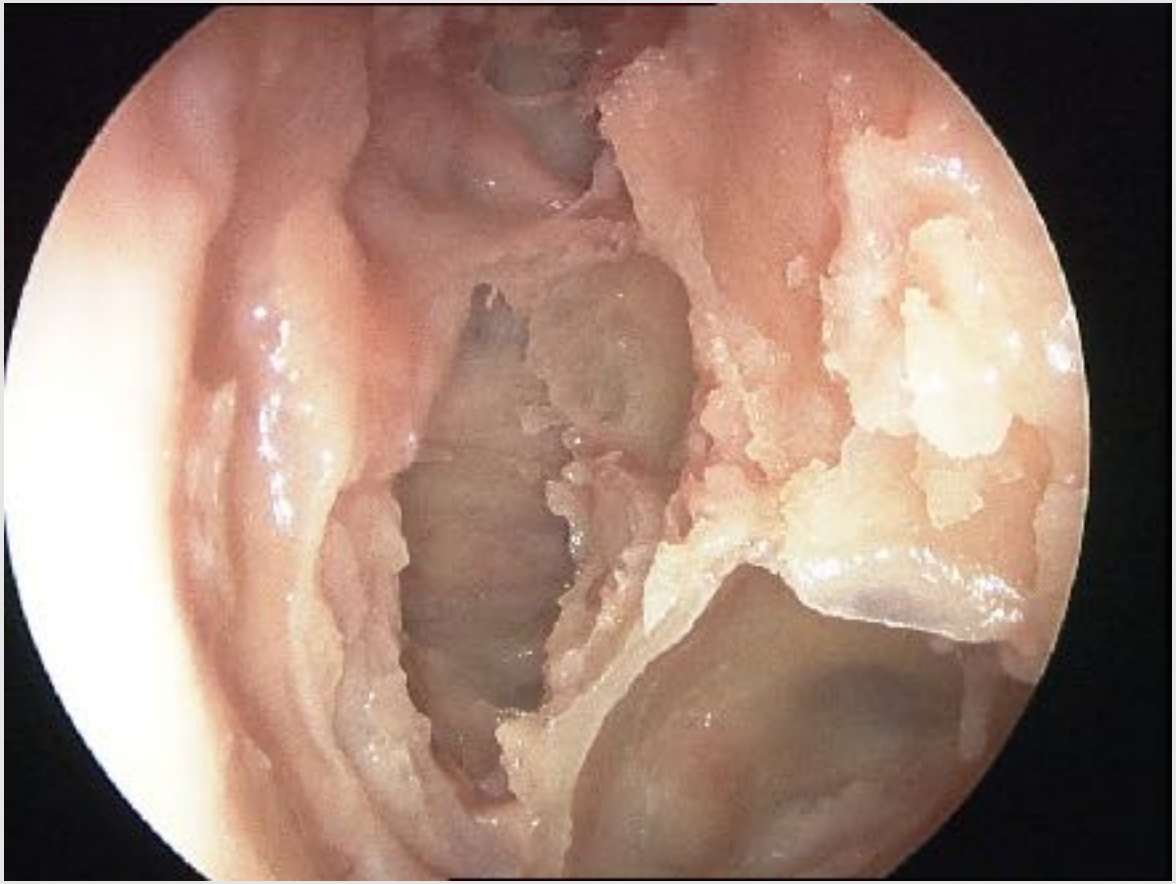
Posterior ethmoidectomy

Posterior ethmoidectomy

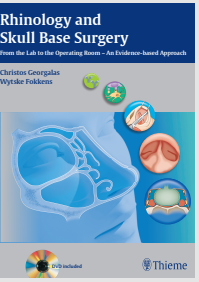


From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013

Posterior ethmoidectomy

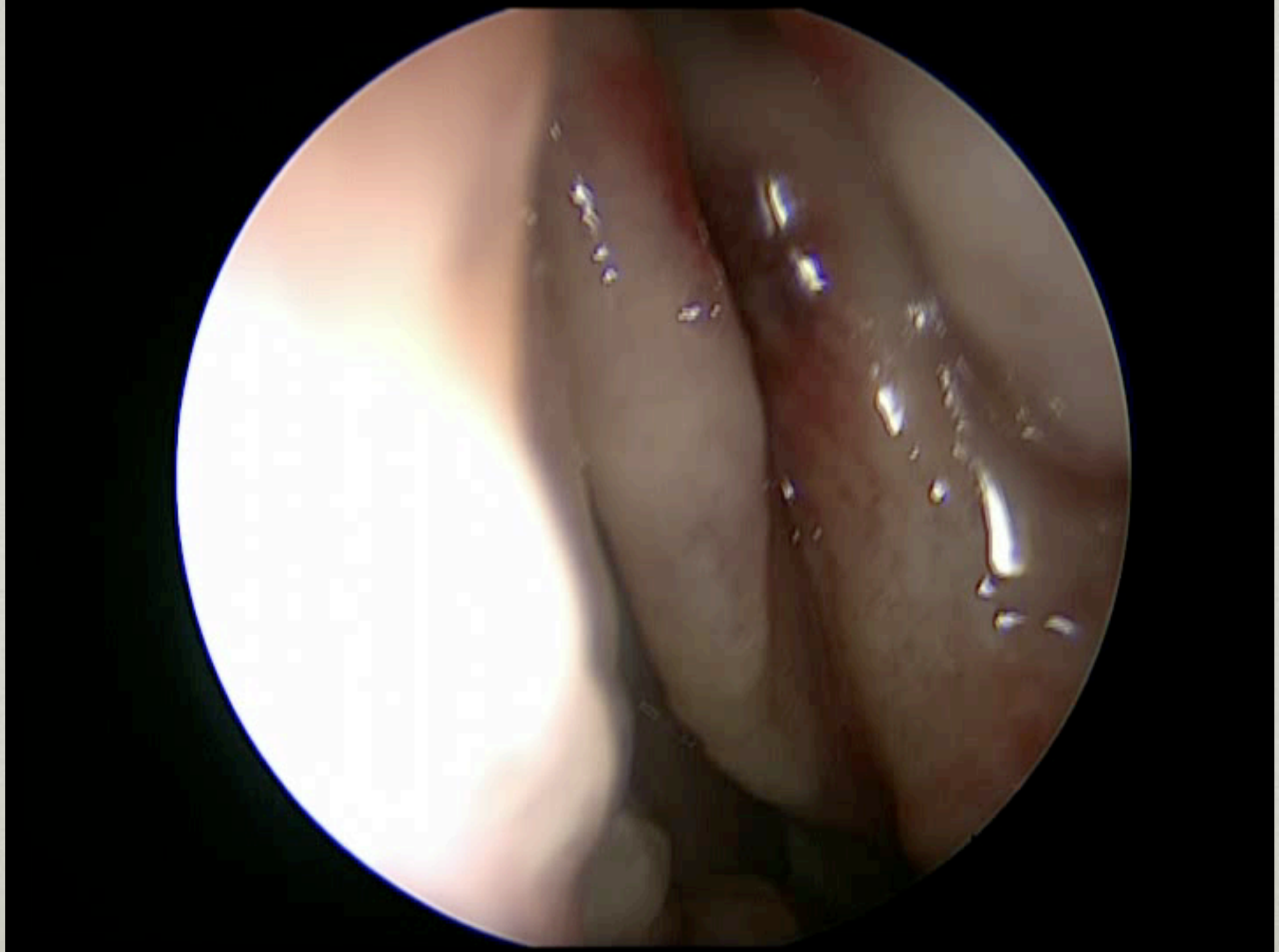


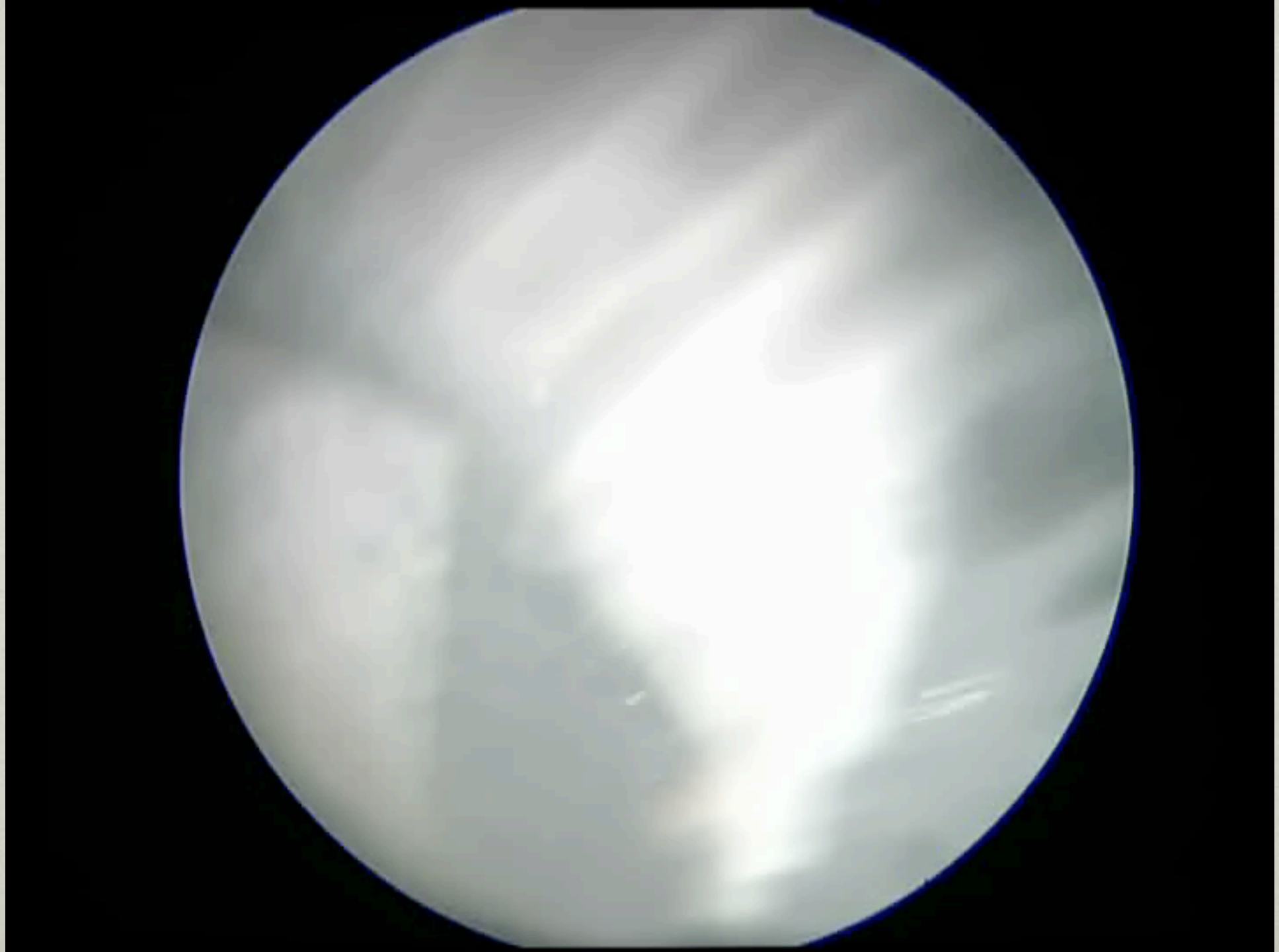
From: Georgalas et al : Rhinology and Skull Base Surgery, Thieme Publications, 2013



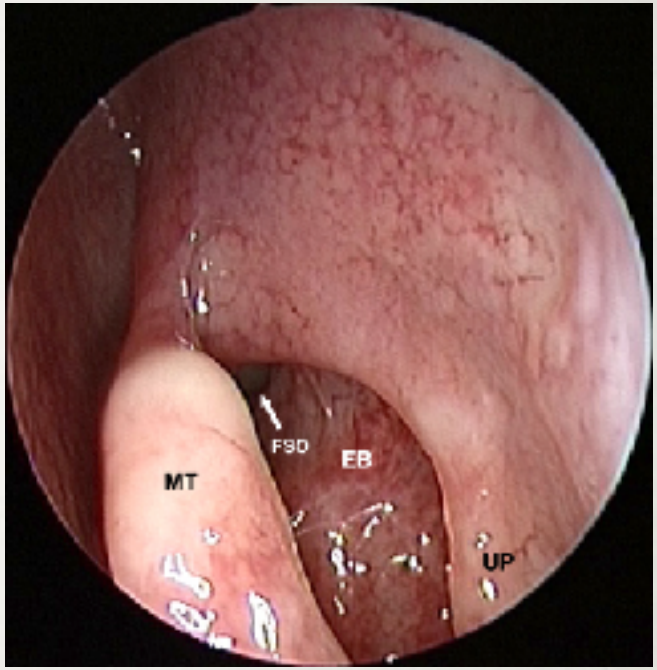
Posterior ethmoidectomy

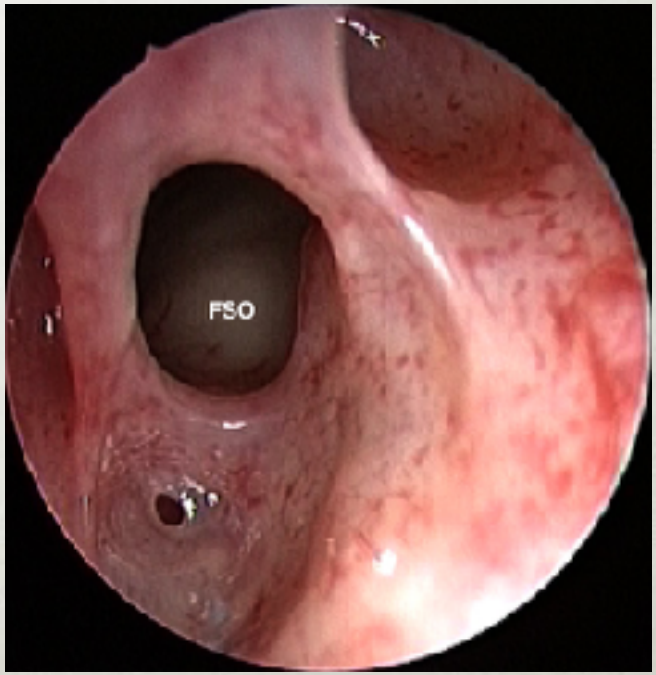
- Keep in mind Onodi cell: superolateral to the sphenoid
- The optic nerve and carotid artery may lie in this cell



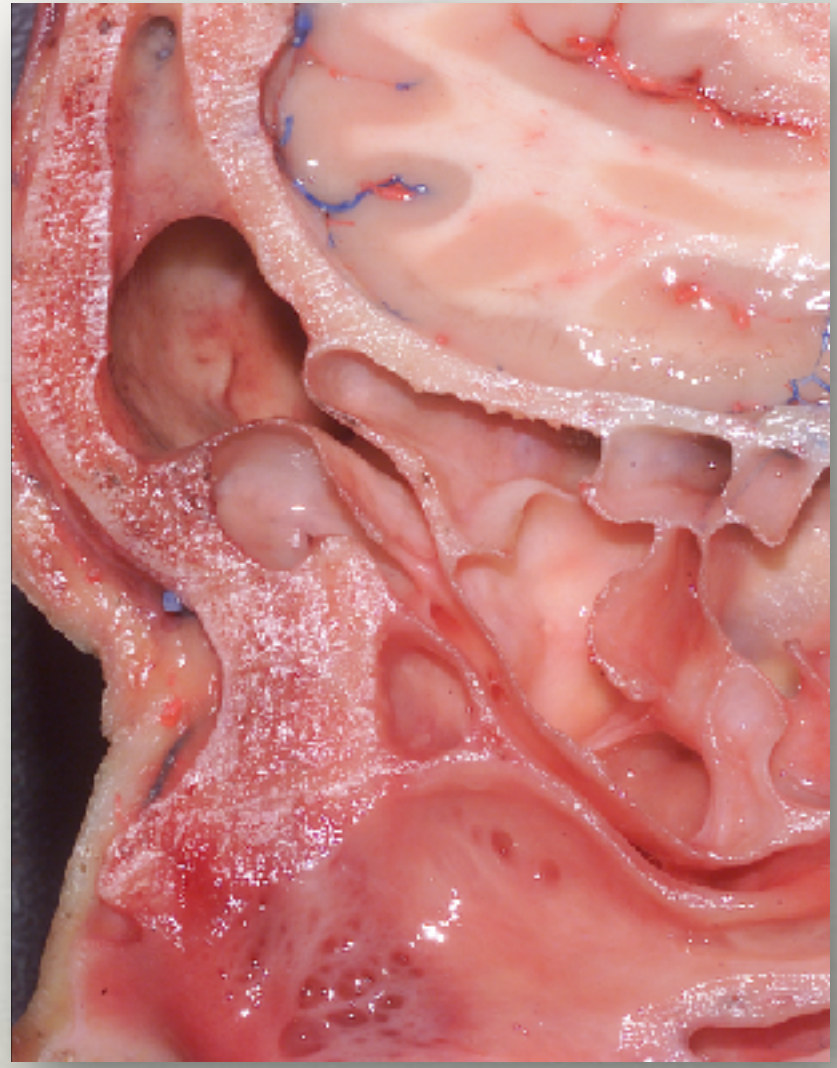


Frontal recess & sinus



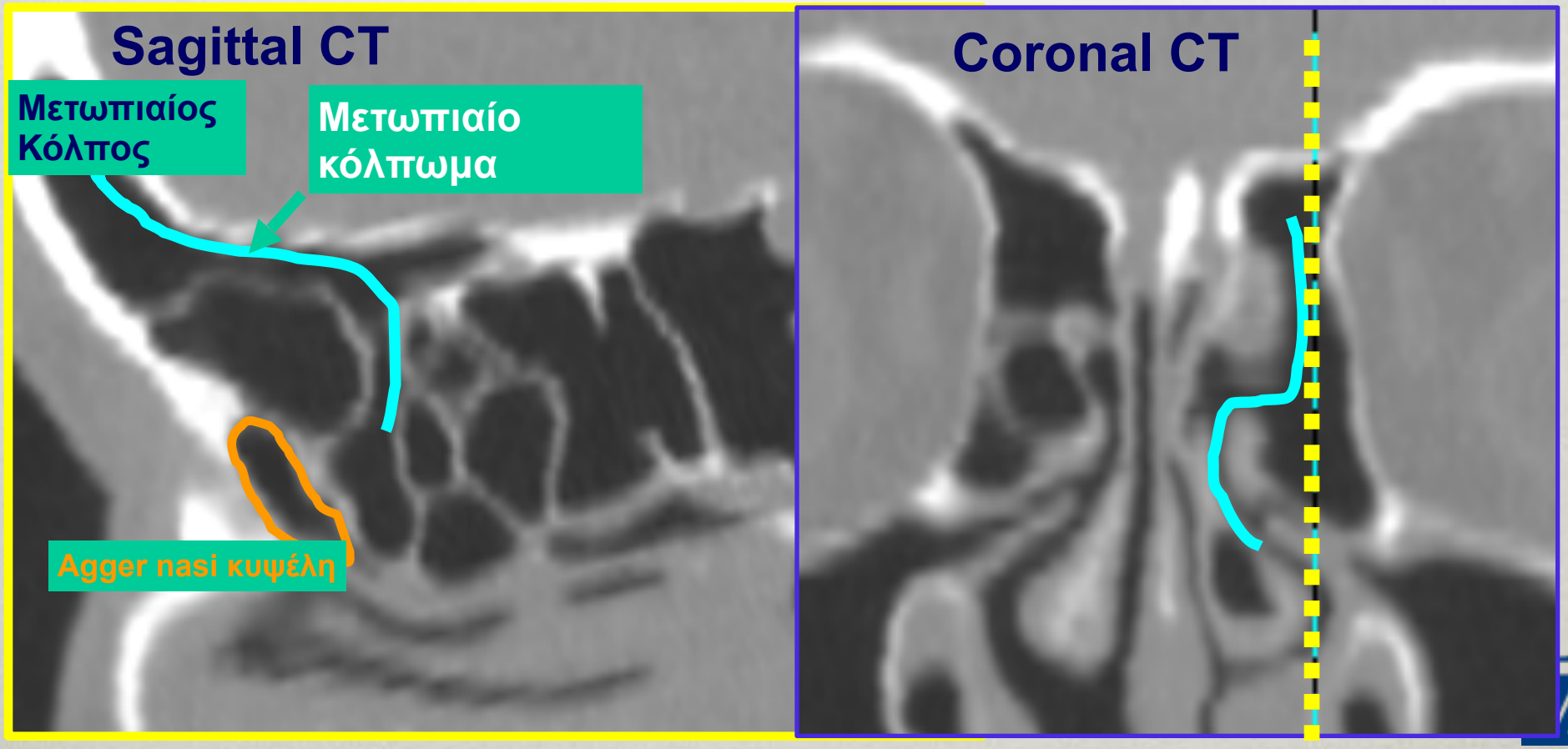


Frontal recess, intrafrontal cells



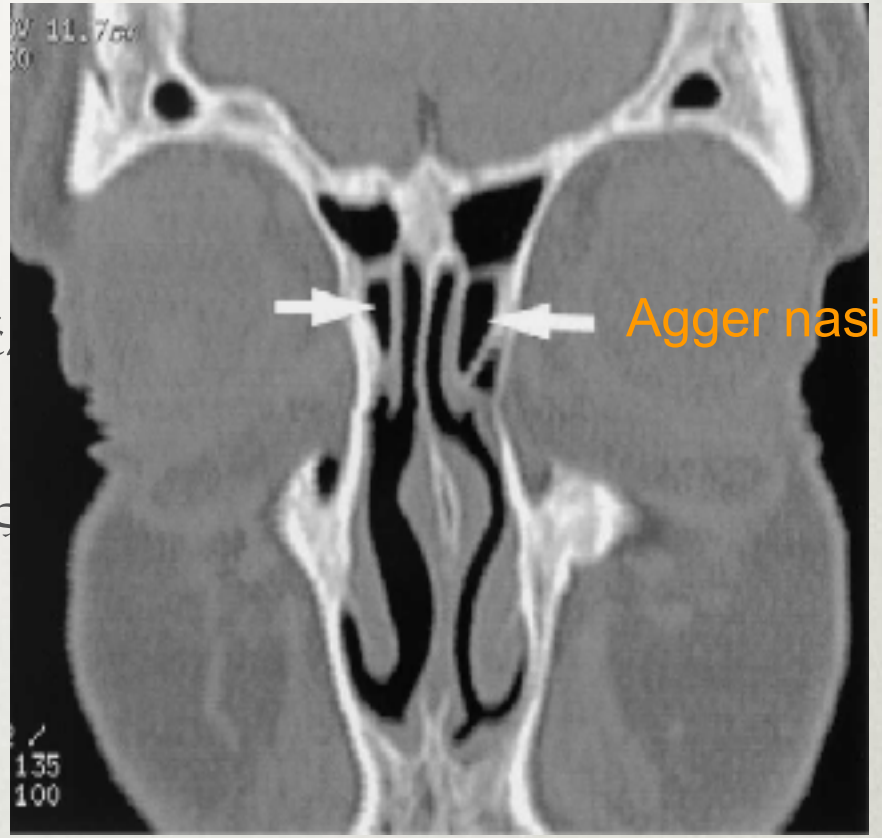
Μετωπιαίο κόλπωμα (recess)

Επικοινωνία μεταξύ μετωπιαίου κόλπου και ρινικής κοιλότητας. Δεν είναι πόρος με την αυστηρή έννοια του όρου αλλά μάλλον ένα κανάλι ανάμεσα στις πρόσθιες ηθμοειδείς κυψέλες, με τεράστια ποικιλομορφία...

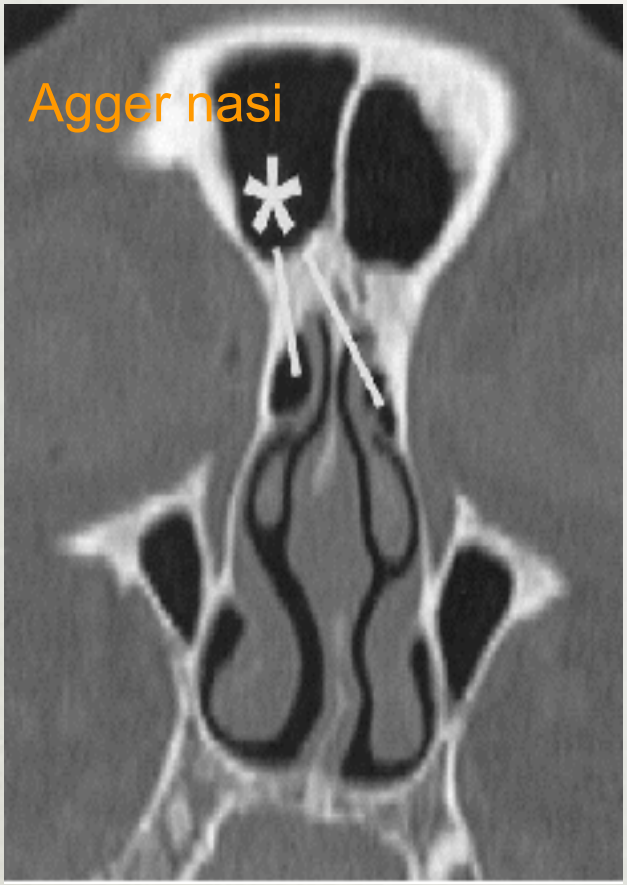


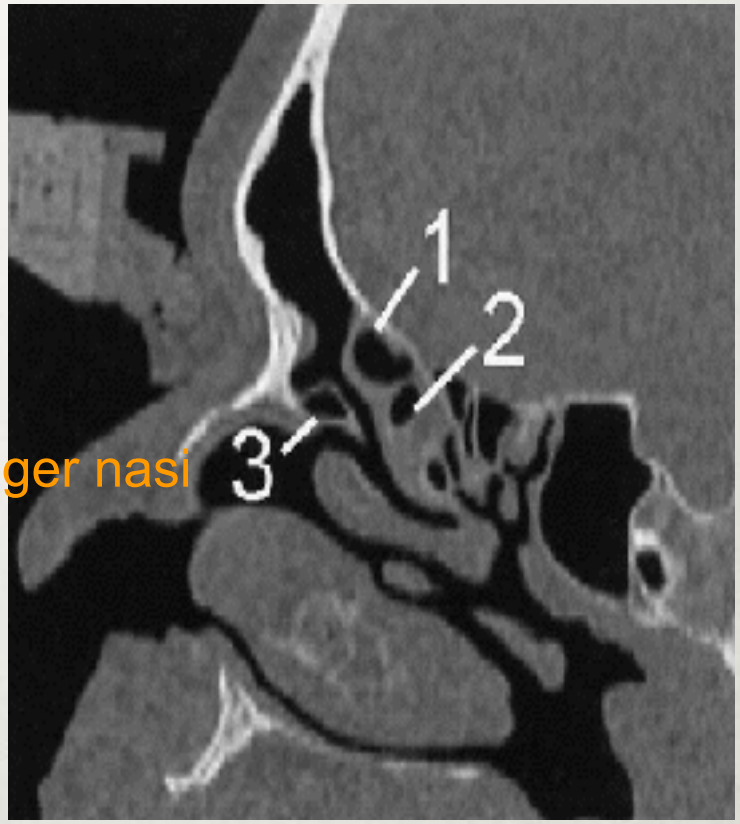
Agger nasi

- Η πιο πρόσθια ηθμοειδής κυψέ
  ethmoidalis....
- Agger nasi- Στην πρόσφυση της
- Ορια



Agger nasi



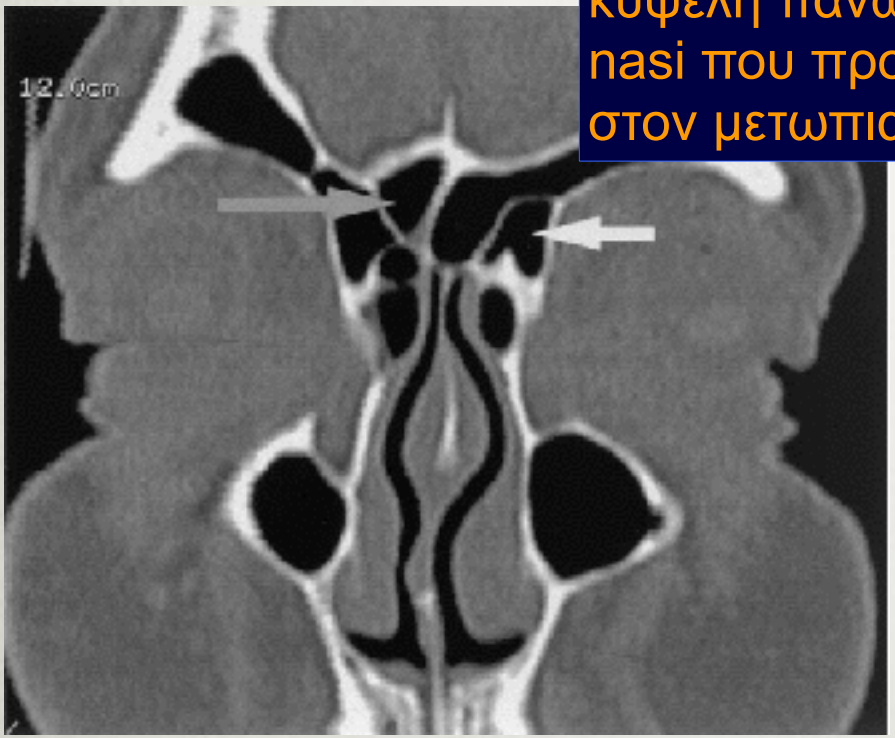


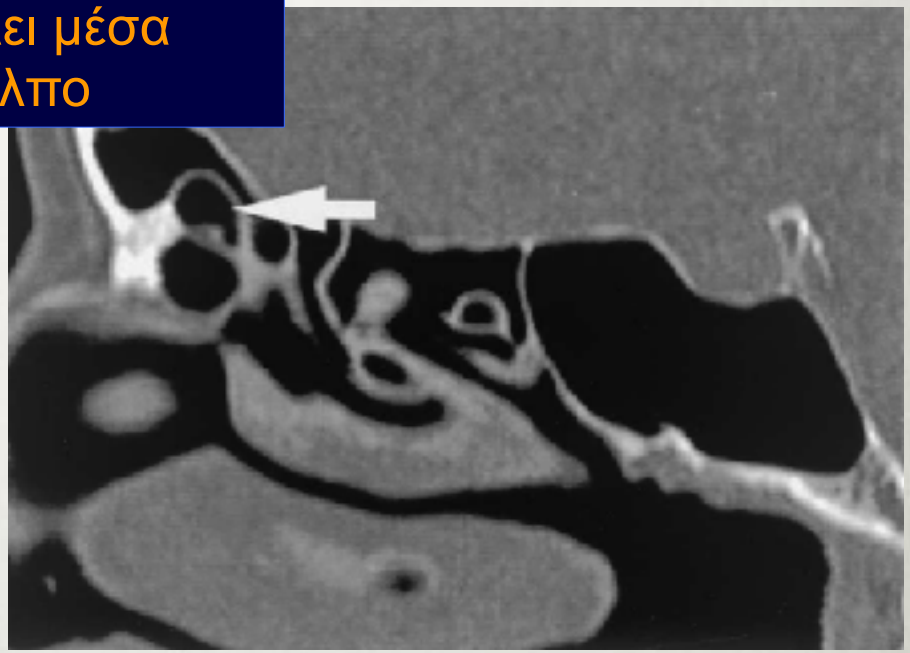
Kuhn Type II

Kuhn τύπου 2: Δύο η περισσότερες κυψέλες πάνω από το agger nasi

Kuhn Type III

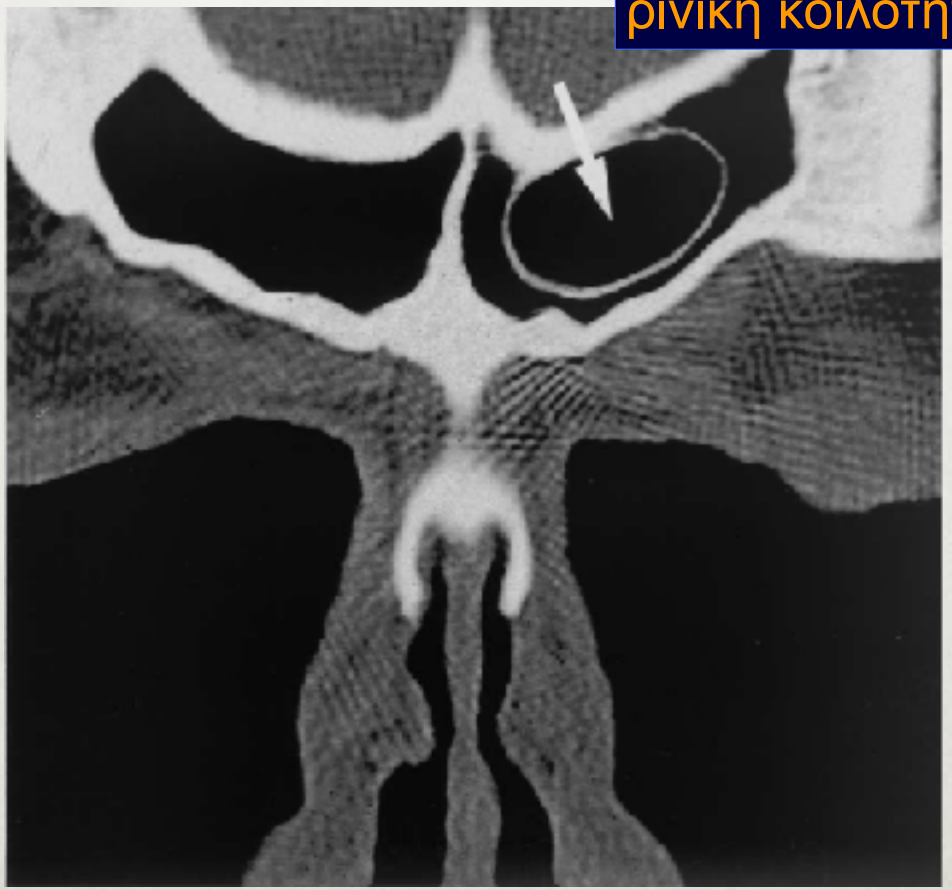
Kuhn τύπου 3: Μία μοναδική κυψέλη πάνω από το agger nasi που προβάλλει μέσα στον μετωπιαίο κόλπο





Kuhn Type IV

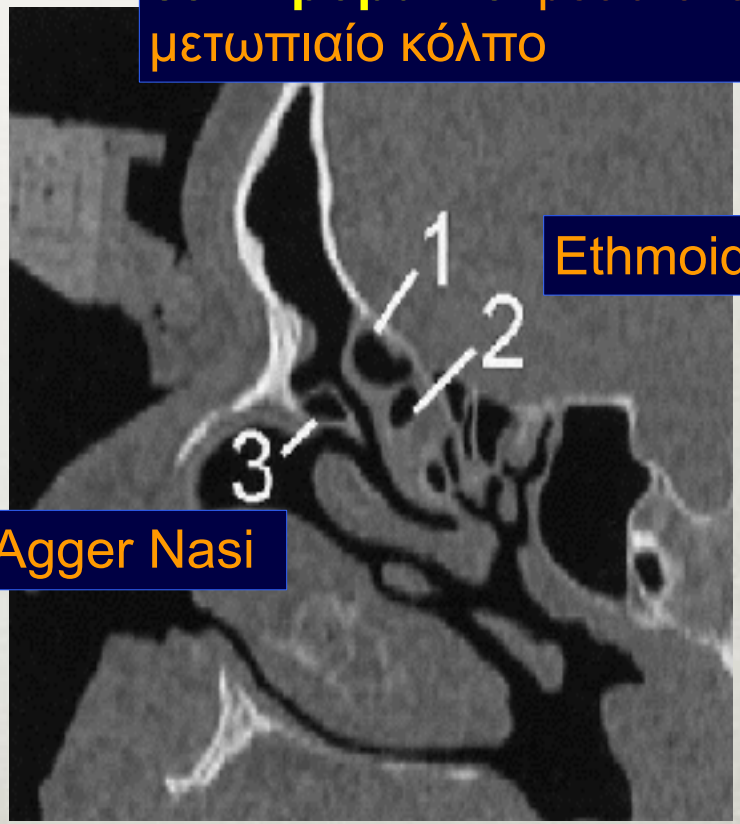
Kuhn τύπου 4: Μεμονωμένη κυψέλη μέσα στον μετωπιαίο κόλπο,χωρίς επικοινωνία με τη ρινική κοιλότητα



Supra – Frontal Bullar cells

Fronto bullar cell: Μοναδική κυψέλη πάνω απο την bulla – **προβάλλει** μέσα στον μετωπιαίο κόλπο

Supra bullar cell: Μοναδική κυψέλη πάνω απο την bulla – **δεν προβάλλει** μέσα στον μετωπιαίο κόλπο



Ethmoid bulla

Agger Nasi

esa
endoscopic skull base athens

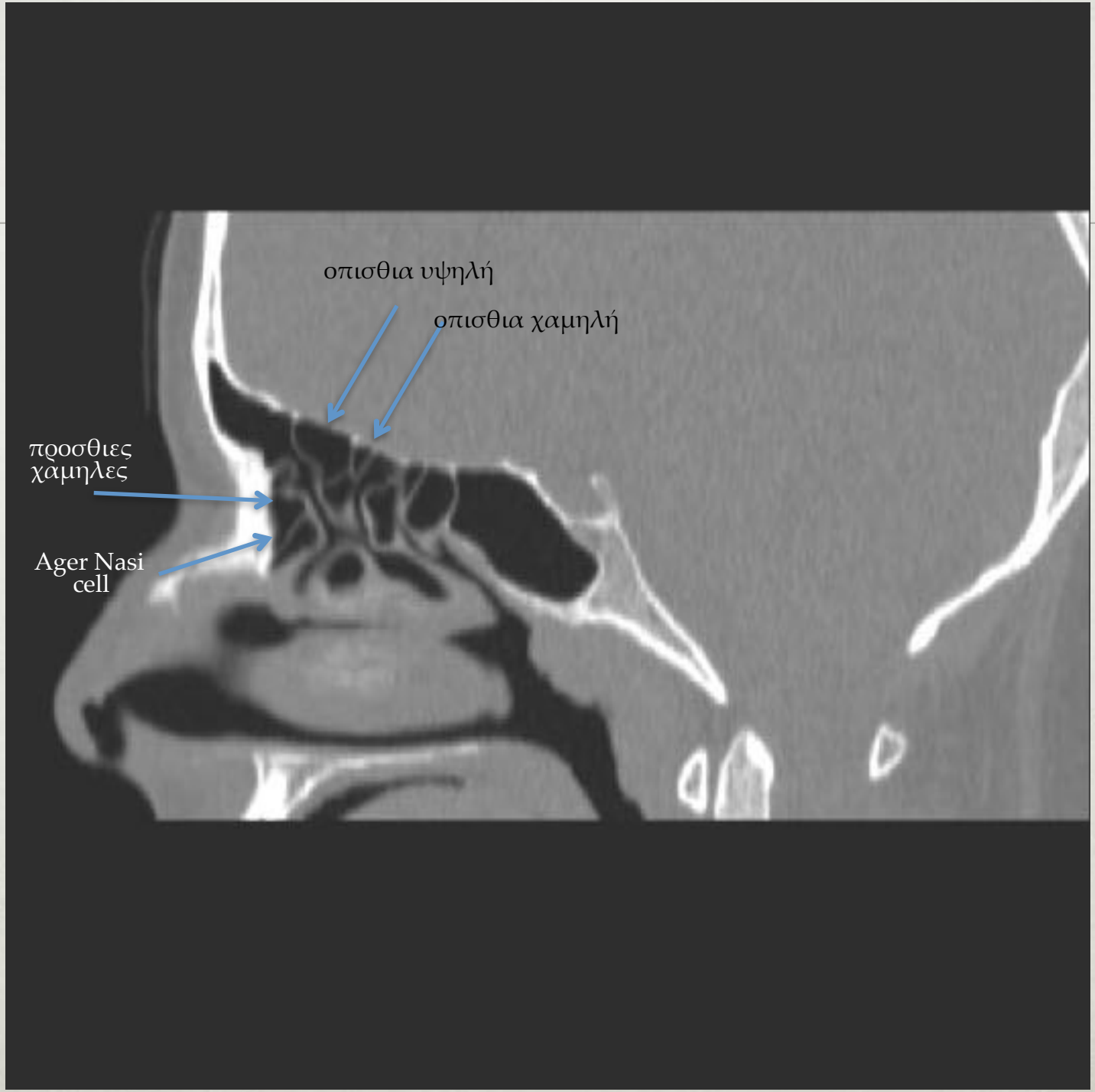
KEEP IT SIMPLE....

LUMC

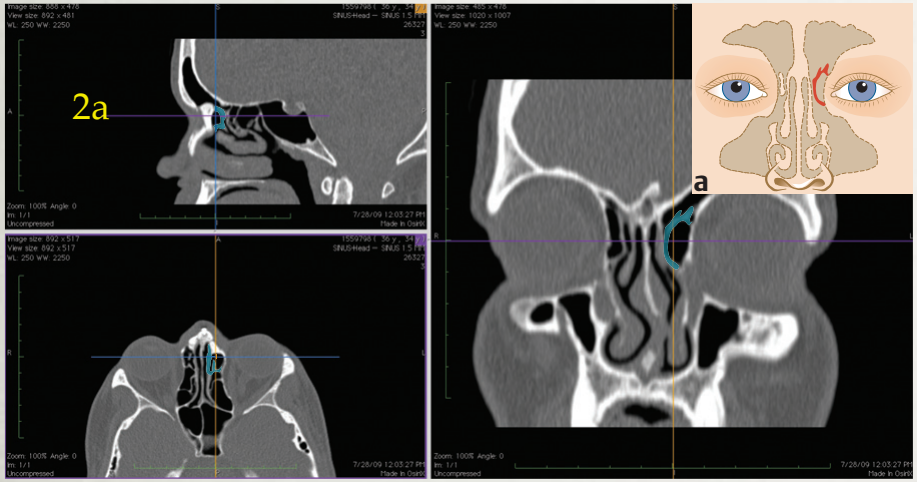
Μια νεα Προταση ταξινομησης

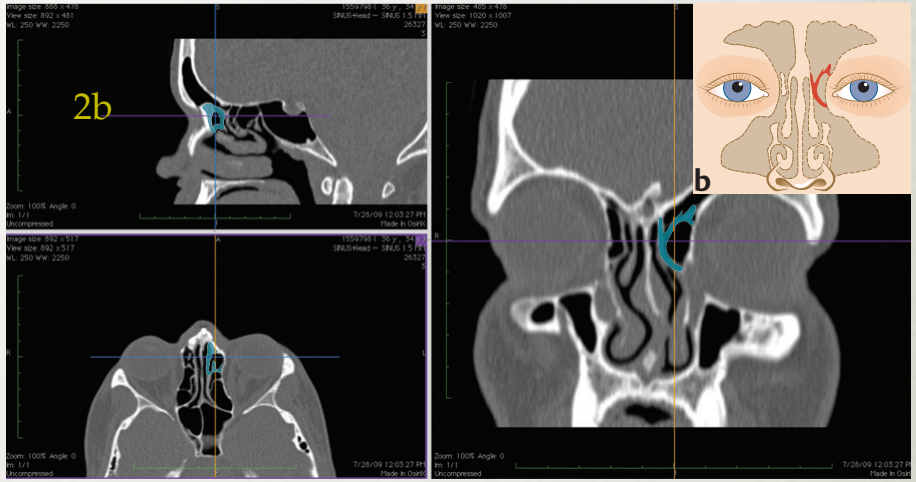
- Πρόσθιες
  - Υψηλές ("Kuhn 3,4")
  - Χαμηλές ("Kuhn 1,2")
- Οπίσθιες
  - Υψηλές ("frontobullar")
  - Χαμηλές (suprabullar")

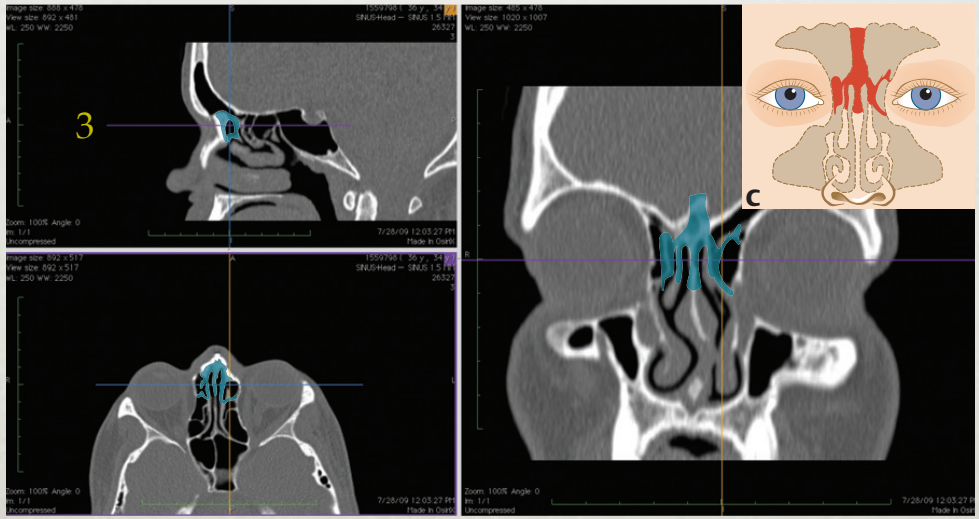
European position paper on the anatomical terminology of the internal nose and paranasal sinuses.
Lund VJ, Stammberger H, Fokkens WJ, Beale T, Bernal-Sprekelsen M, Eloy P, Georgalas C, Gerstenberger C, Hellings P, Herman P, Hosemann WG, Jankowski R, Jones N, Jorissen M, Leunig A, Onerci M, Rimmer J, Rombaux P, Simmen D, Tomazic PV, Tschabitscherr M, Welge-Luessen A.
Rhinol Suppl. 2014 Mar;(24):1-34.


οπισθια υψηλή
οπισθια χαμηλή
προσθιες χαμηλες
Ager Nasi cell

Ταξινομηση προσεγγισεων στον μετωπιαιο

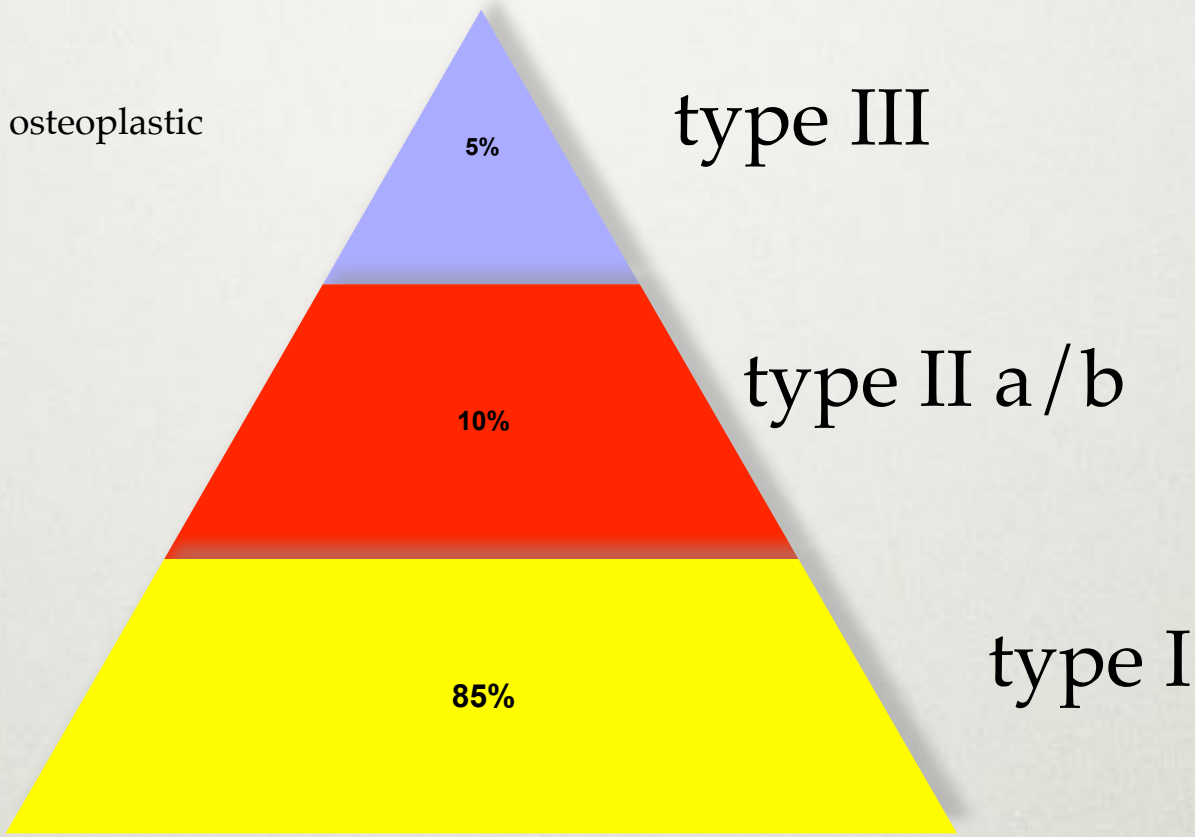






From: Georgalas C: The frontal sinus in - Georgalas C et al: Rhinology and Skull Base surgery, Thieme , 2013

(Primary Surgery)



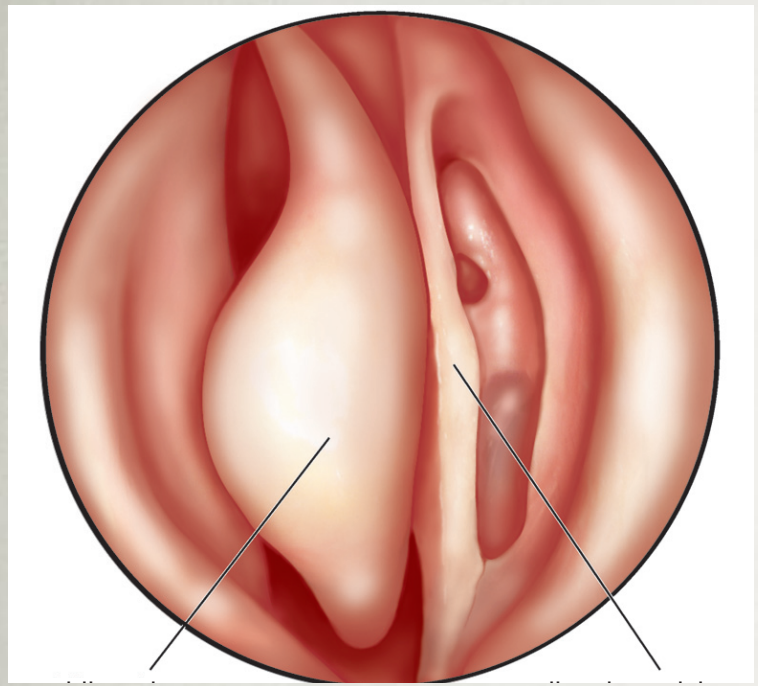
All - or - none concept

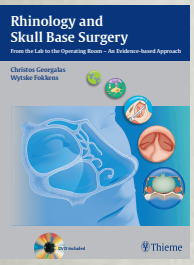
- *Μετά την είσοδο στονμετωπιαίο,* ***δεν υπάρχει επιστροφή***
- *Μια* ***μικρή τρύπα*** *που ανατράται δια μέσου των οστεοκύστεων του μετωπιαίου κολπώματος οδηγεί* ***νομοτελιακά*** *σε στένωση και ιατρογενή κολπίτιδα*
- *Η* ***λιγότερο επεμβατική*** *χειρουργικη στο μετωπιαίο πρέπει να περιλαμβάνει ως ελάχιστο την* ***πλήρη αφαίρεση*** *όλων των οστεοκύστεων του μετωπιαίου*

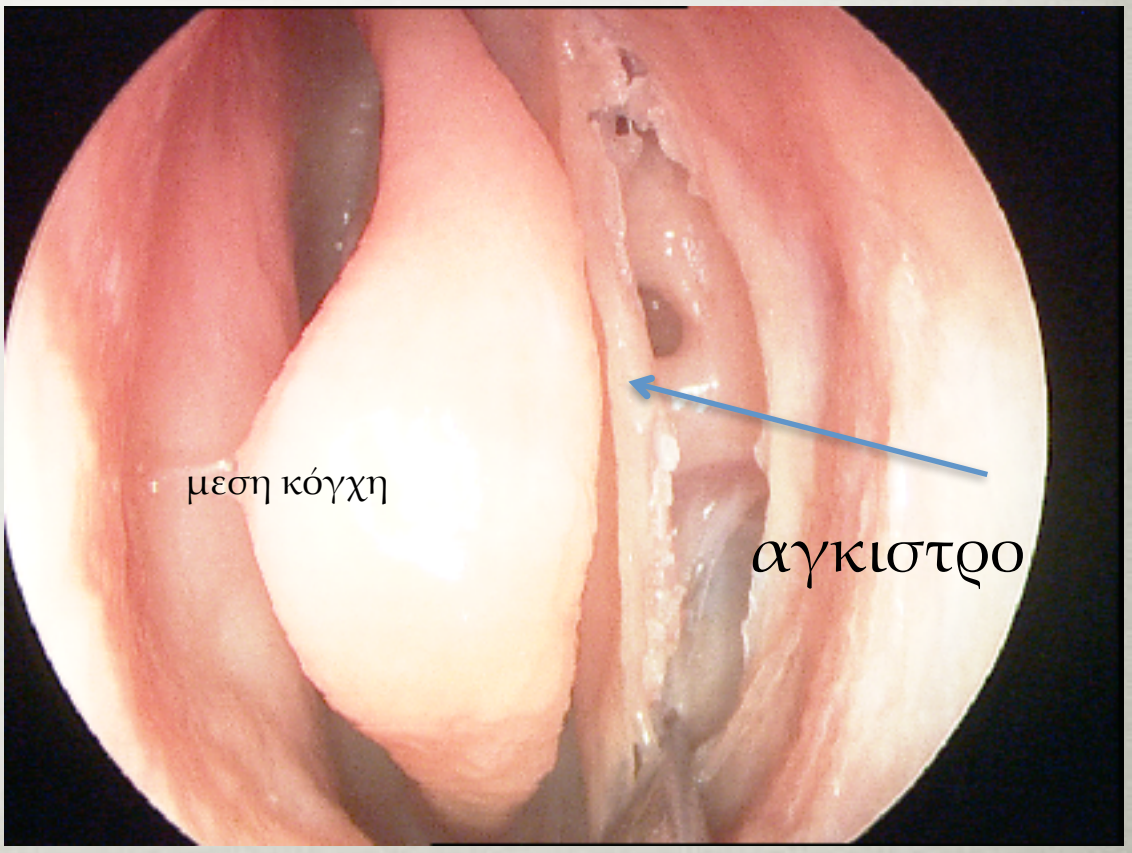
Draf 1- εκτομη αγκίστρου και πρόσθια ηθμοιδεκτομή

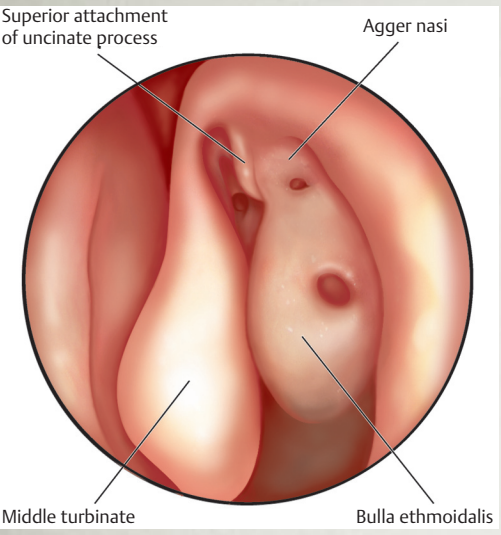
ενδείξεις:

- σχεδόν όλες οι αρχικές επεμβάσεις για μετωπιαία κολπίτιδα




Rhinology and
Skull Base Surgery
From the Lab to the Operating Room – An Evidence-based Approach
Christos Georgalas
Wytske Fokkens
Thieme

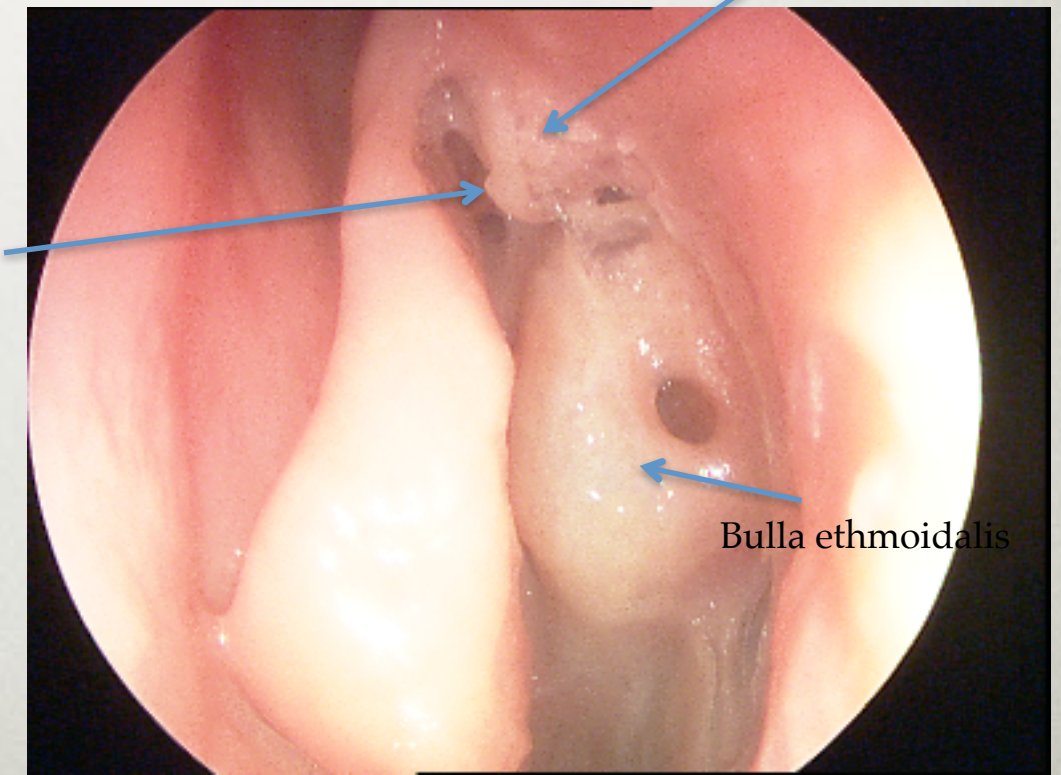

μεση κόγχη
αγκιστρο

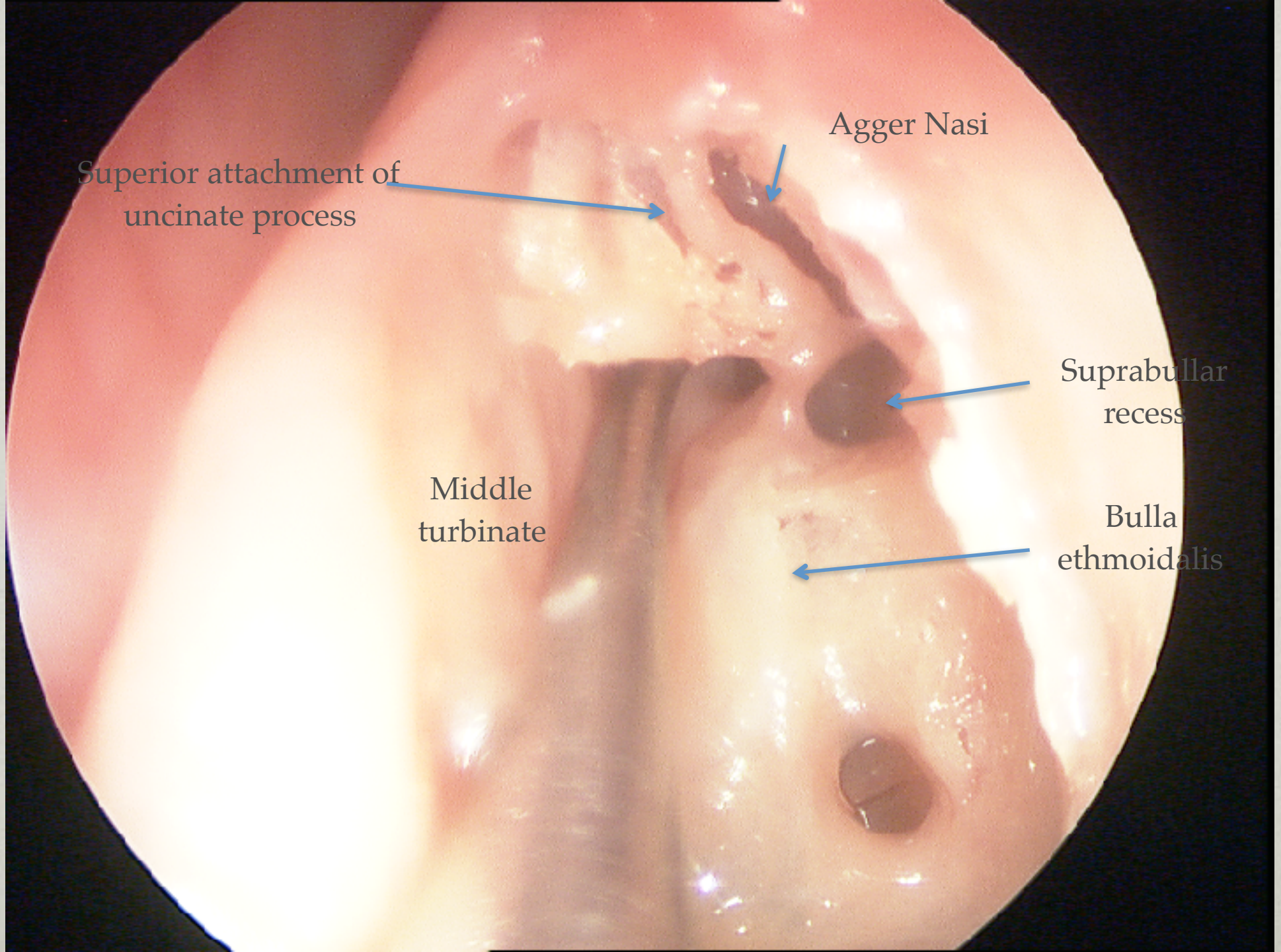


Agger Nasi

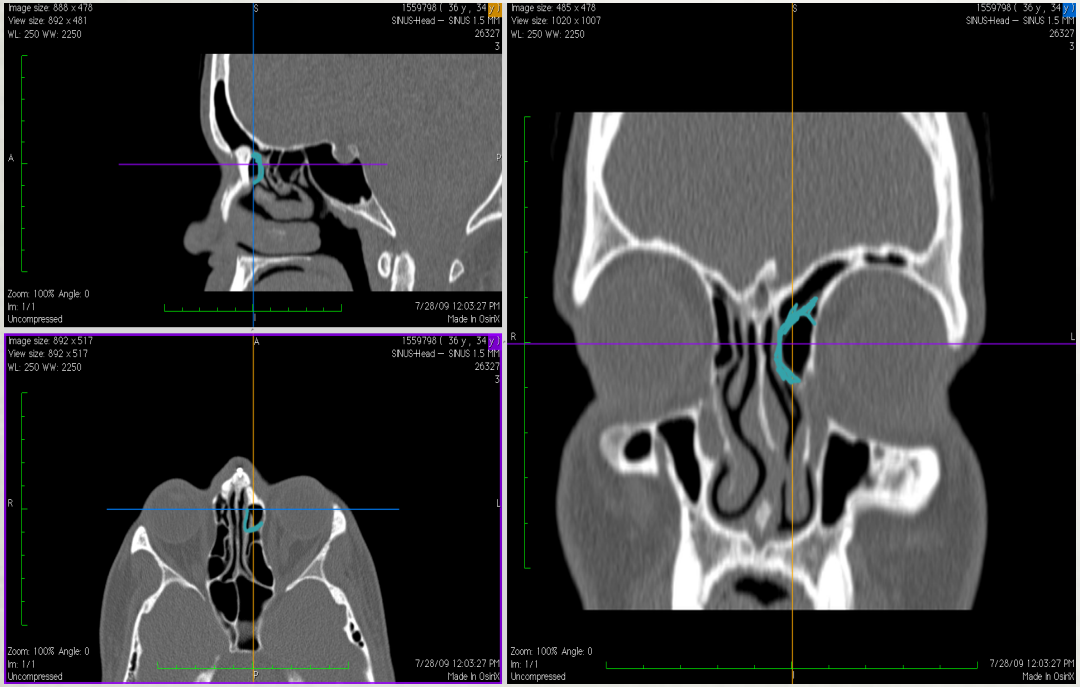
ανω προσφυση αγκιστρου

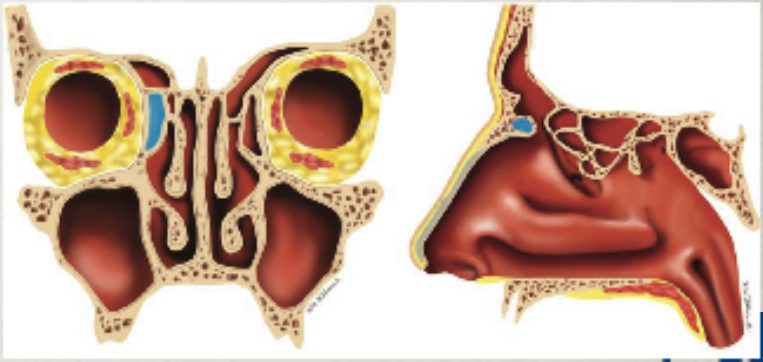
μεση κογχη



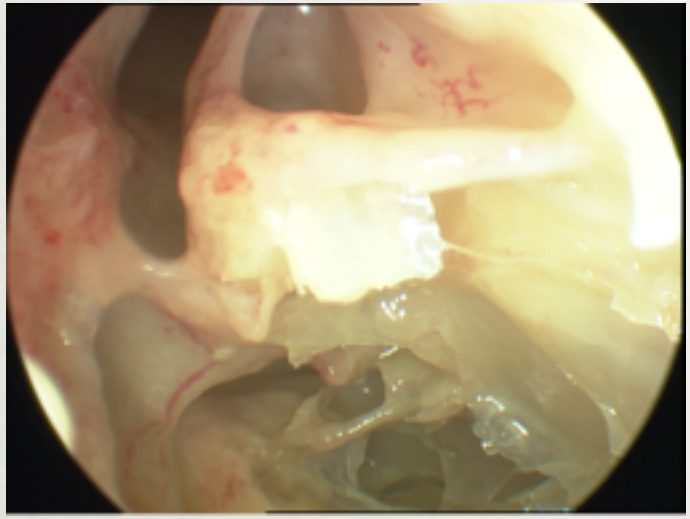

Agger Nasi
Superior attachment of uncinate process
Suprabullar recess
Middle turbinate
Bulla ethmoidalis

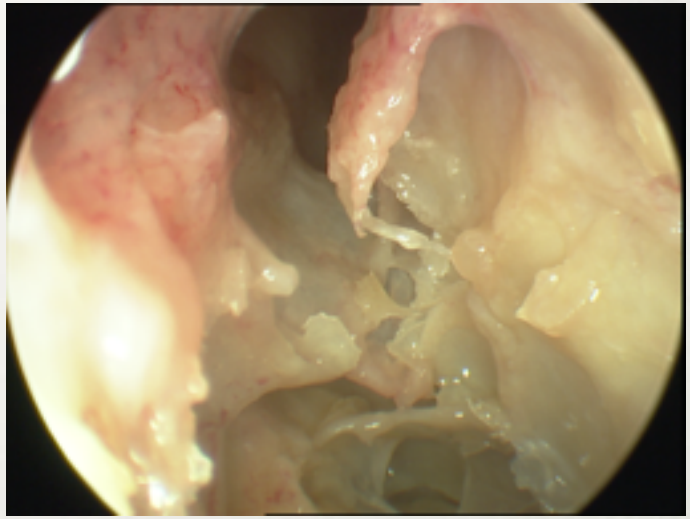
Draf 2a -"uncapping the egg"

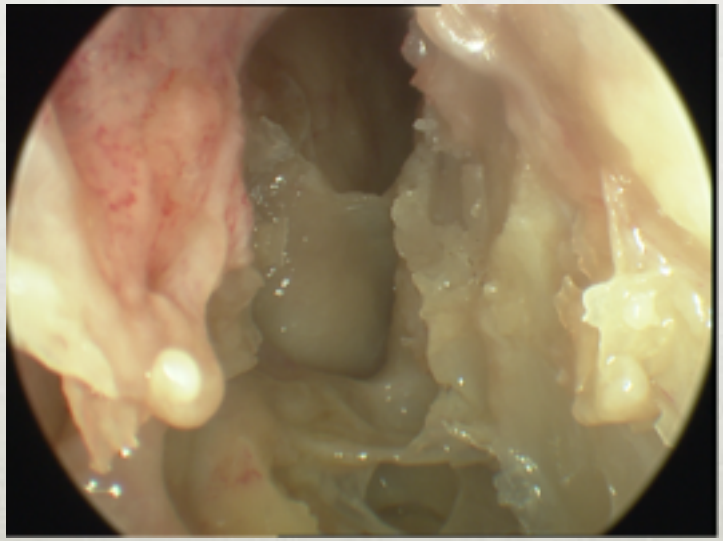




Draf 2a



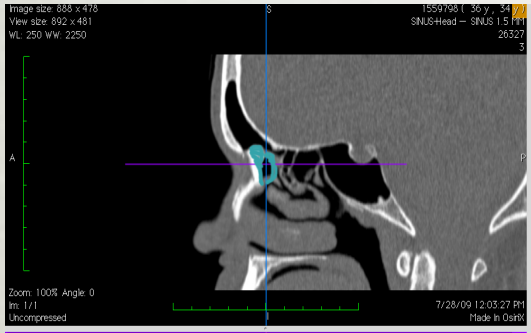




Draf IIb

- Αφαίρεση (ανάτρηση) όλου του εδάφους του μετωπιαίου κόλπου

Draf 2b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SINUS-Head – SINUS 1.5
26327
Zoom: 100% Angle: 0
Im: 1/1
Uncompressed
7/28/09 12:03:27 PM
Made in OsiriX


Image size: 892 x 517
View size: 892 x 517
WL: 250 WW: 2250
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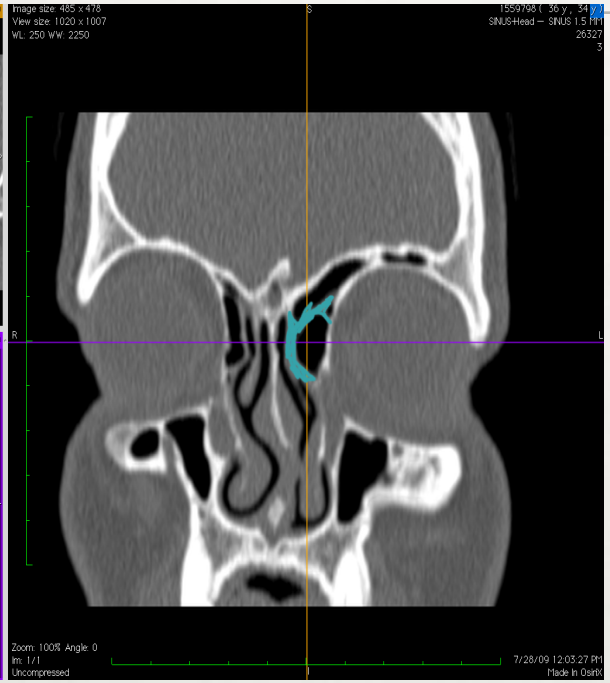
26327
Zoom: 100% Angle: 0
Im: 1/1
Uncompressed
7/28/09 12:03:27 PM
Made in OsiriX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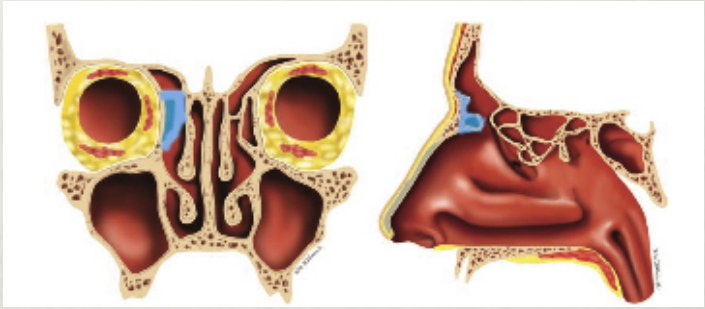
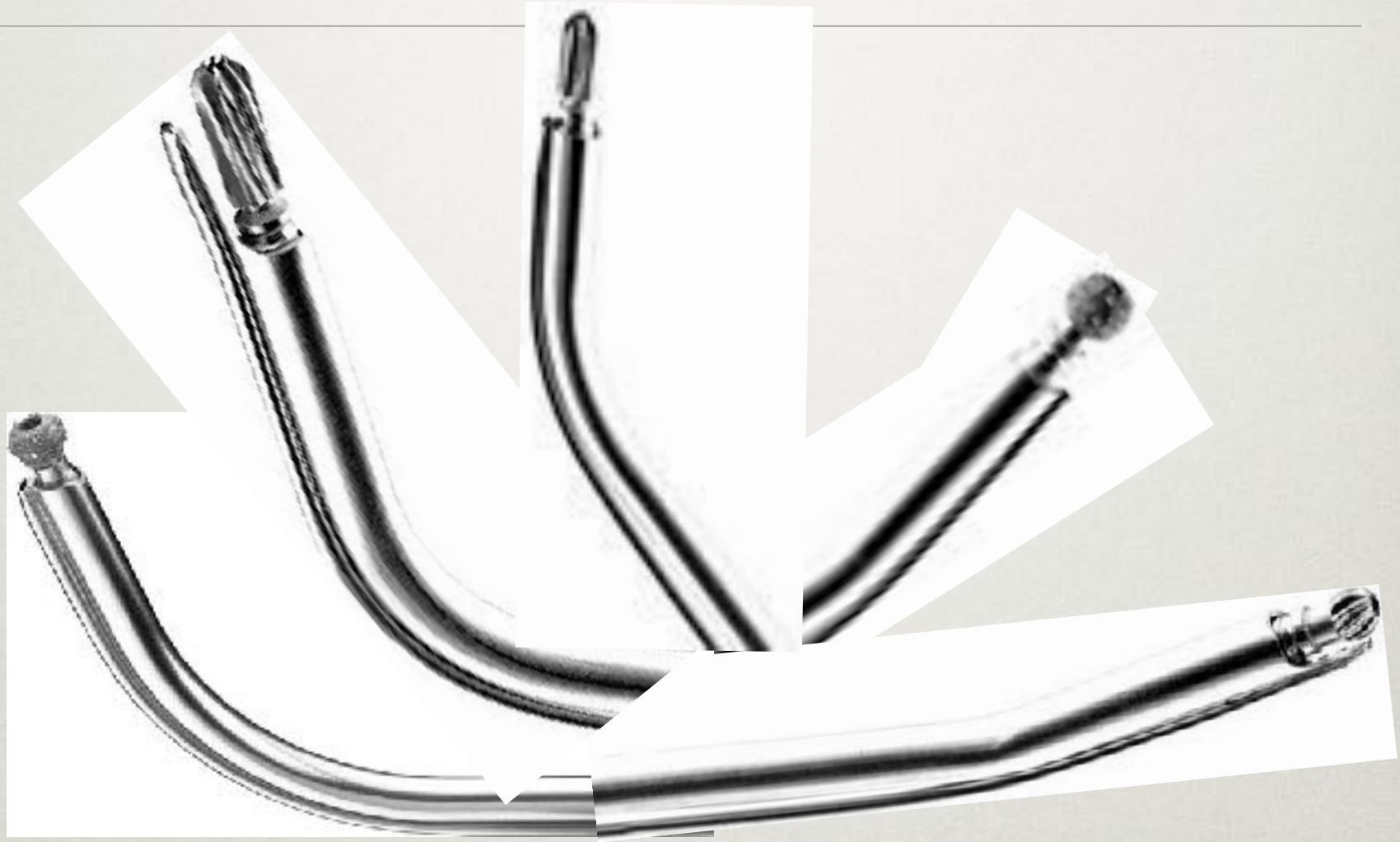


esa
endoscopic skull base athens

Drilling in the frontal sinus



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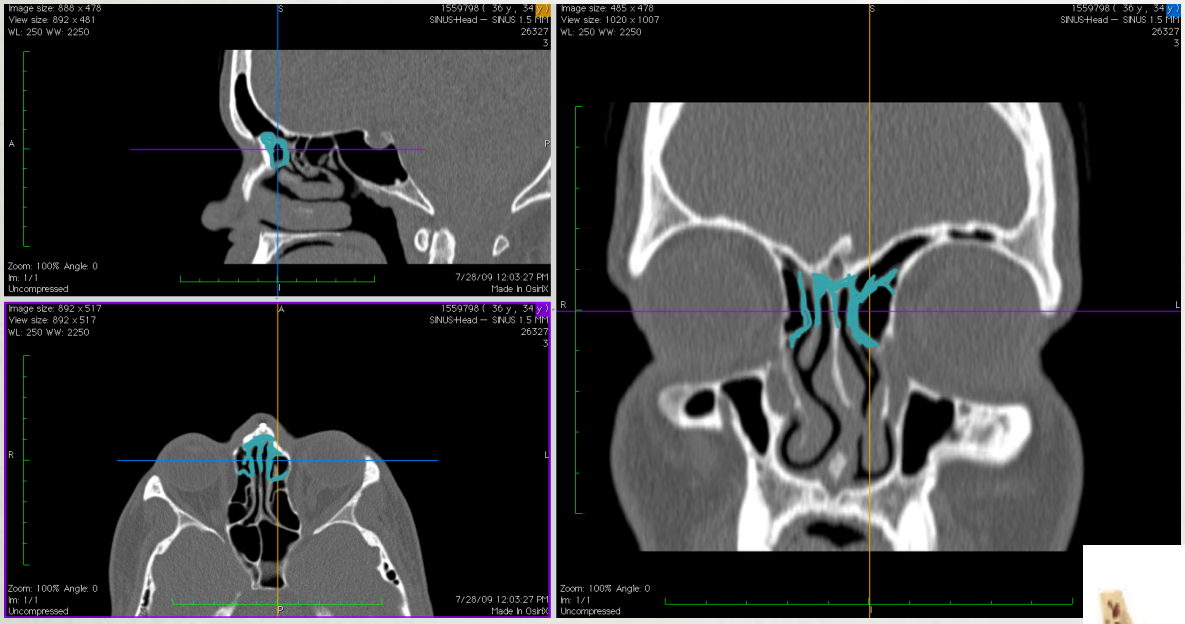
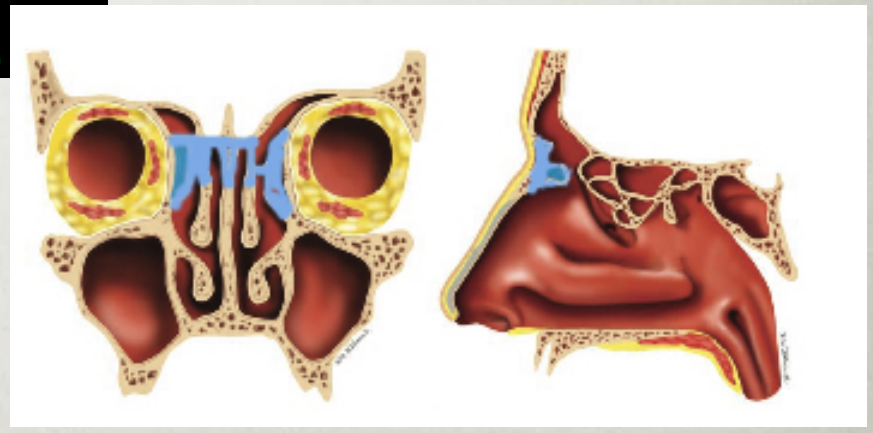
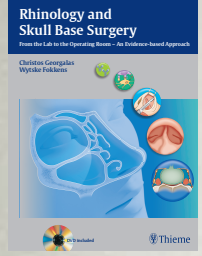
Draf tynoy 3 -MODIFIED LOTHROP PROCEDURE







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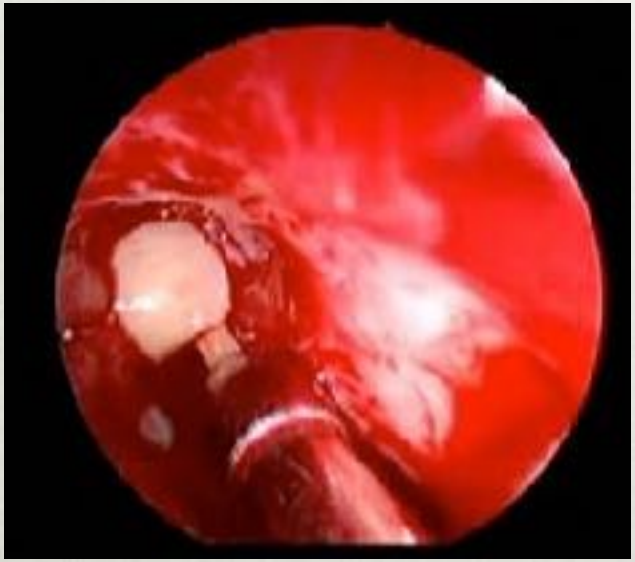
Draf 2a amΦΩ



From: Georgalas C: The frontal sinus in - Georgalas C et al: Rhinology and Skull Base surgery, Thieme , 2013

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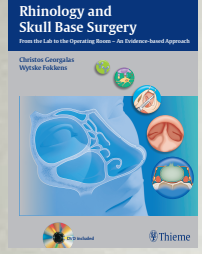
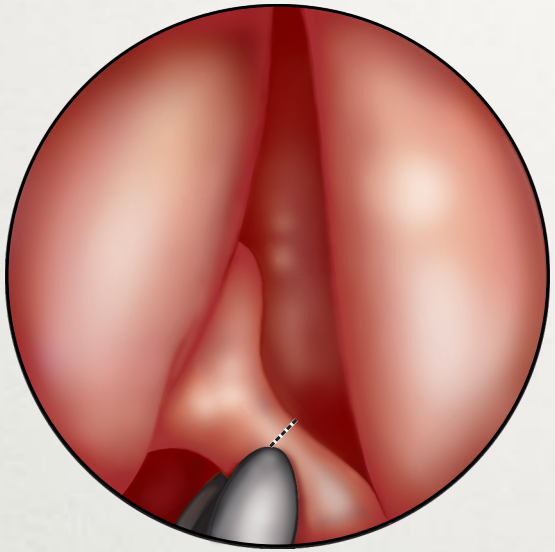


From: Georgalas C: The frontal sinus in - Georgalas C et al: Rhinology and Skull Base surgery, Thieme , 2013

ΜΕΡΙΚ'Η ΑΦΑΙΡΕΣΗ ΜΕΣΗΣ ΚΟΓΧΗΣ



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"ΠΑΡΑΘΥΡΟ" ΔΙΑΦΡΑΓΜΑΤΟΣ

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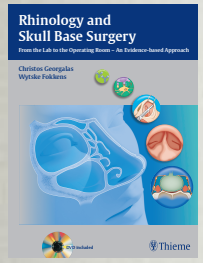

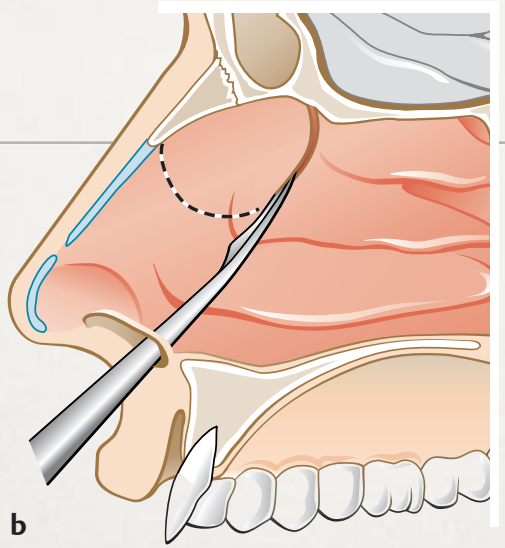

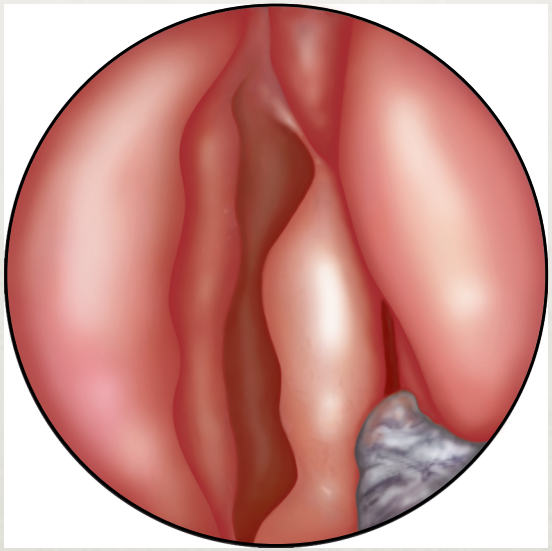

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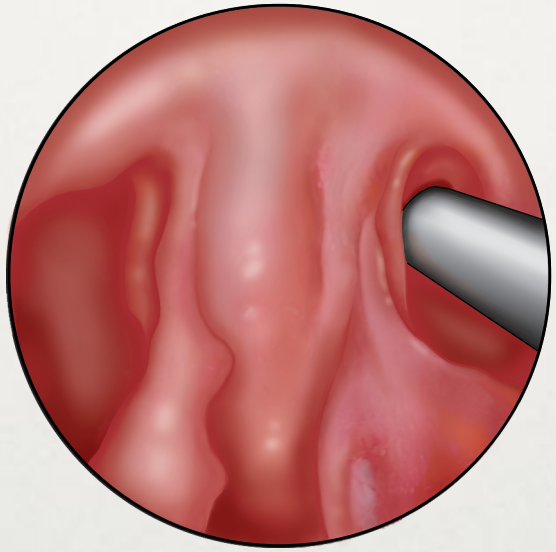
ΕΝΟΠΟΙΗΣΗ ΤΩΝ ΜΕΤΩΠΙΑΙΩΝ ΔΟΥΛΕΥΟΝΤΑΣ ΜΕΣΑ ΑΠΟ ΤΟΥΣ ΔΥΟ ΡΩΘΩΝΕΣ



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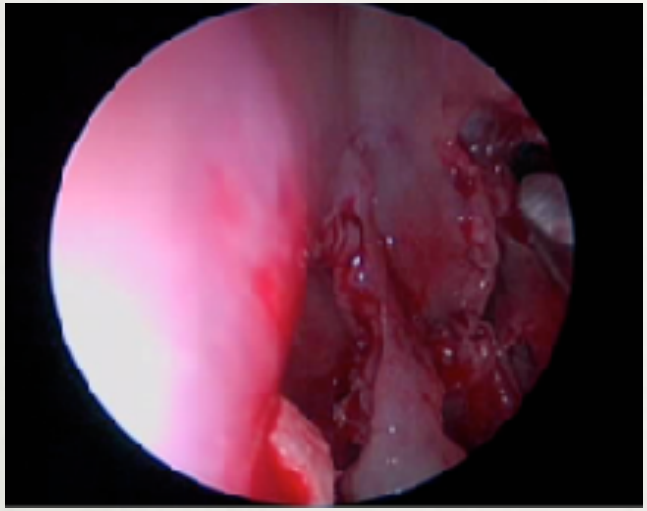
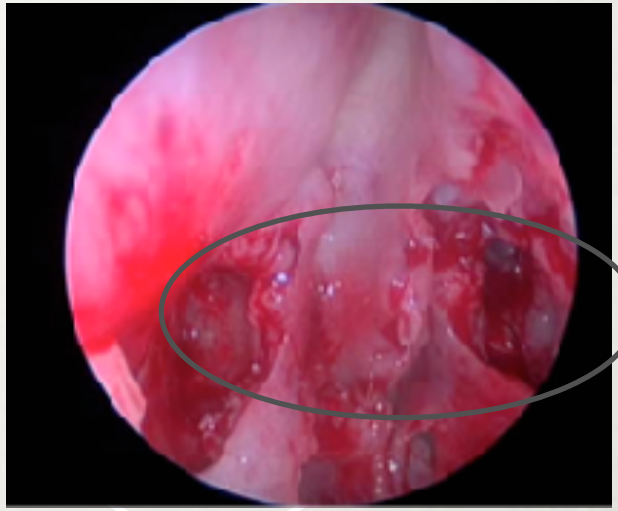
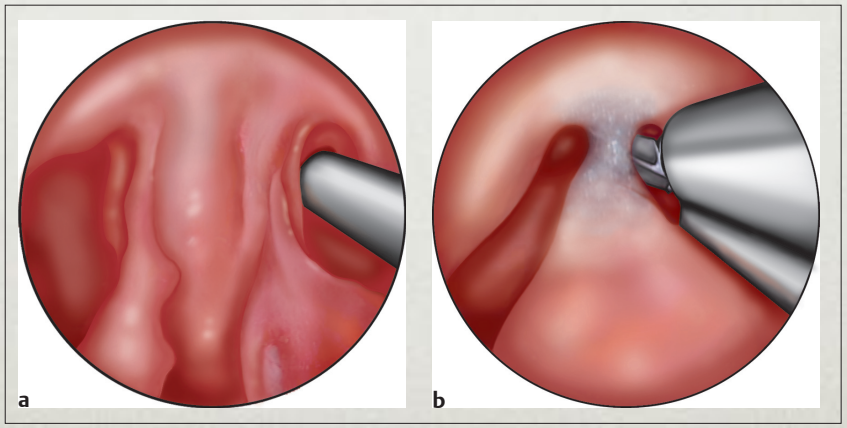
ΑΦΑΙΡΕΣΗ NASAL BEAK







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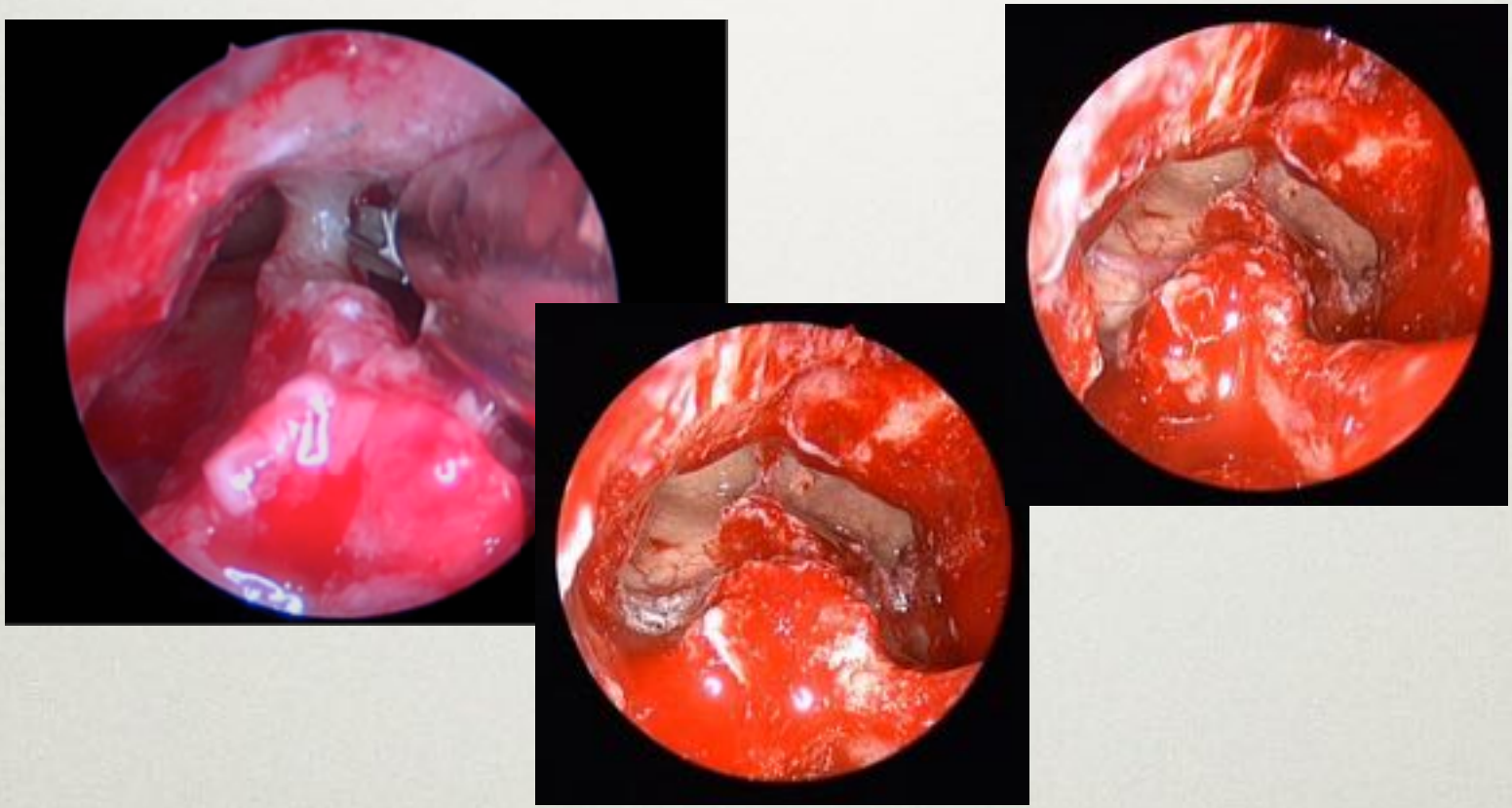
ΤΟ ΝΕΟ-ΣΤΟΜΙΟ ΜΕΓΙΣΤΟΠΟΙΕΊΤΑΙ



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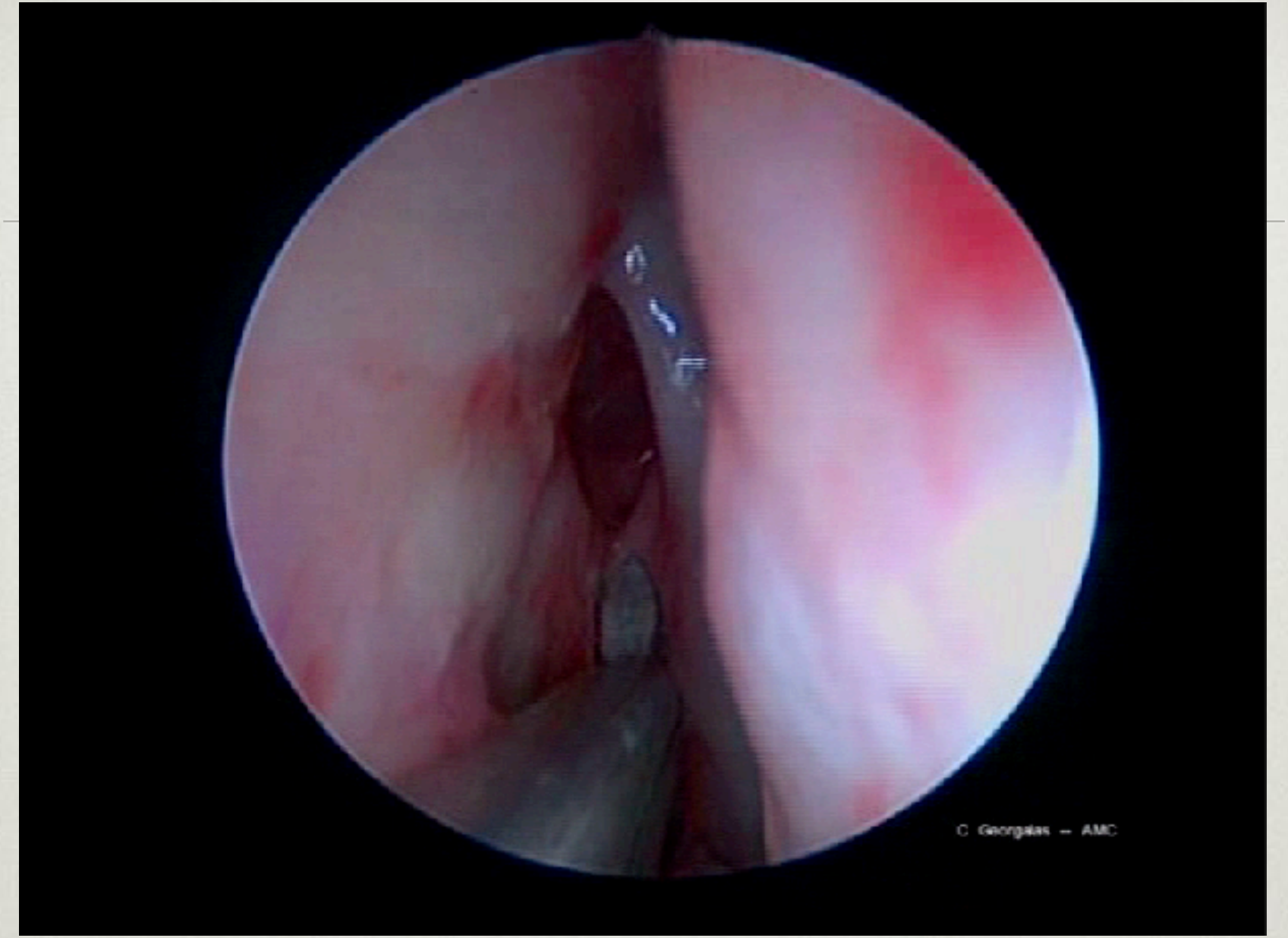

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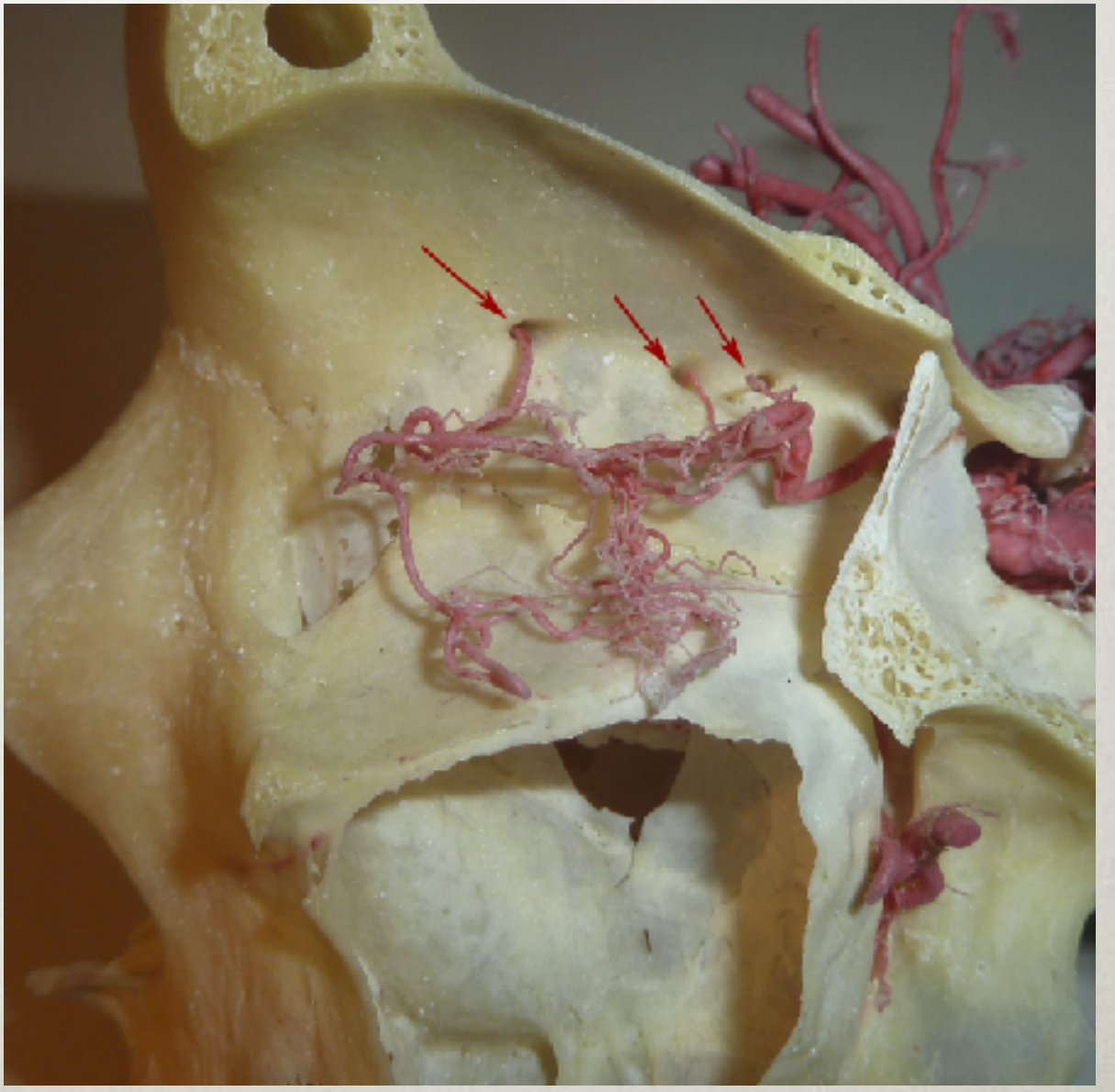
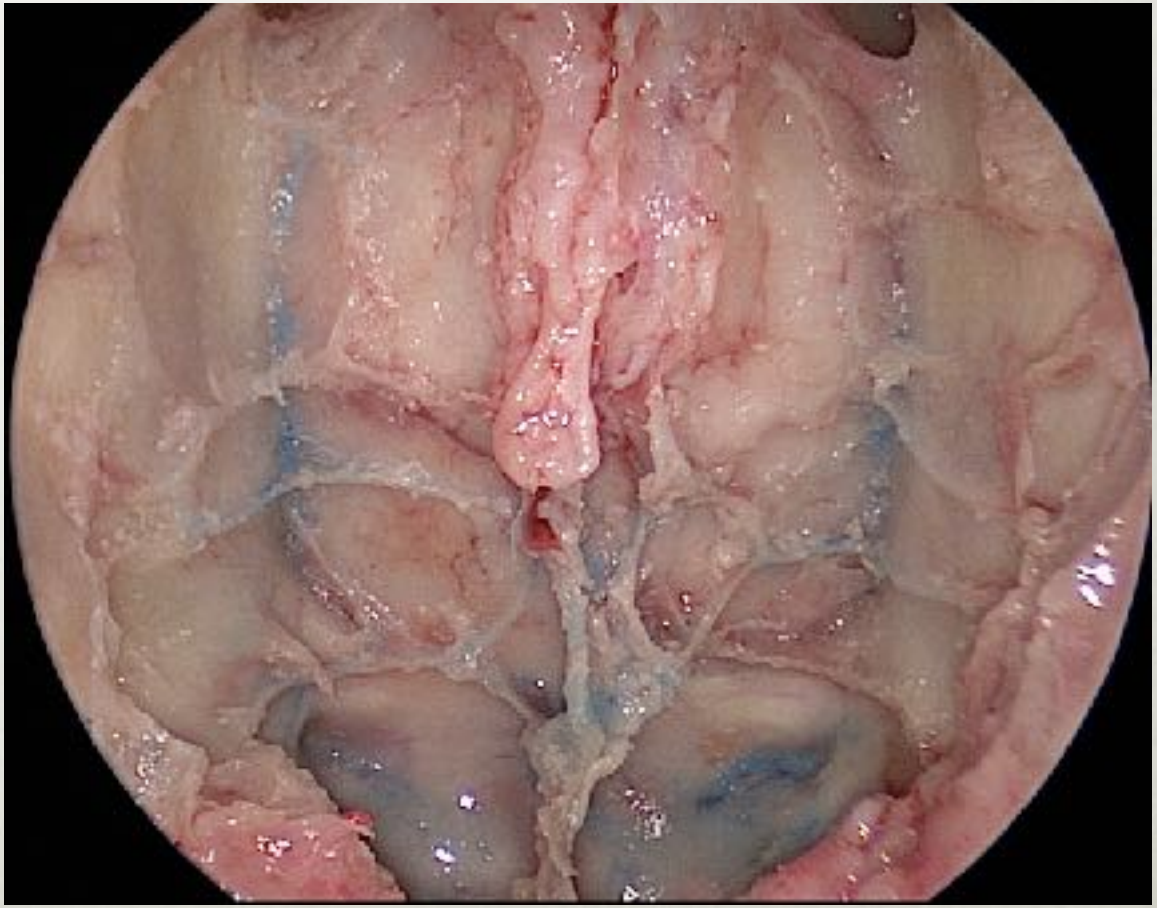
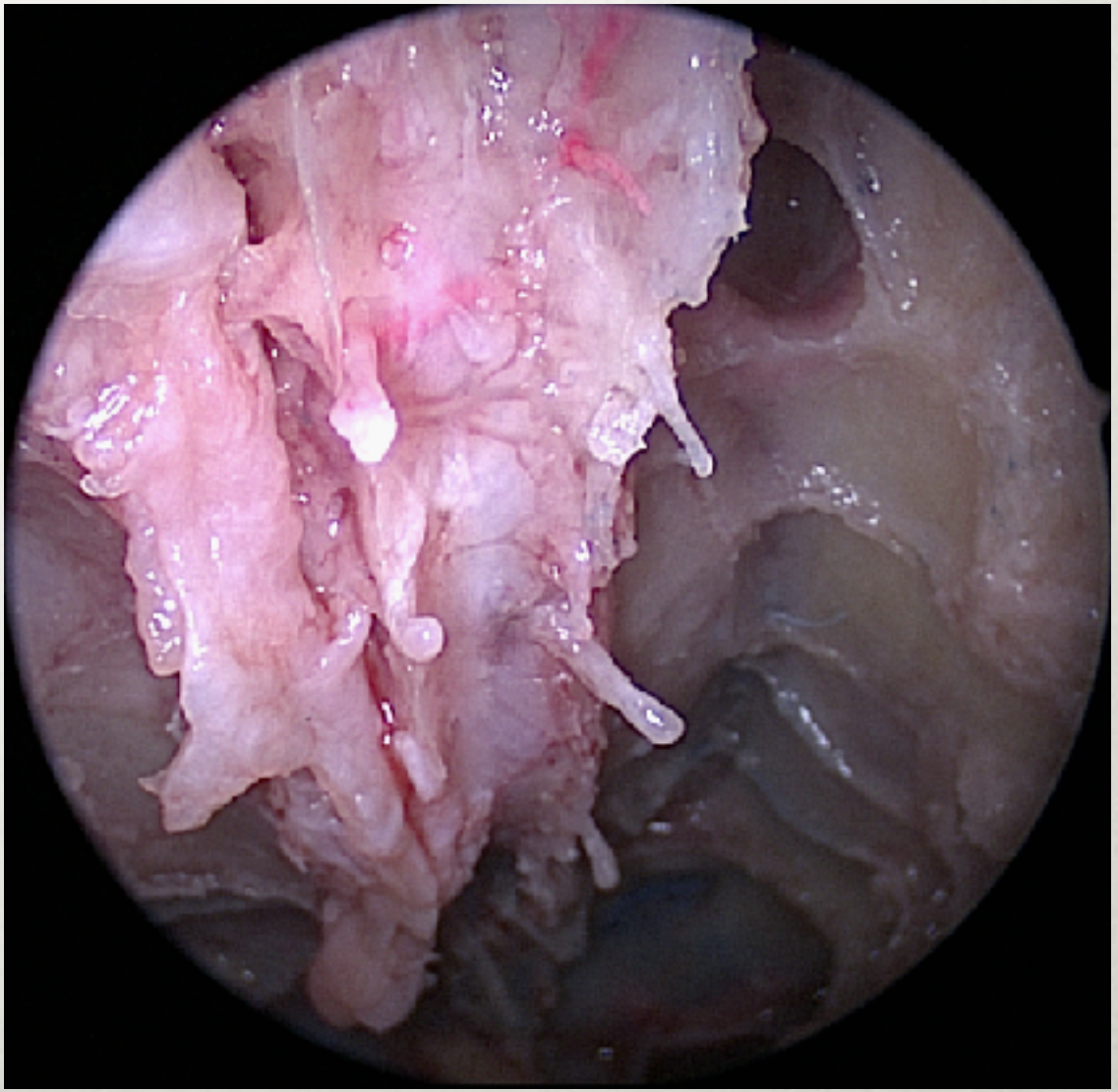
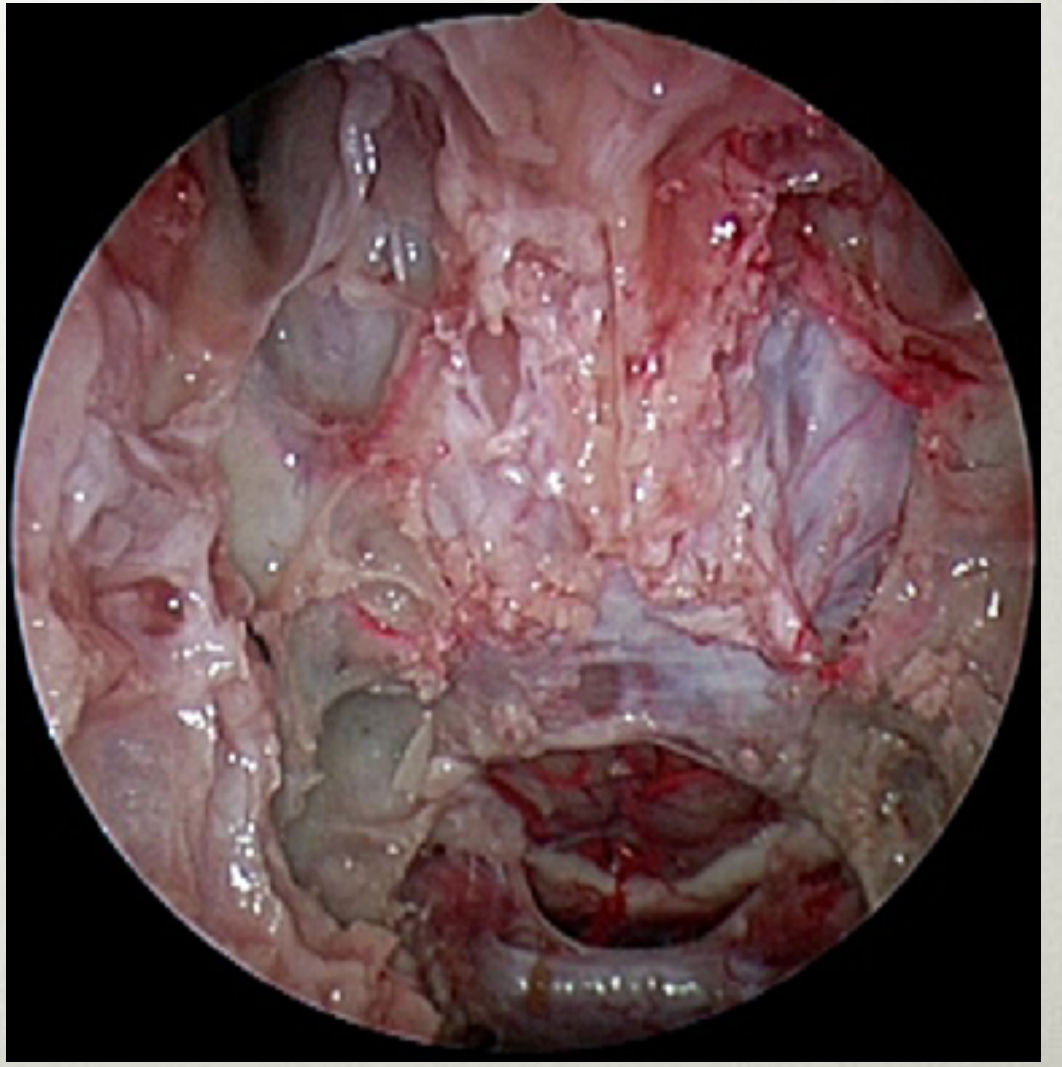
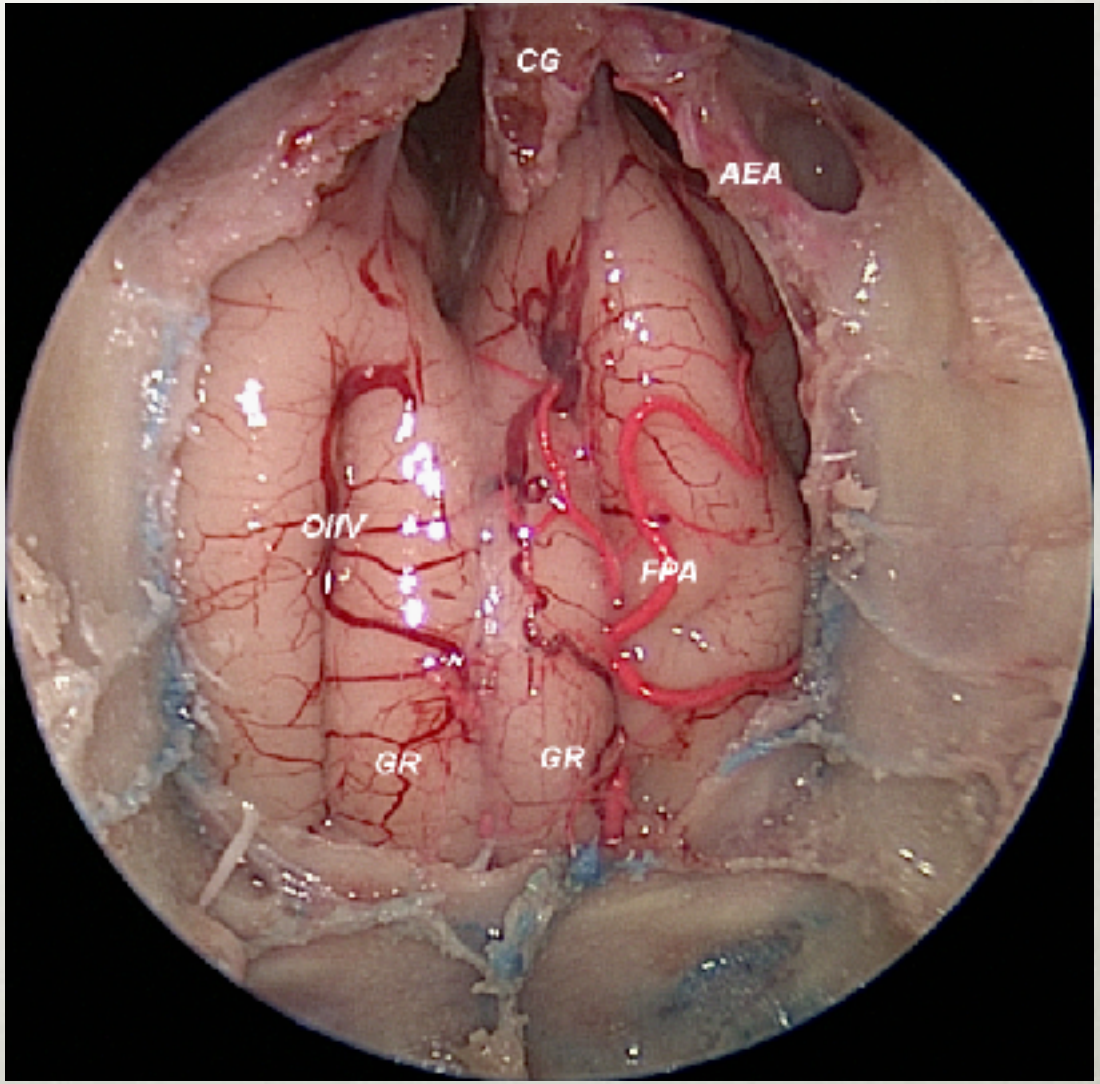
Ethmoidal arteries







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OIIV
FPA
GR
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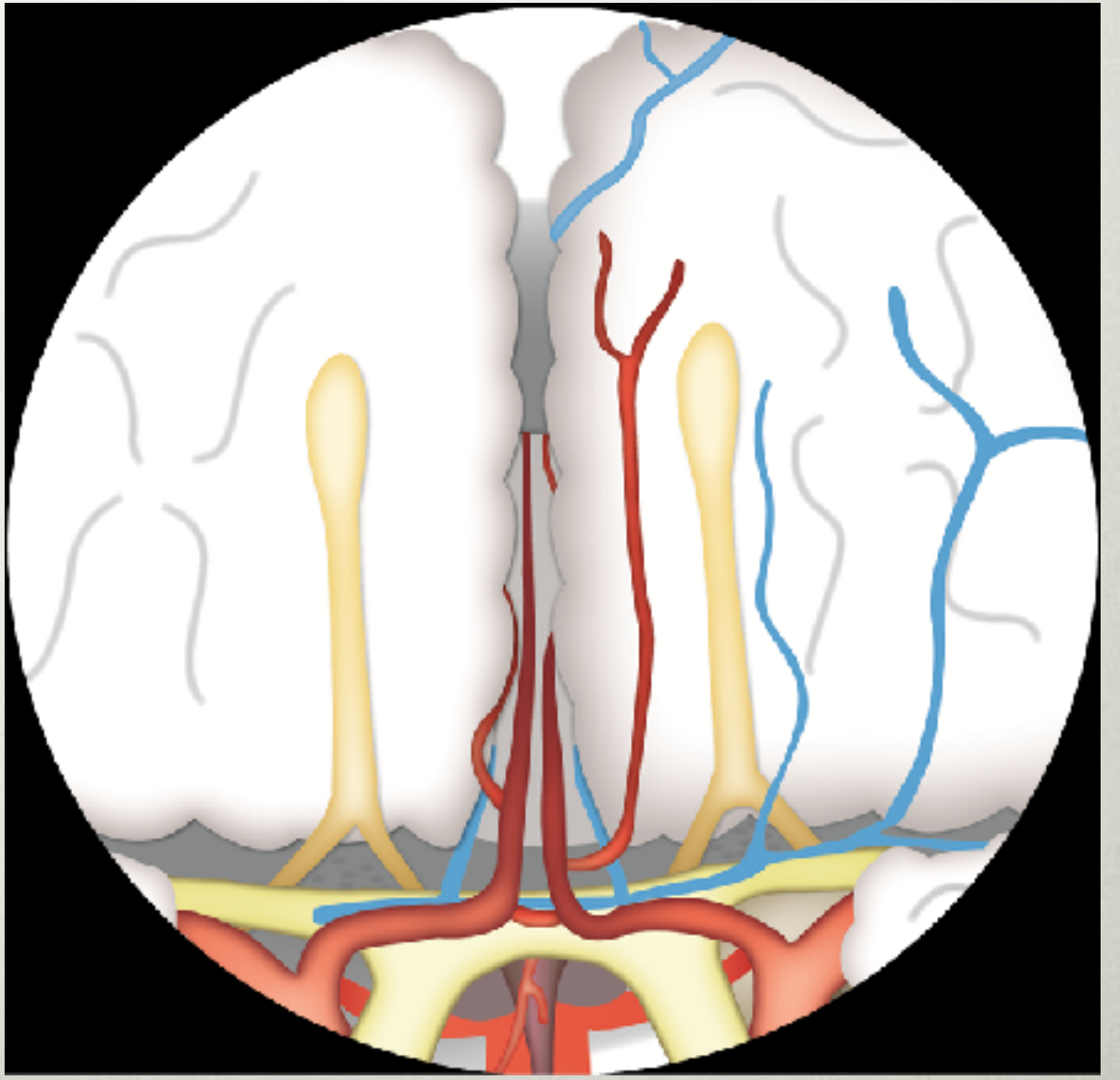

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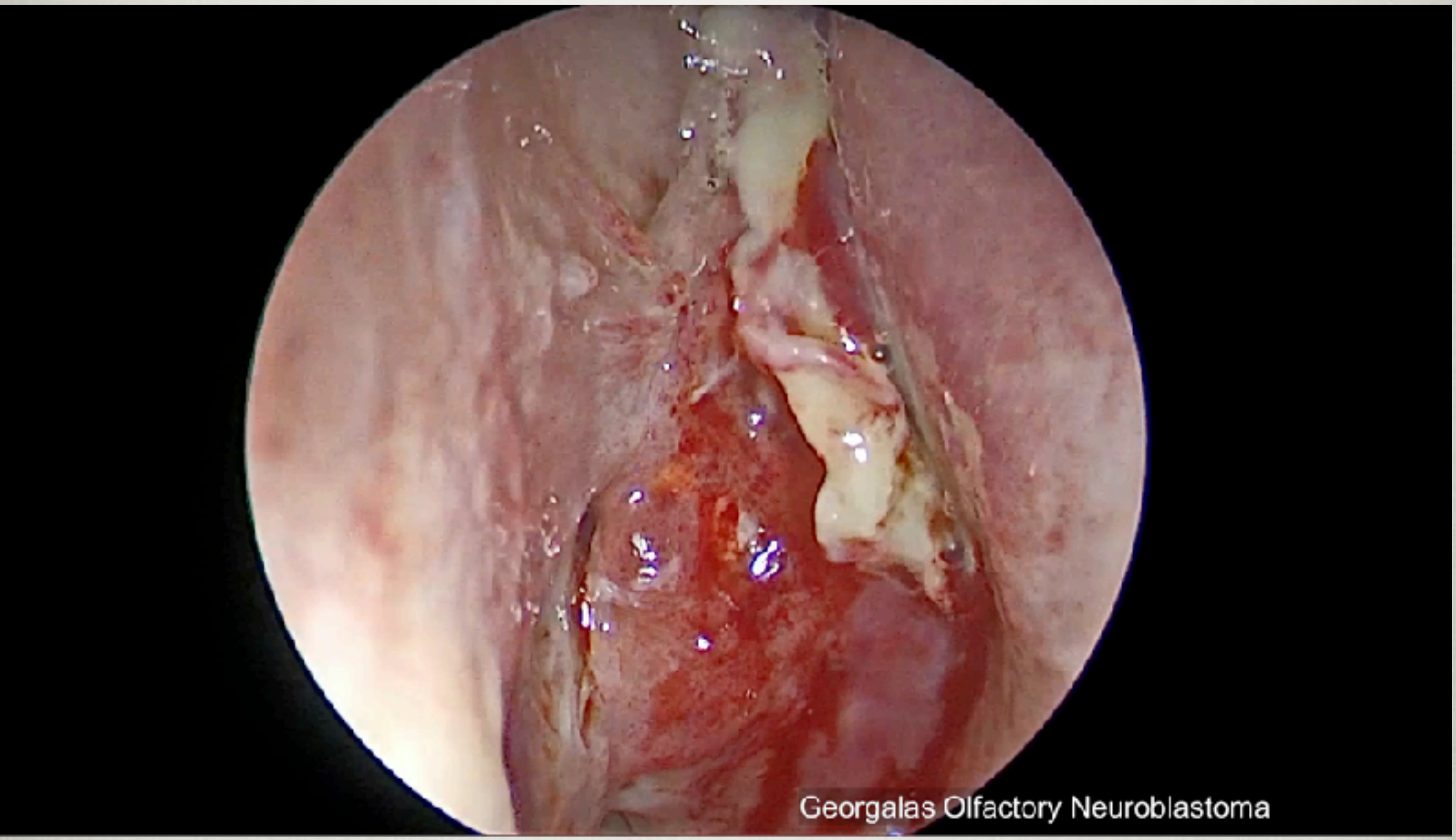

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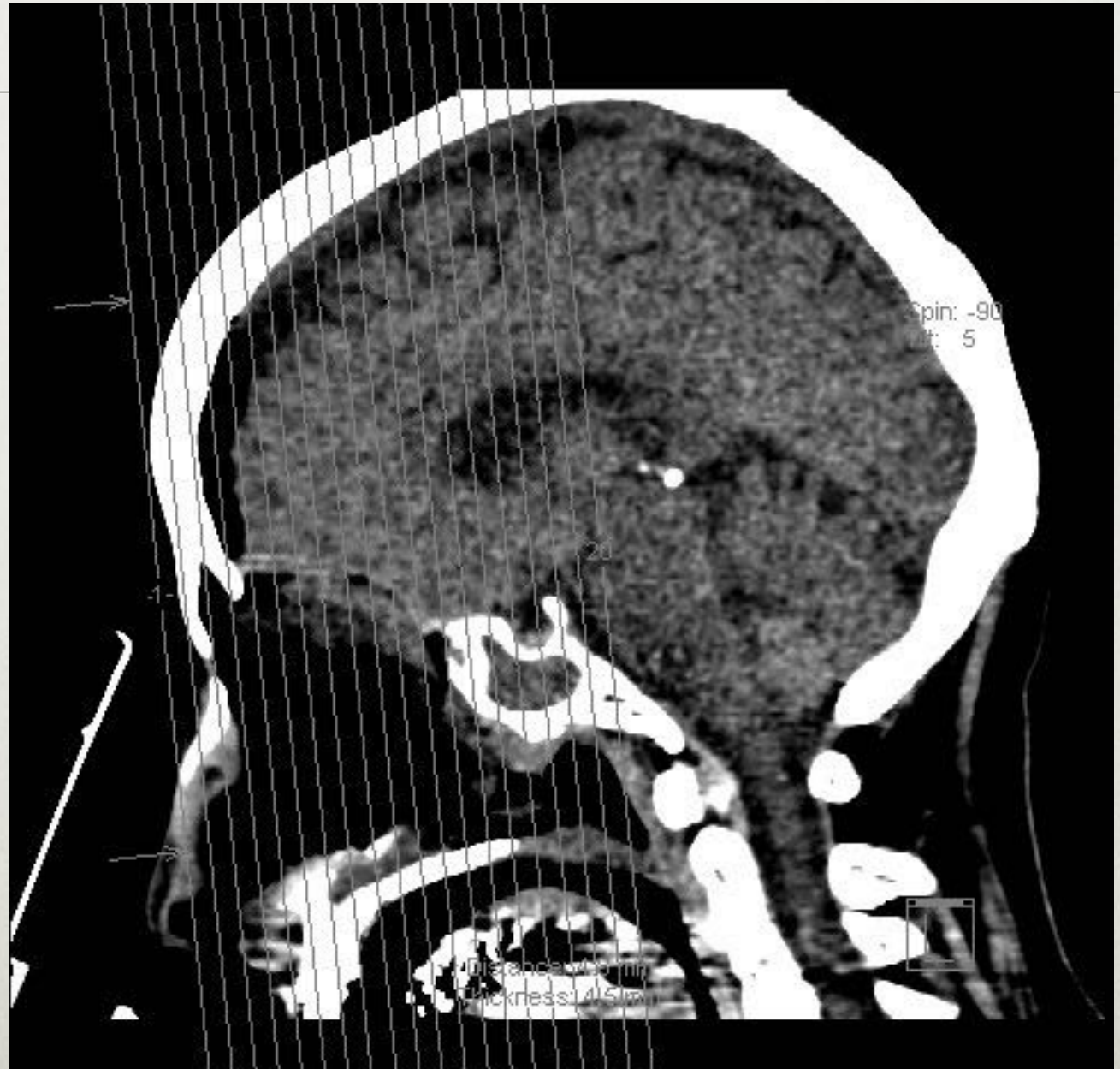

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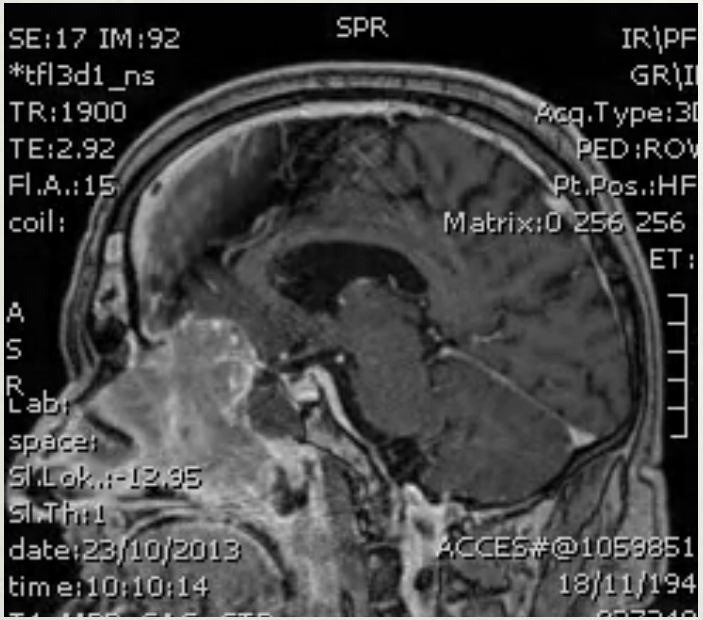
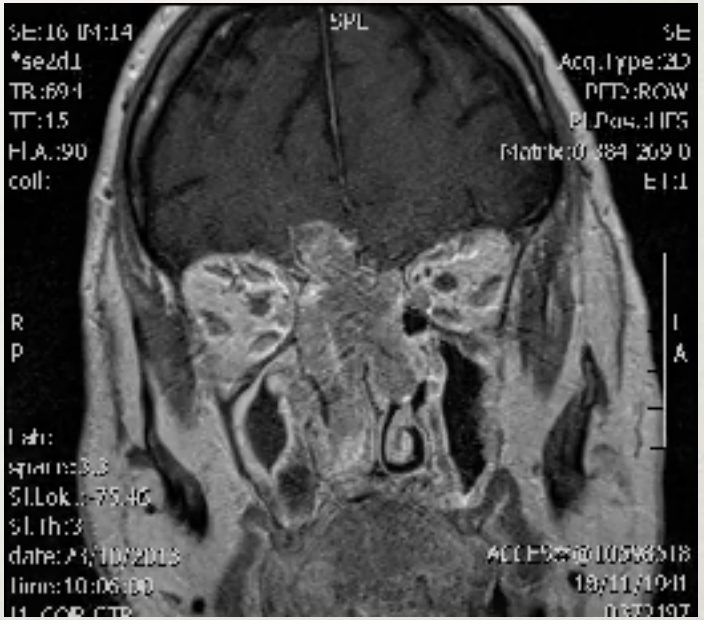
TRANSCRIBRIFORM





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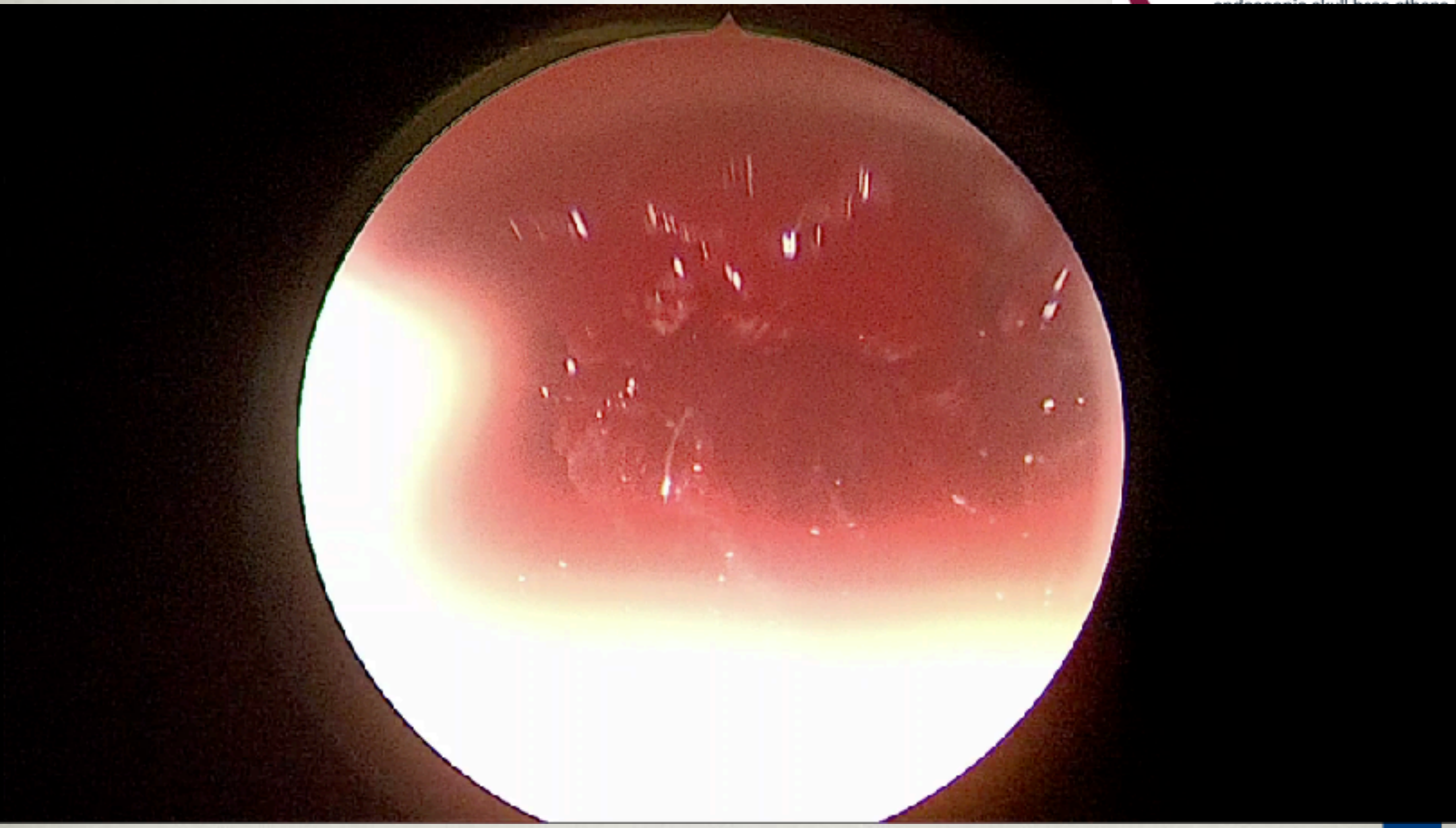
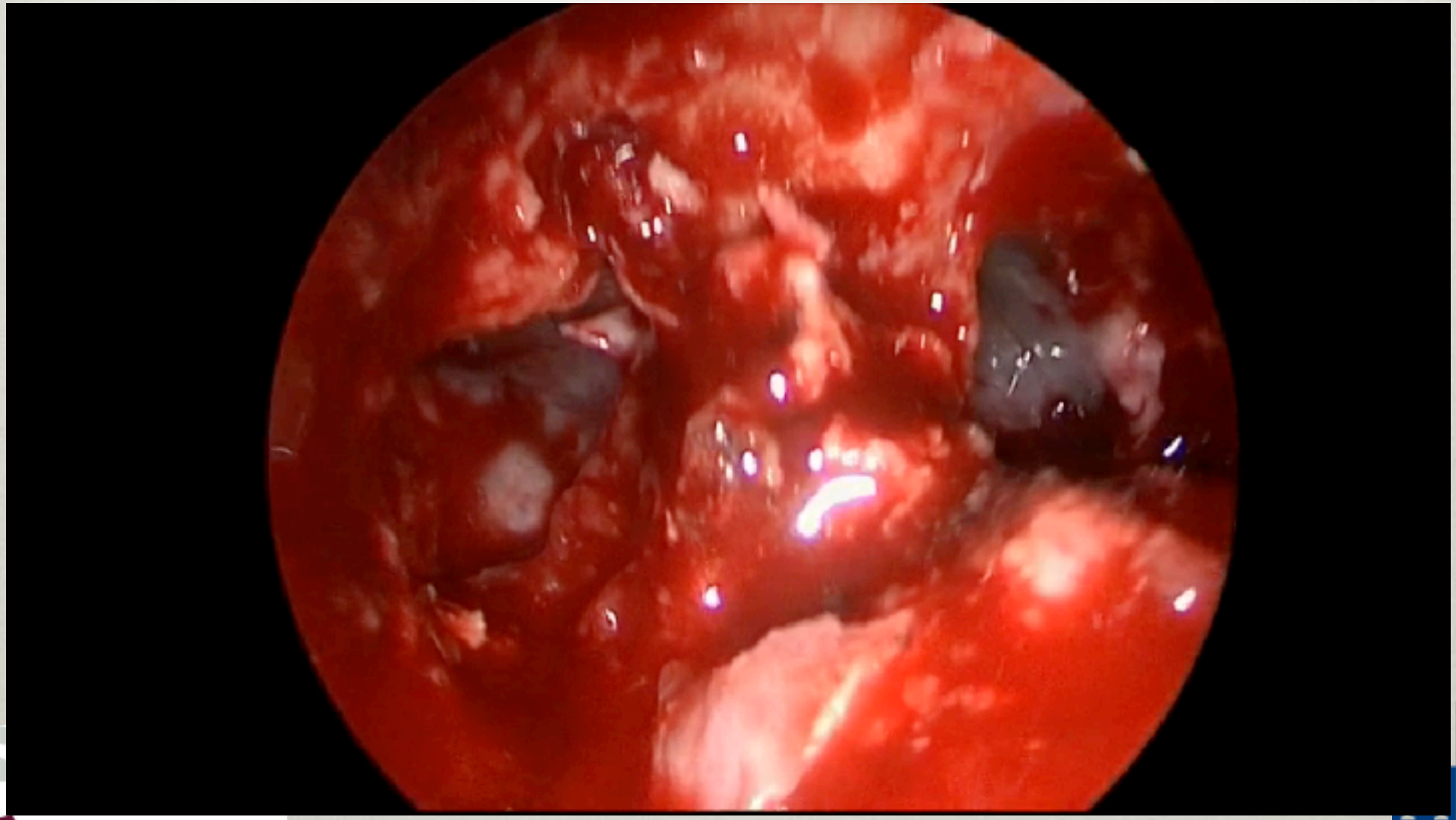
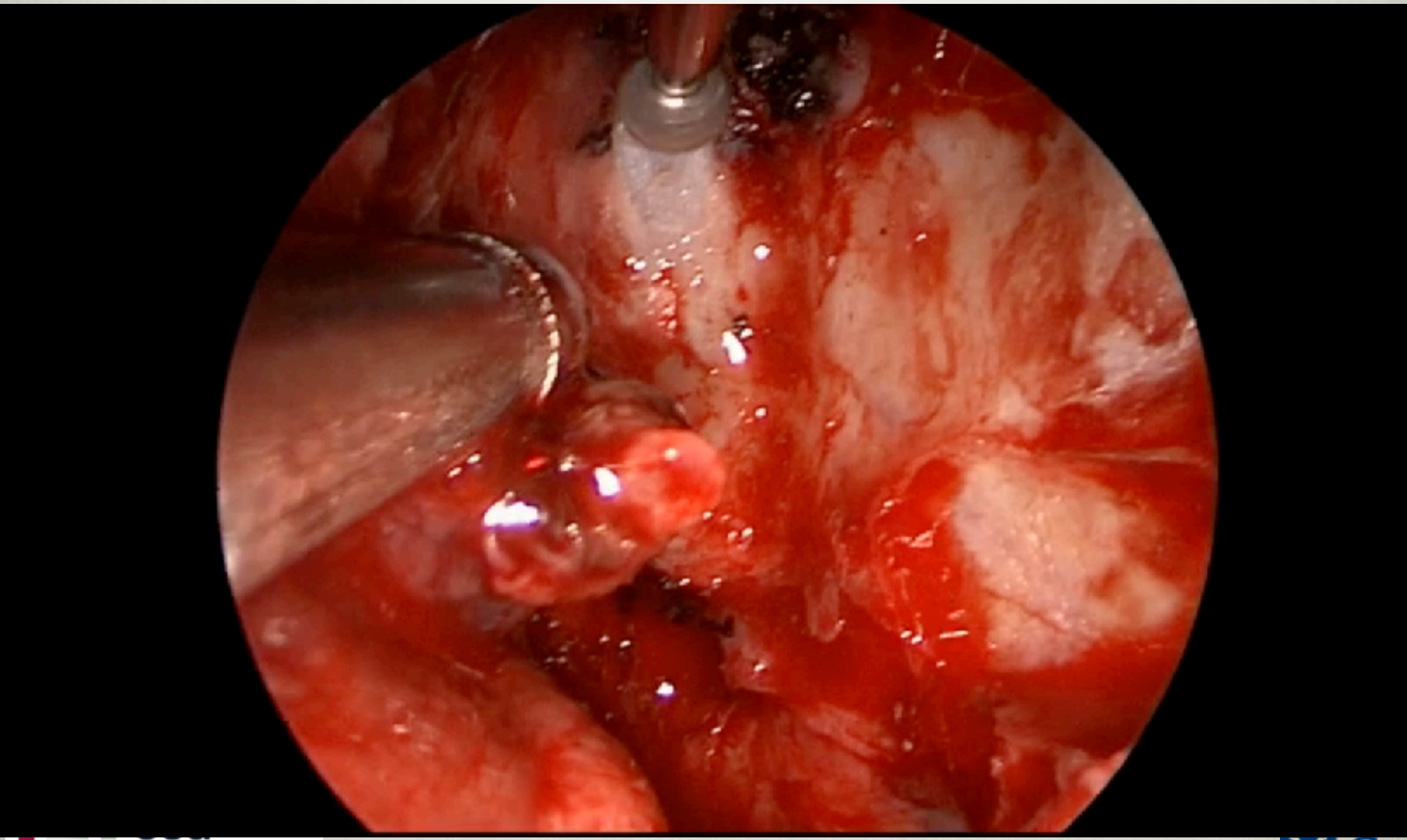
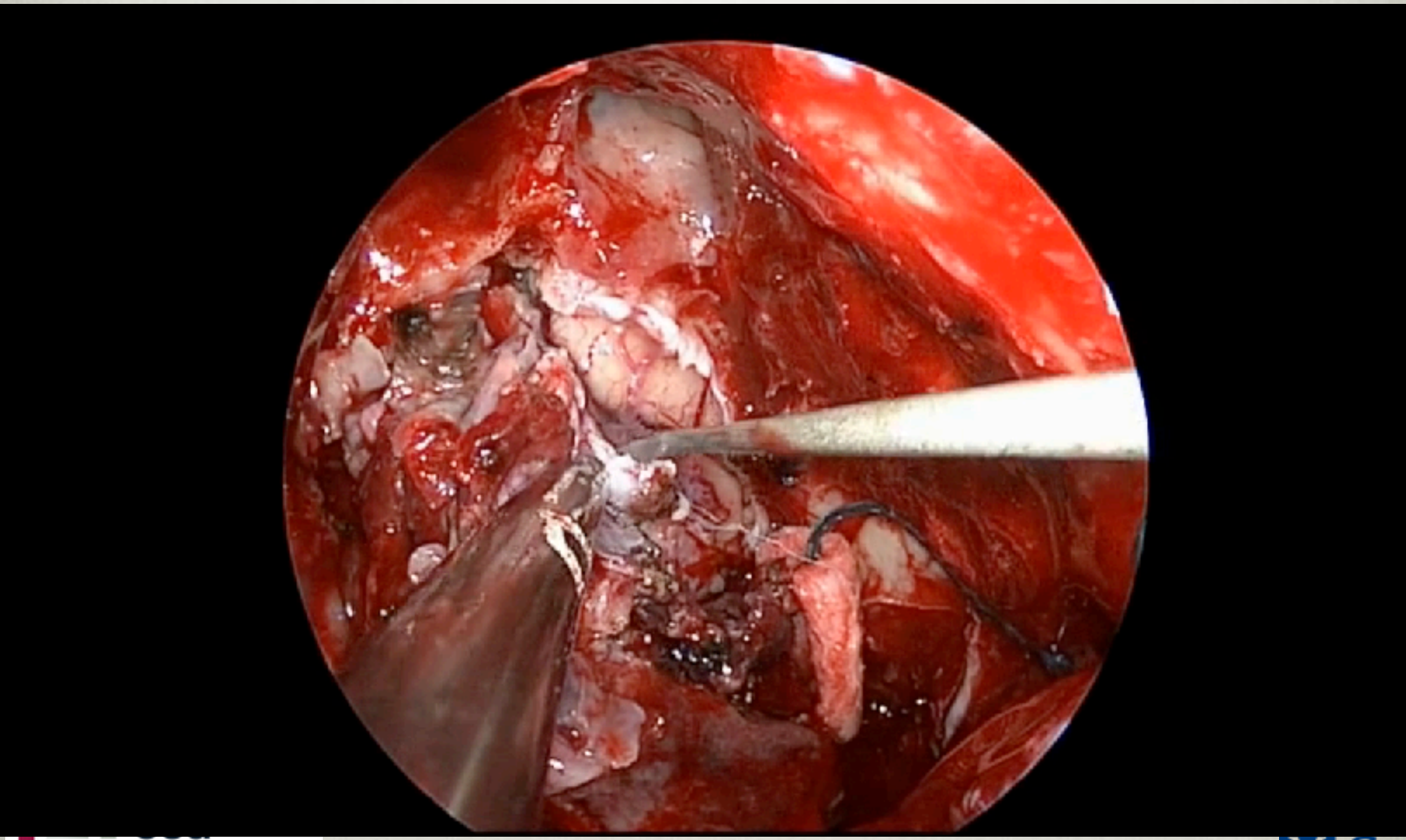
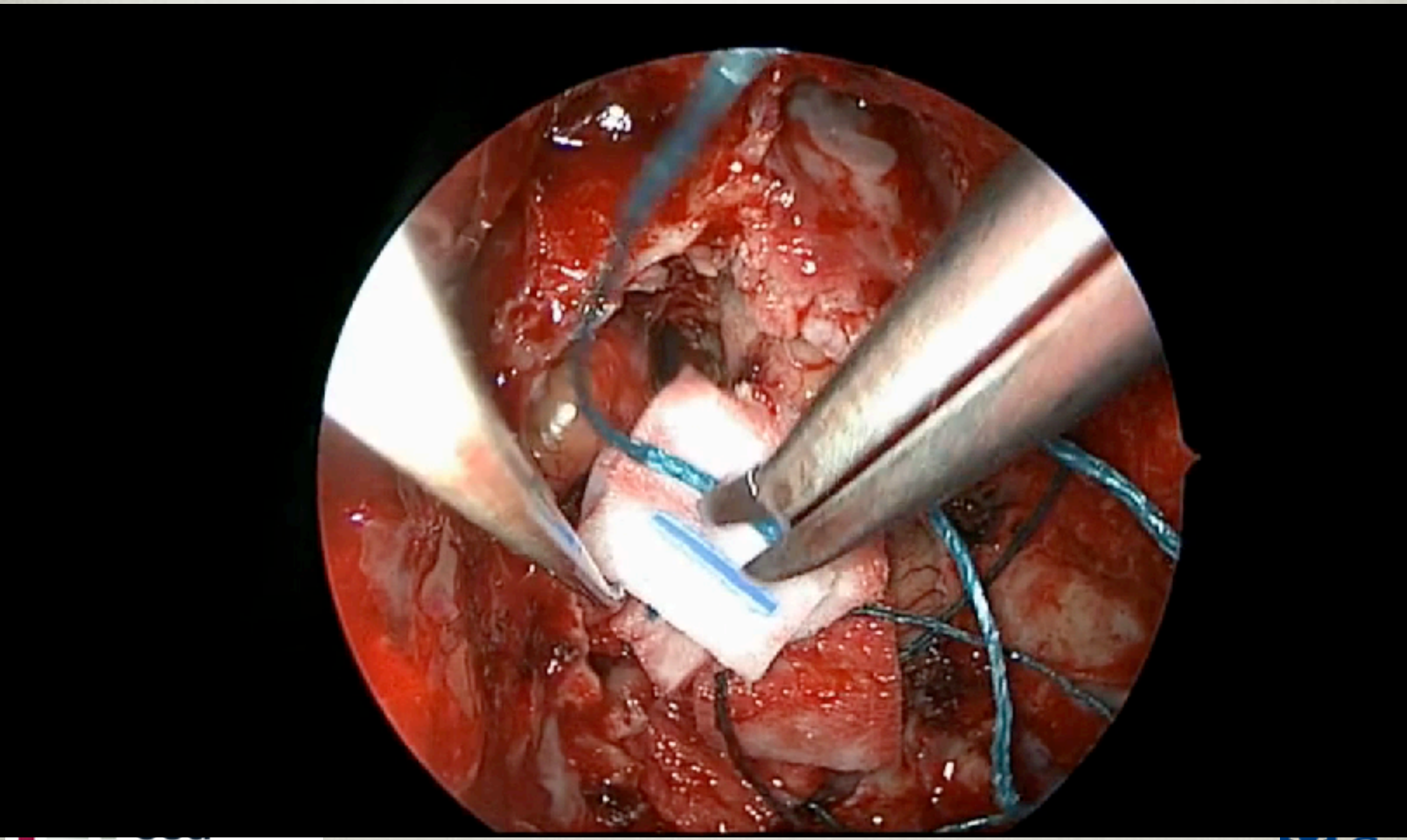


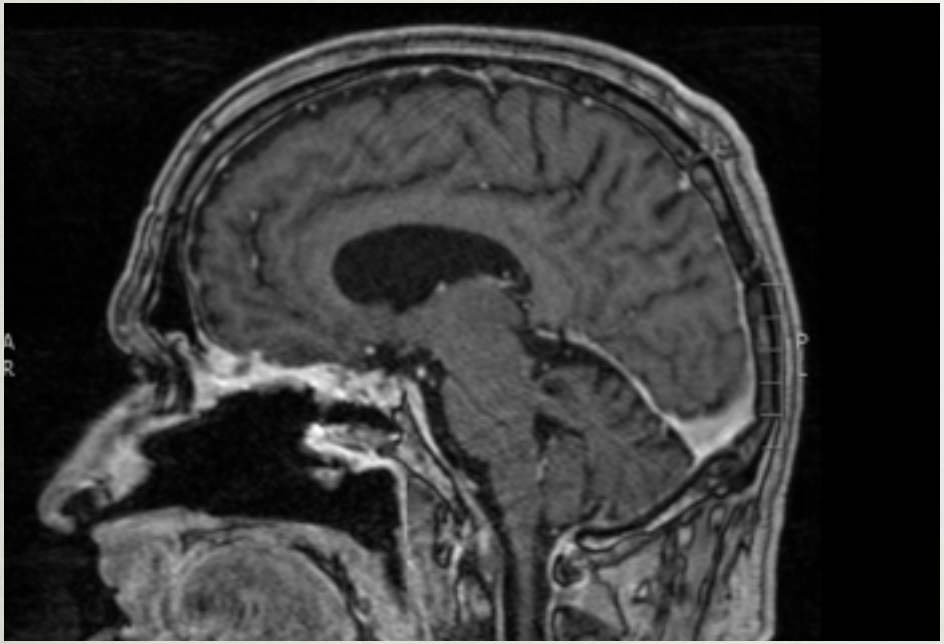
Draf 3 - anterior access

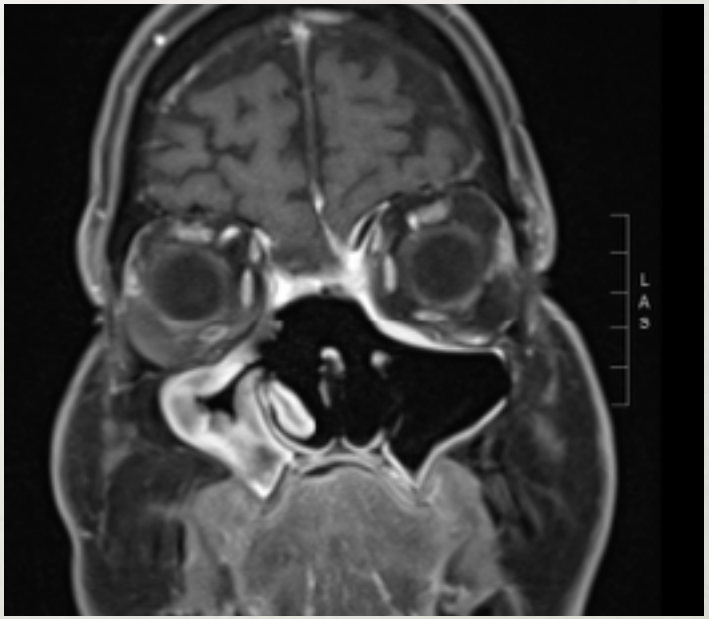












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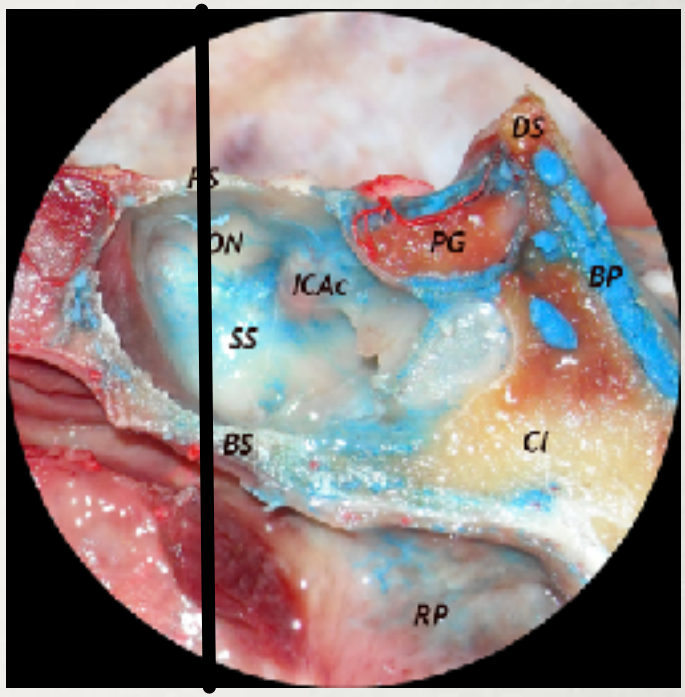
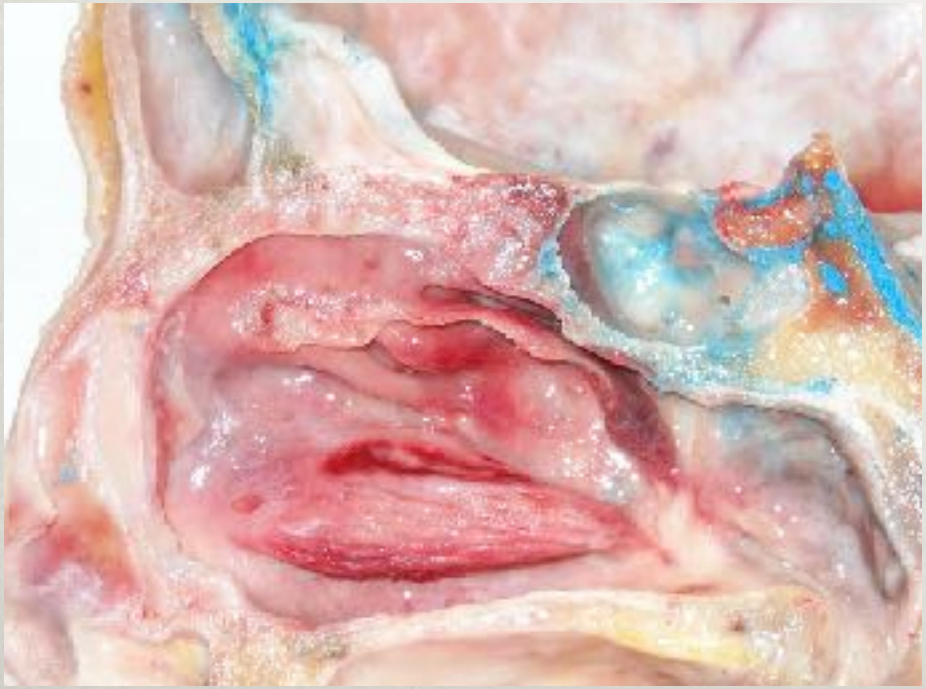
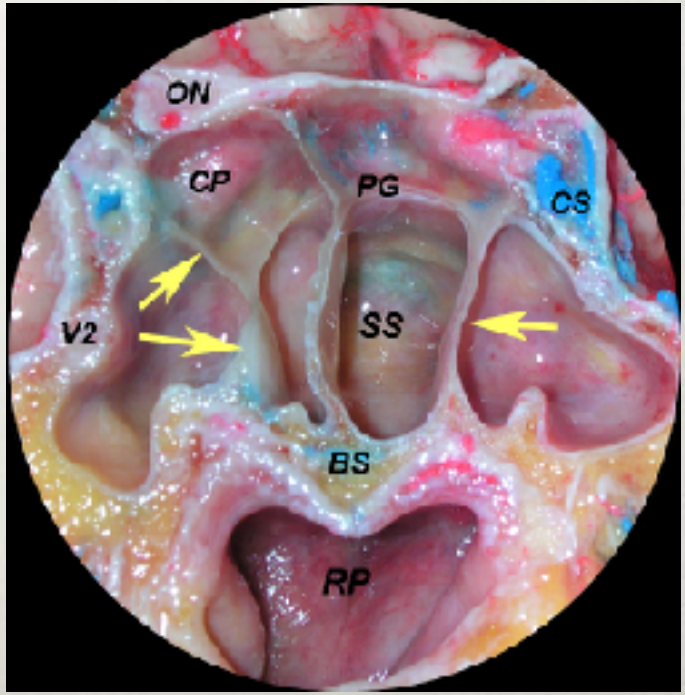
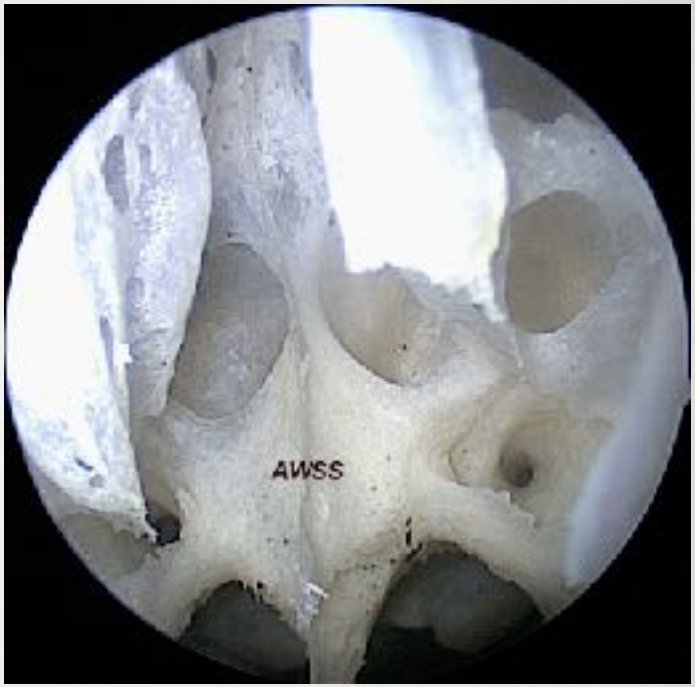
Sphenoid sinus

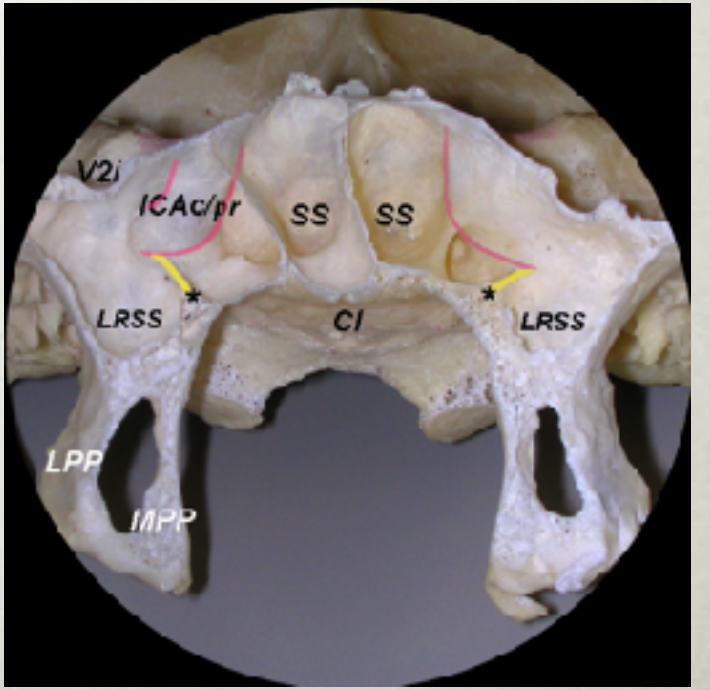






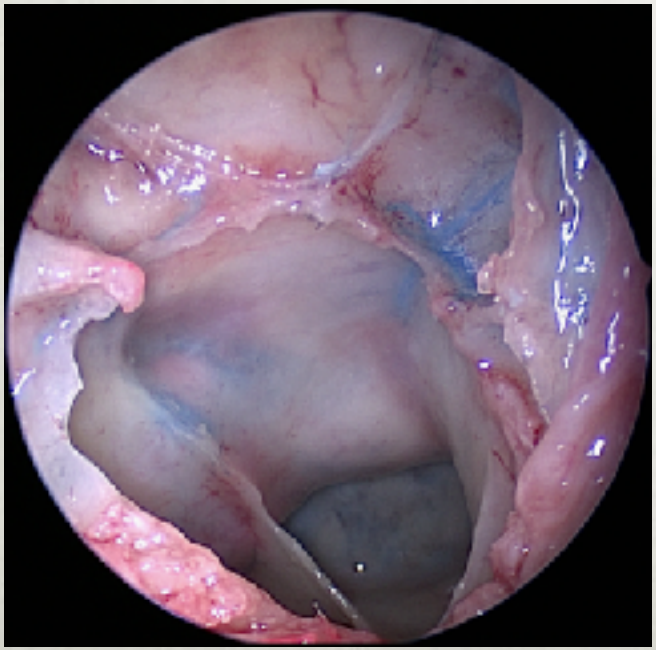
Sphenoid sinus
(osteology)

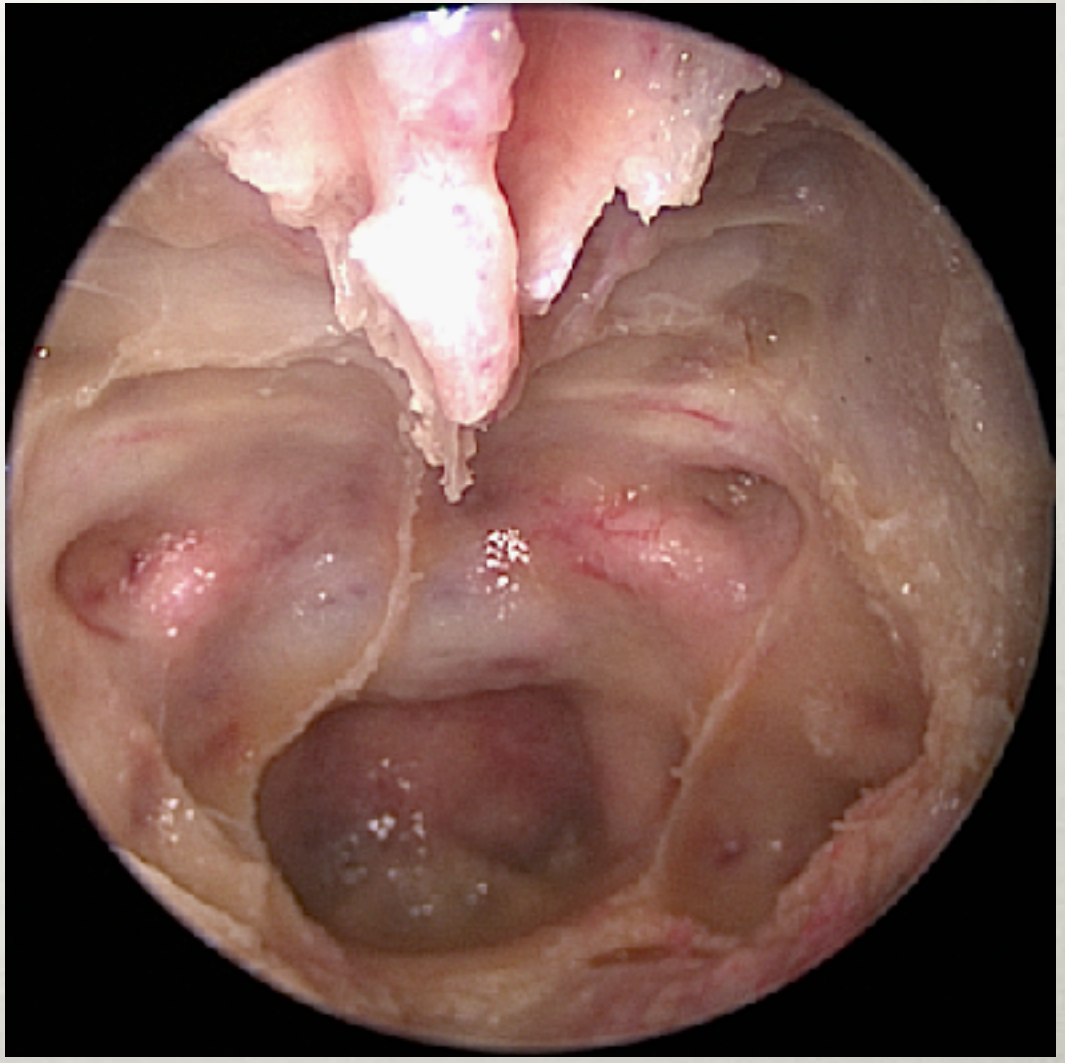




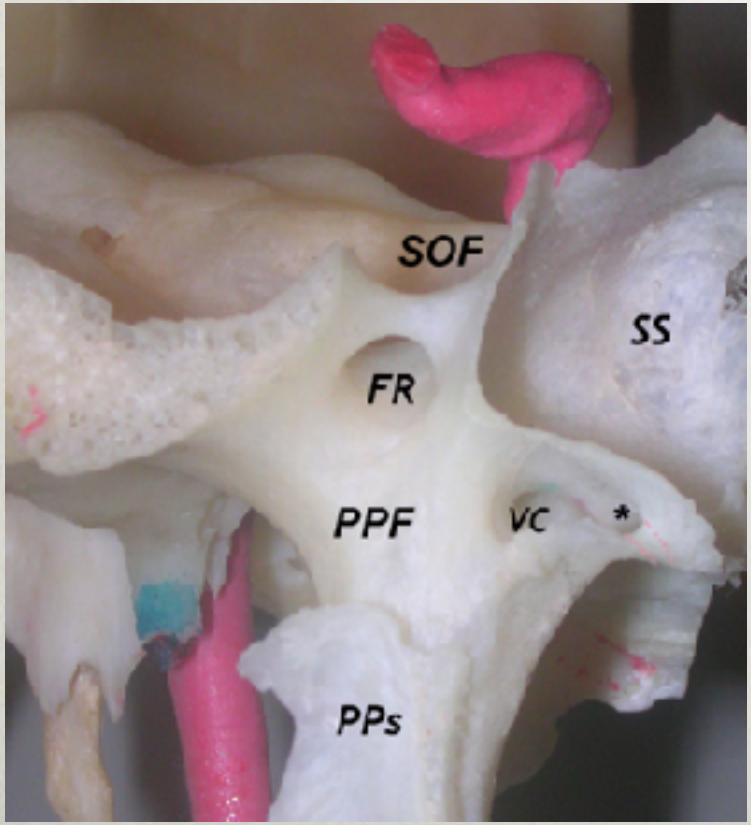
Sphenoid sinus

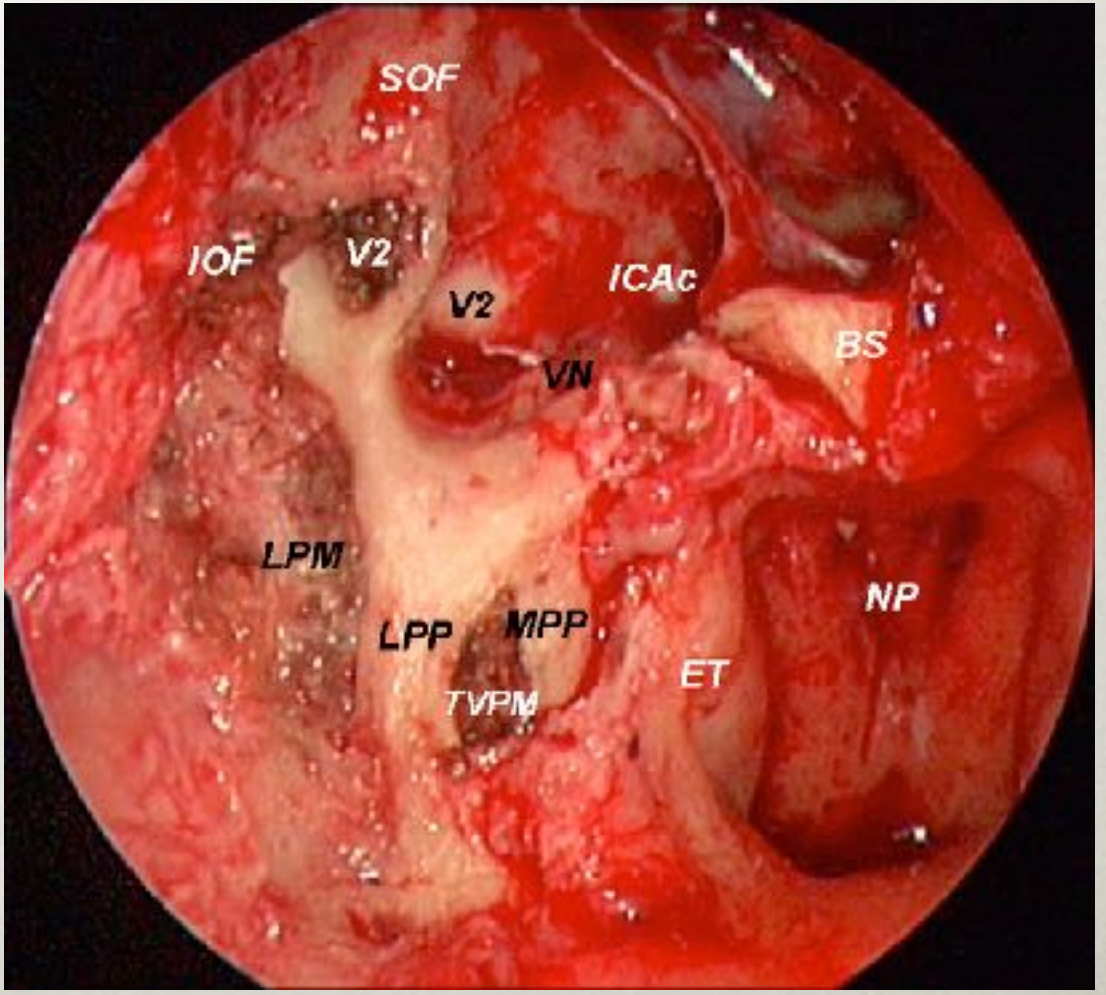
Monolateral vs bilateral





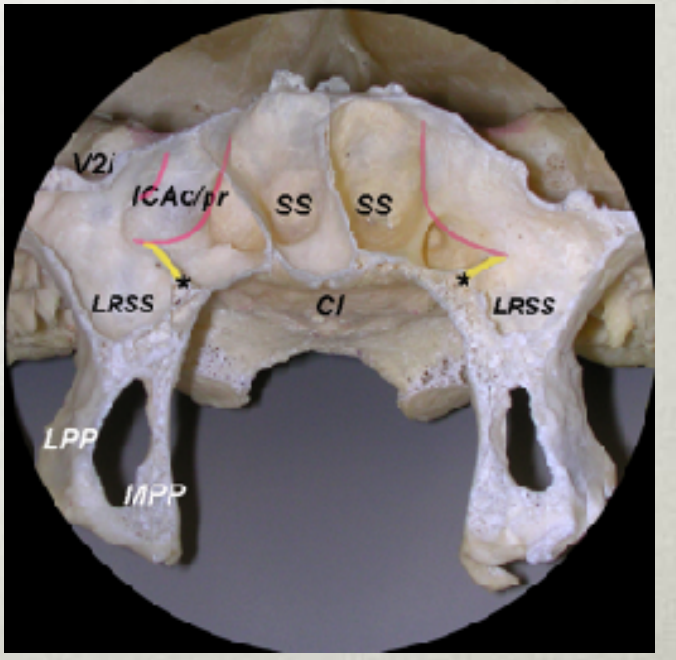
Sphenoid sinus
lateral relationship



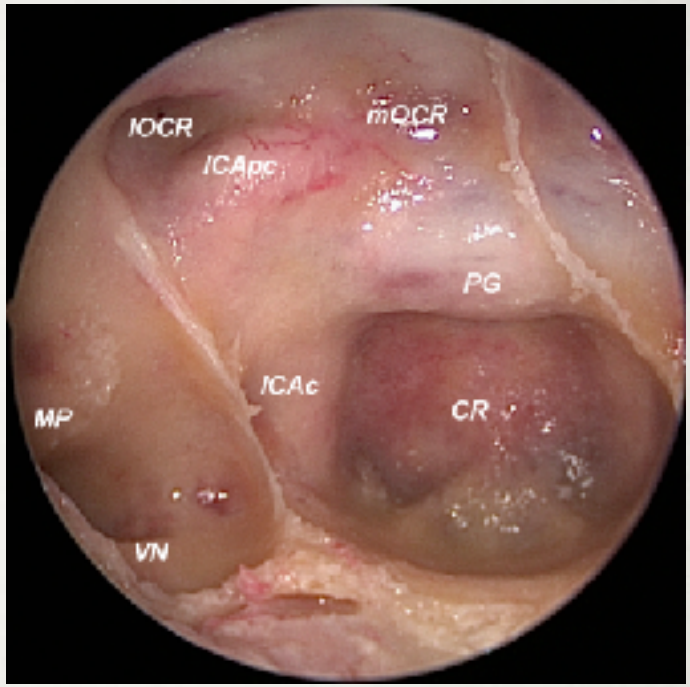


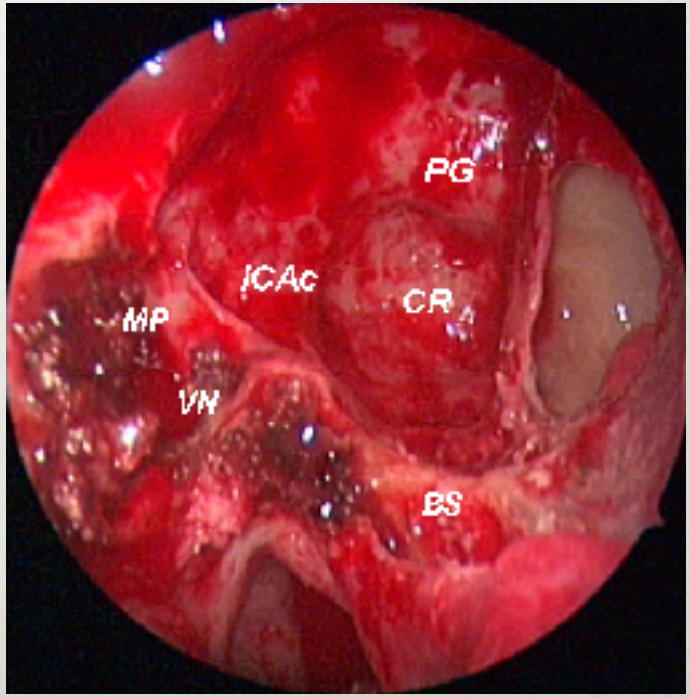
Sphenoid sinus

Different degree of pneumatization



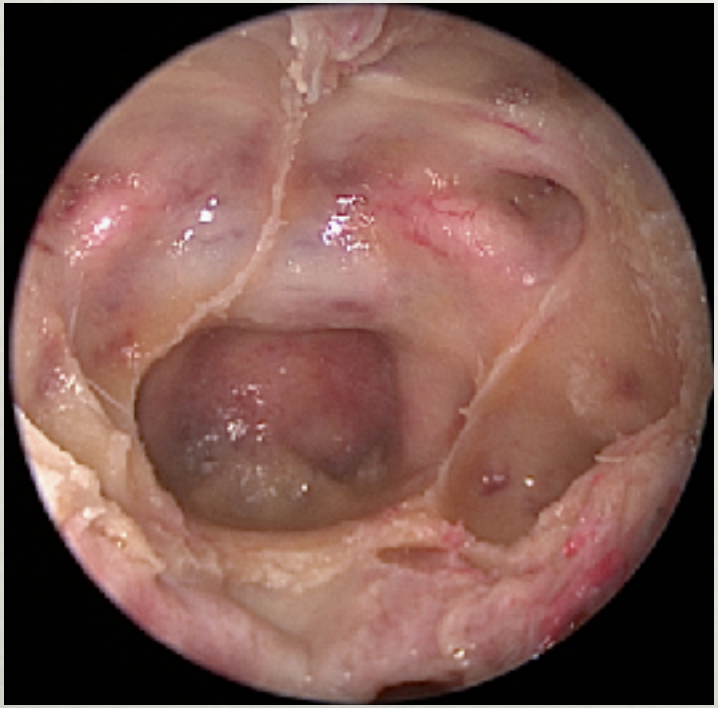
Sphenoid sinus
Lateral recess

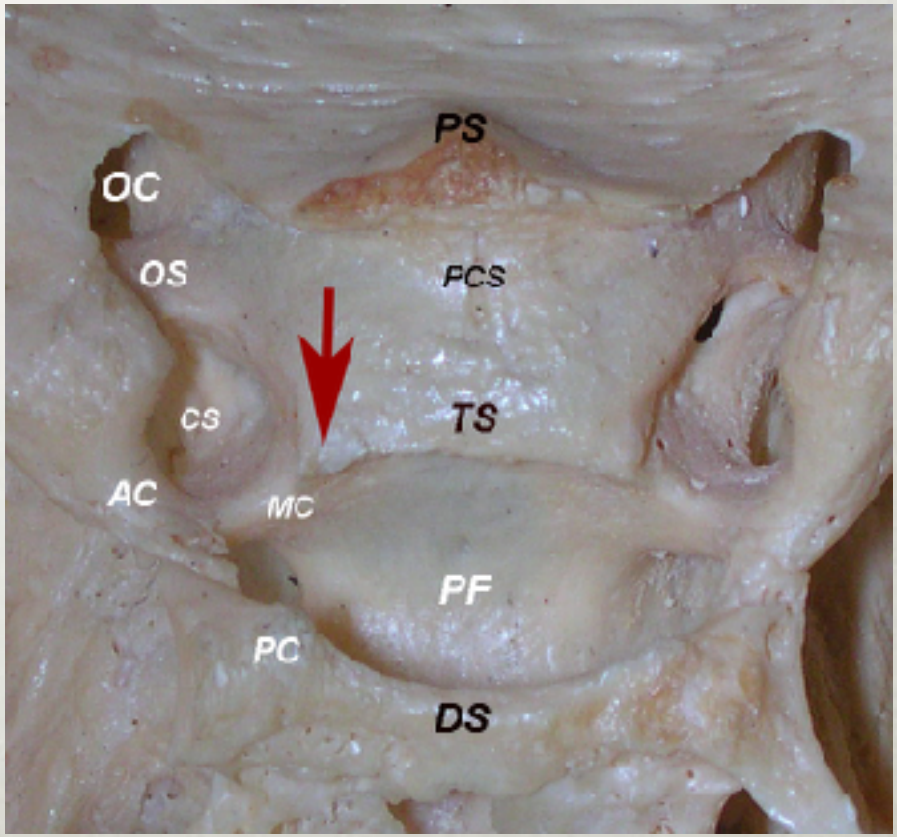




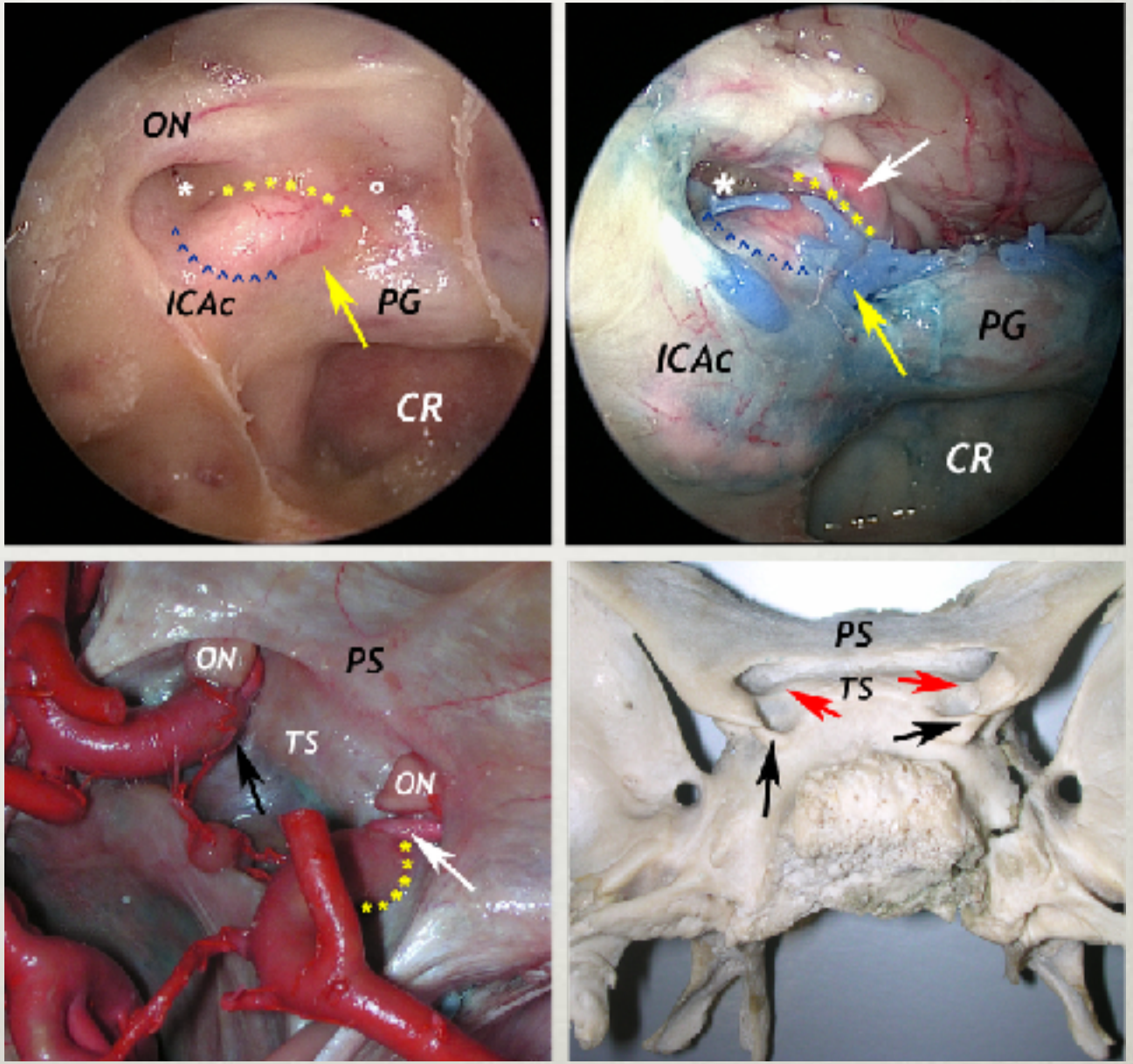
Sphenoid sinus

Below vs above

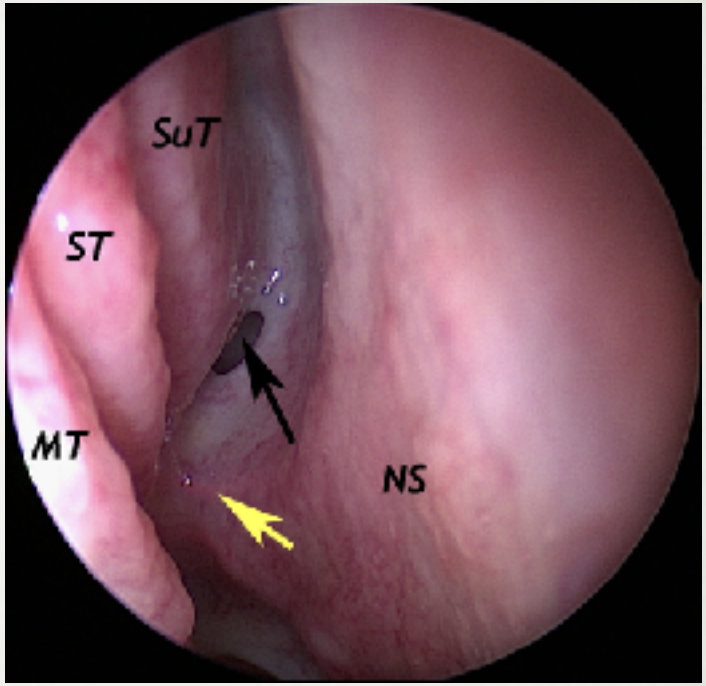


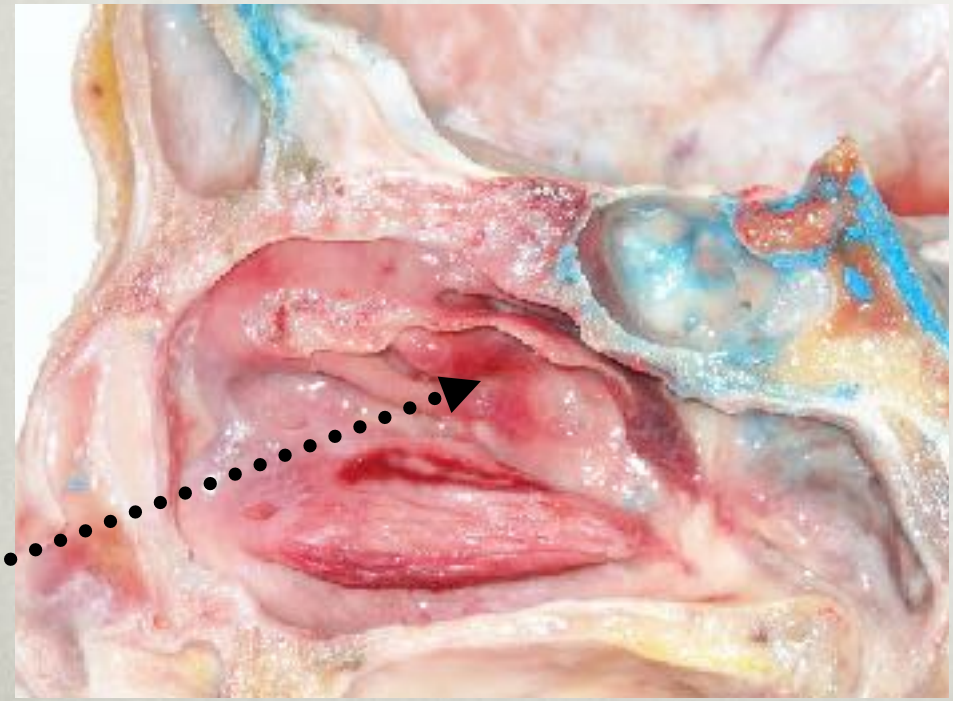


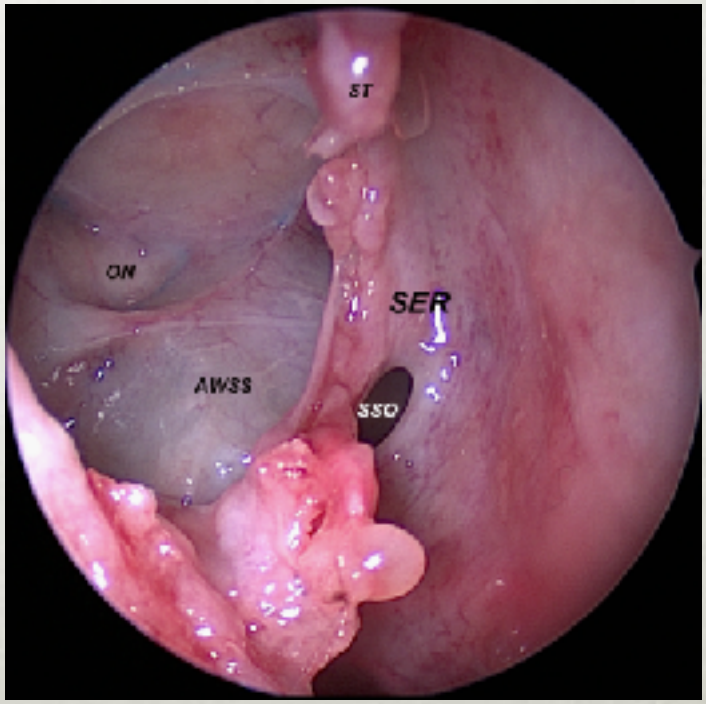
Sphenoid sinus_critical relationship



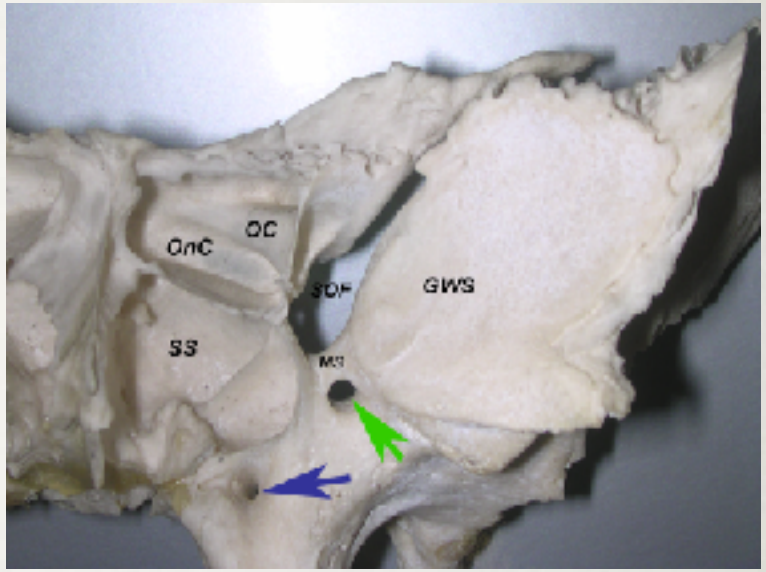
Sphenoethmoidal recess

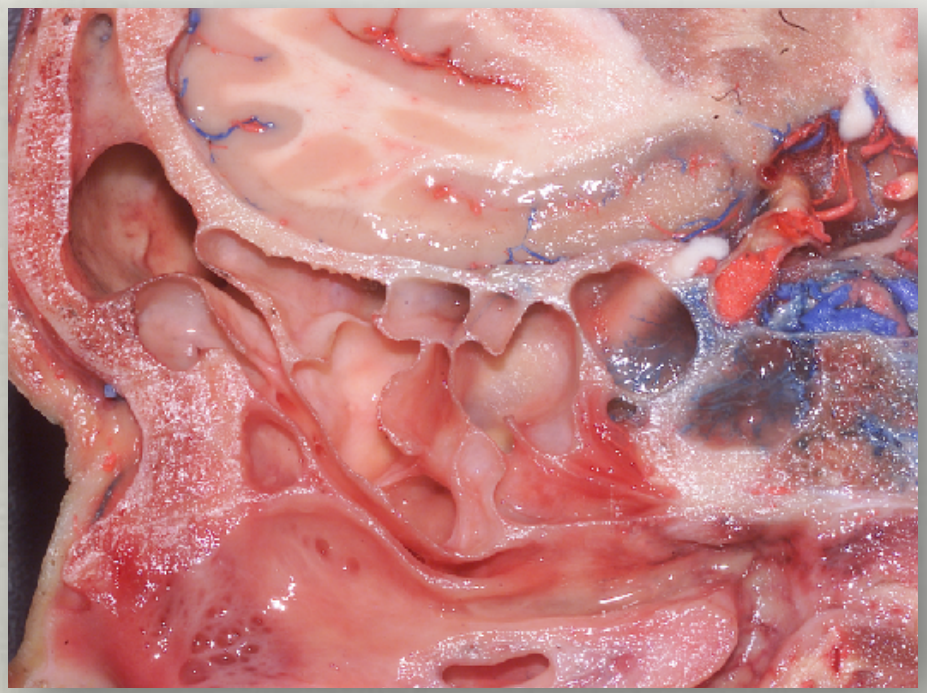


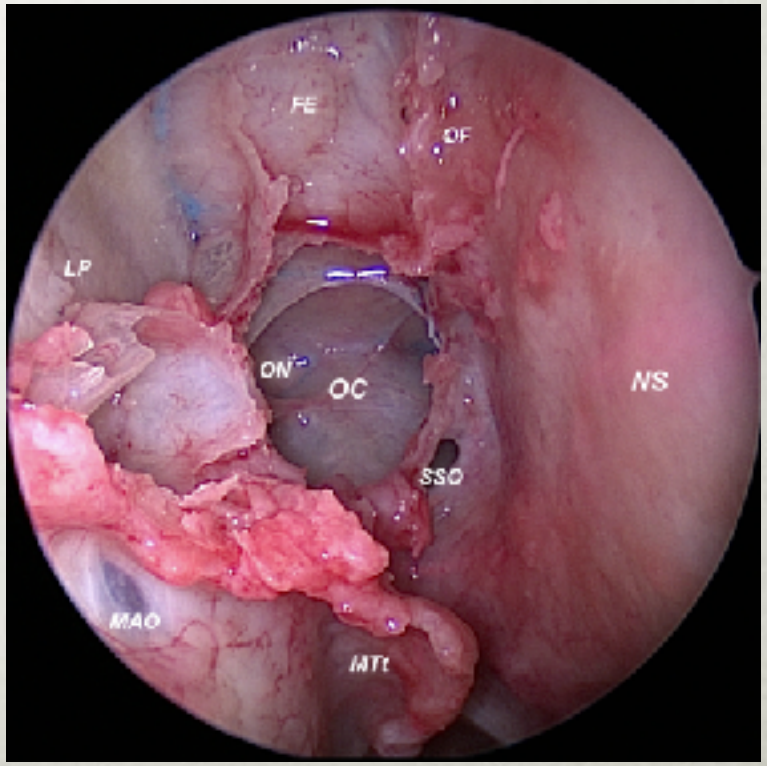




Onodi Cell

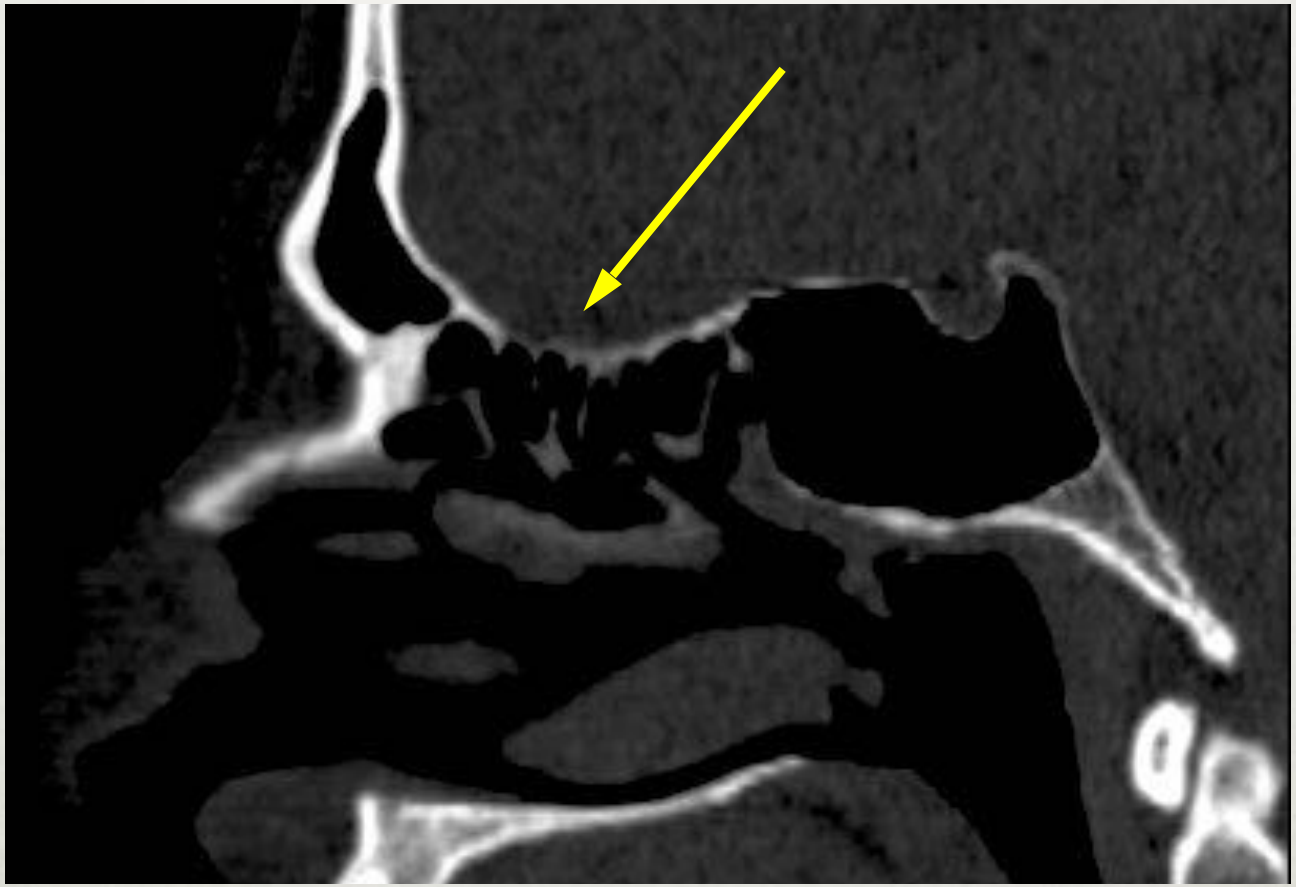






esa
endoscopic skull base athens

ΣΦΗΝΟΕΙΔΉΣ

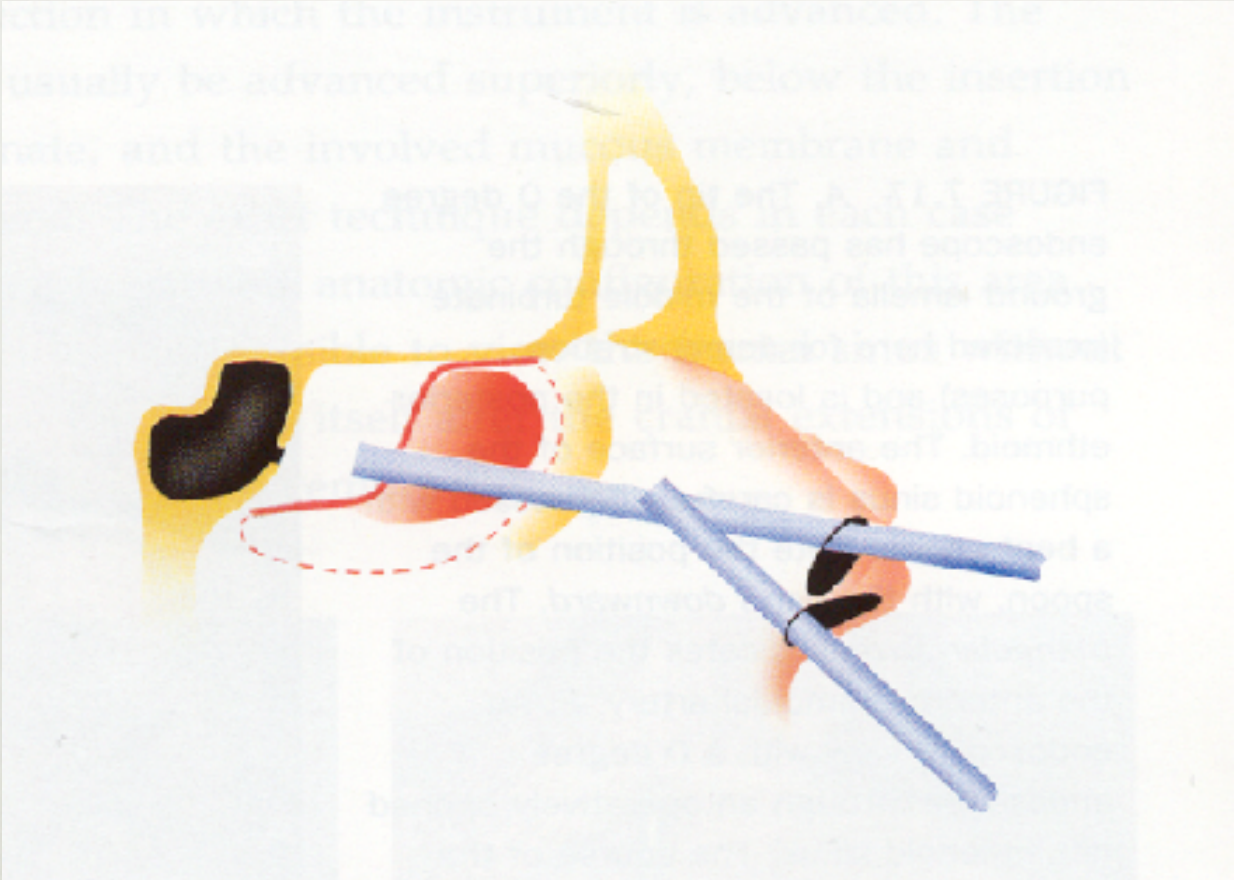


Σφηνοειδεκτομή

- Η πρόσθια επιφάνεια του σφηνοειδούς είναι περιπου 8 εκ από την ρινική άκανθα και σε 15^0 γωνία με την βάση της ρινικής κοιλότητας

esa
endoscopic skull base athens

ΣΦΗΝΟΕΙΔΕΚΤΟΜΉ



Τέσσερεις τρόποι να εισέλθεις στο σφηνοειδή

Α. **Ανω κόγχη**

- Μετακίνησε επί τα εκτός την μέση κόγχη.
- Πίσω και πάνω απο την μέση κόγχη ειναι ορατη η άνω κόγχη.
- Επί τα εντός είναι το στόμιο του σφηνοειδούς

Τέσσερεις τρόποι να εισέλθεις στο σφηνοειδή

Β. Ρινοφάρυγγας-οπίσθιες χοάνες

- Ακολούθησε τον ρινοφάρυγγα
- Βρες την οπίσθια χοάνη (ακριβώς εκεί που απο το οπίσθιο τοιχωμα απο κατακόρυφο γίνεται οριζόντιο)
- 1 με 1.5 εκατοστά πιο πάνω είναι το στομιο (4-5 φορές η διάμετρος αναρόφησης)

Τέσσερεις τρόποι να εισέλθεις στο σφηνοειδή

Γ. Μέσω του ρινικου διαφράγματος –rostrum (πιο ασφαλής)

- Αφαίρεσε τον βλενογόνο από το rostrum
- Ακολούθησε το οστό προς τα πλάγια
- Το στόμιο είναι 0.5 – 1 εκ από το διάφραγμα

Τέσσερεις τρόποι να εισέλθεις στο σφηνοειδή

Και ο λιγότερος ασφαλής τρόπος

Δ: Μέσω οπισθιων ηθμοειδών

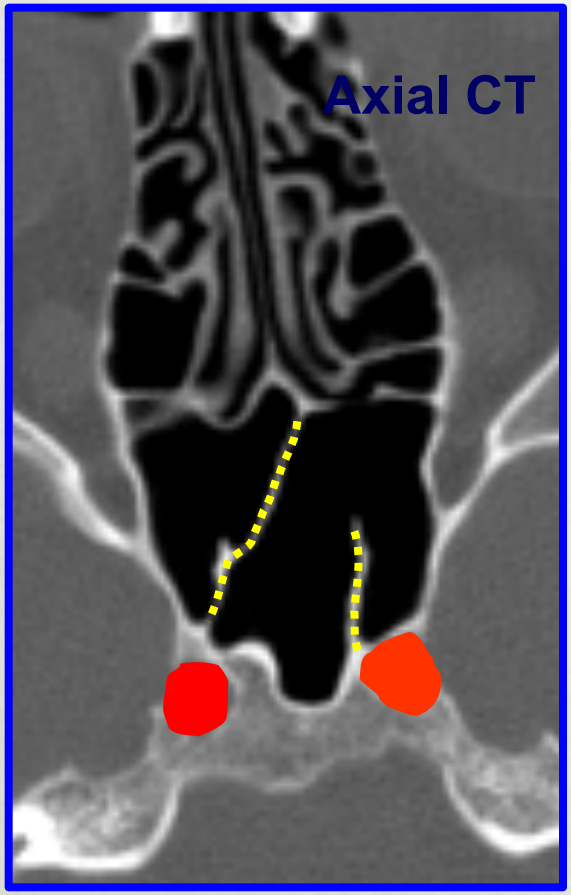
Διάτρησε τη τελευταία ηθμοειδή κυψέλη σε κατεύθυνση οπίσθια και μέση – ΑΝΤΕΝΔΥΚΝΕΙΤΑΙ!!!

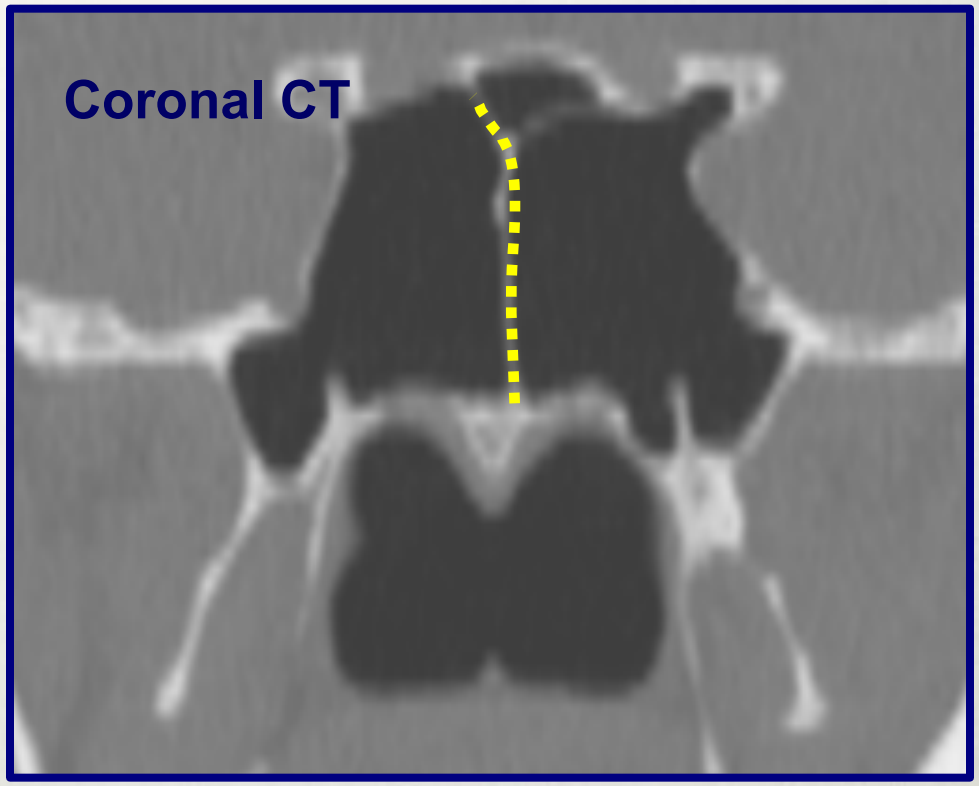
ΣΦΗΝΟΕΙΔΕΚΤΟΜΉ

Ο οπίσθιος ρινικός κλάδος της πτερυγουπερώιας αρτηρίας διατρέχει το πρόσθιο τοίχωμα του σφηνοειδούς

Ενοχλητική αιμοραγία

Διαφραγμάτια του σφηνοειδούς

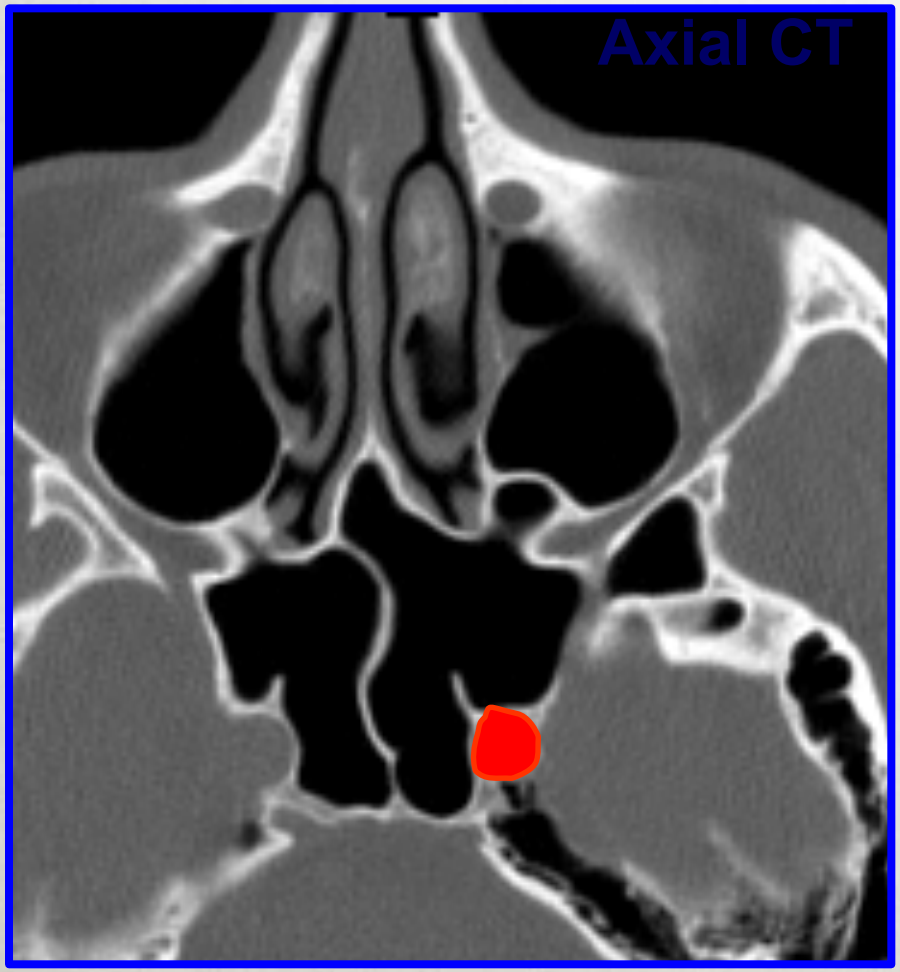


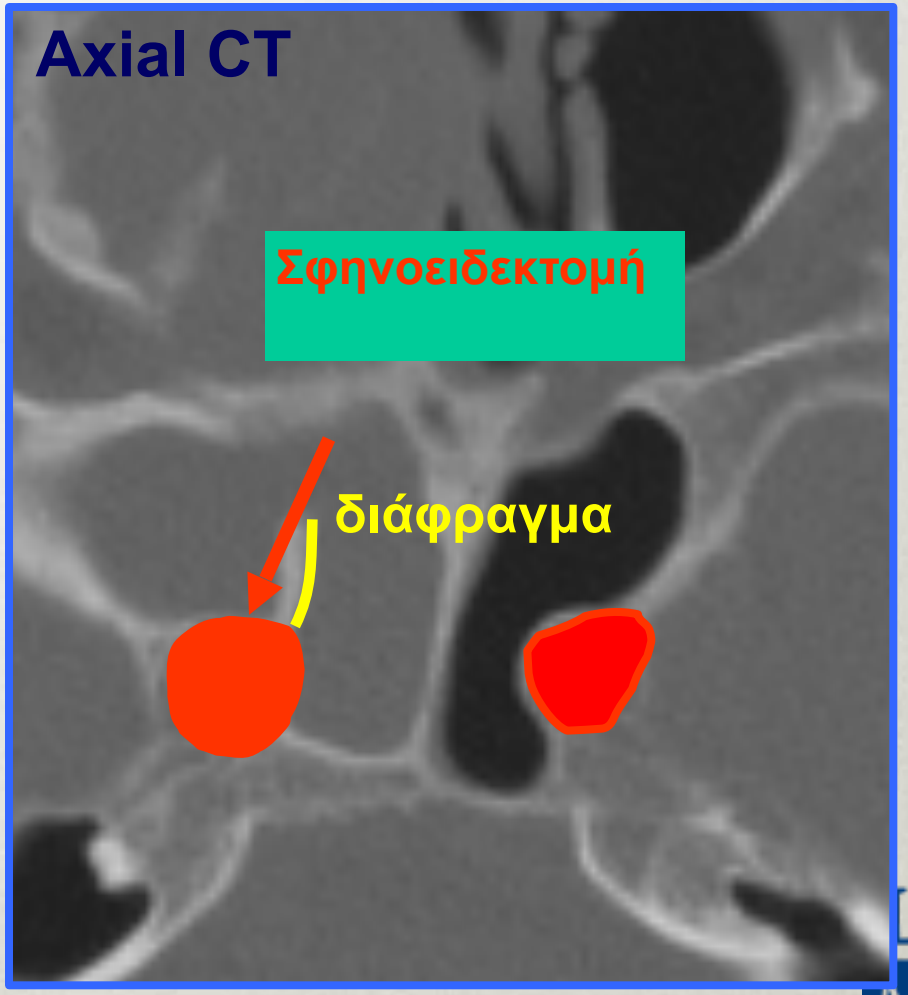


Προ – εφιππίου τμήμα της έσω καρωτίδας

Η έσω καρωτίδα είναι ευάλωτη

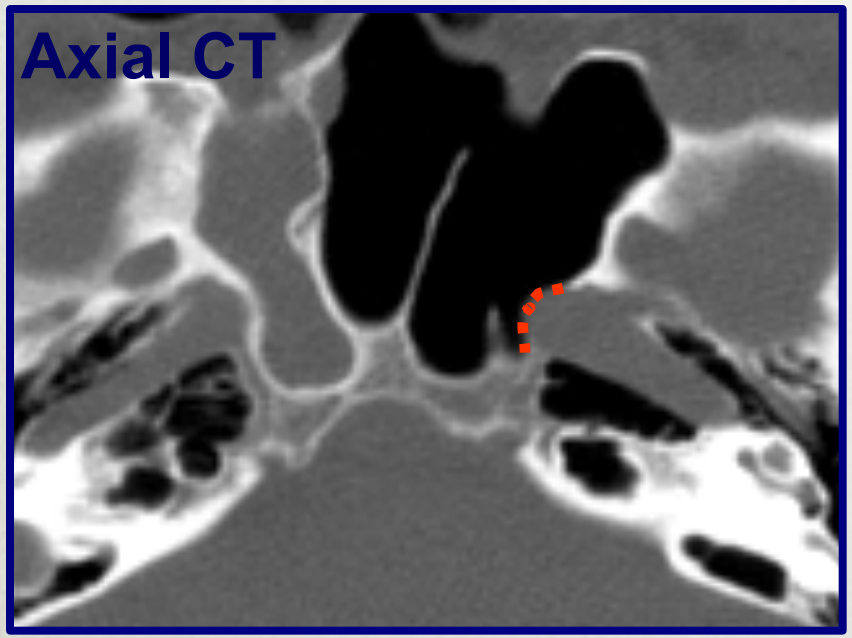
Η έσω καρωτίδα μπορεί να προβάλλει ή να μην καλύπτεται με οστό
Τα διαφραγμάτια σχεδόν πάντα καταλήγουν στην έσω καρωτίδα

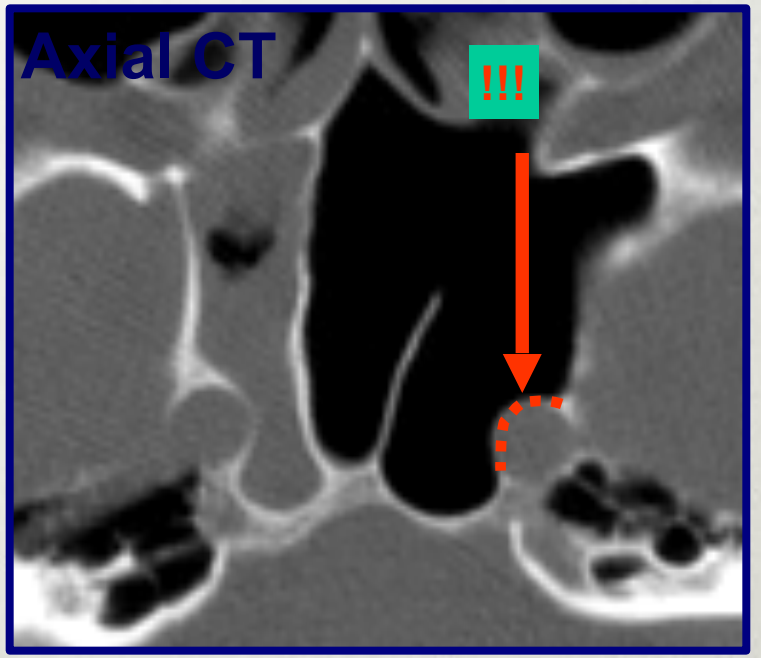




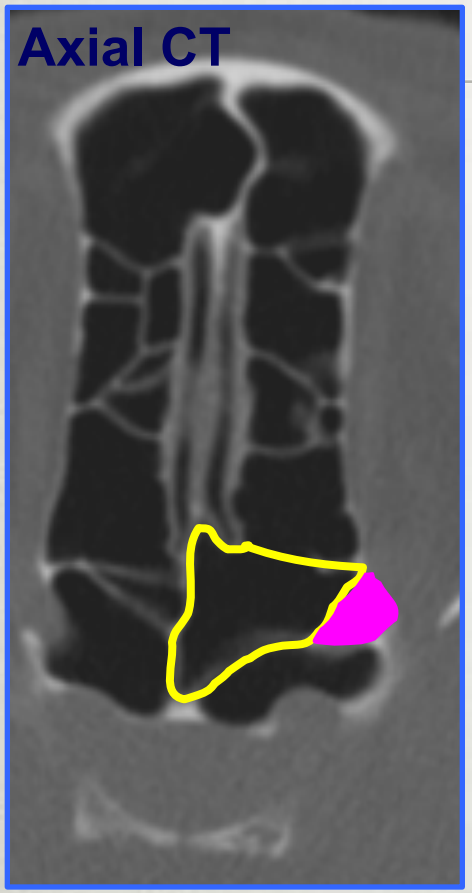
Η έσω καρωτίδα είναι ευάλωτη !

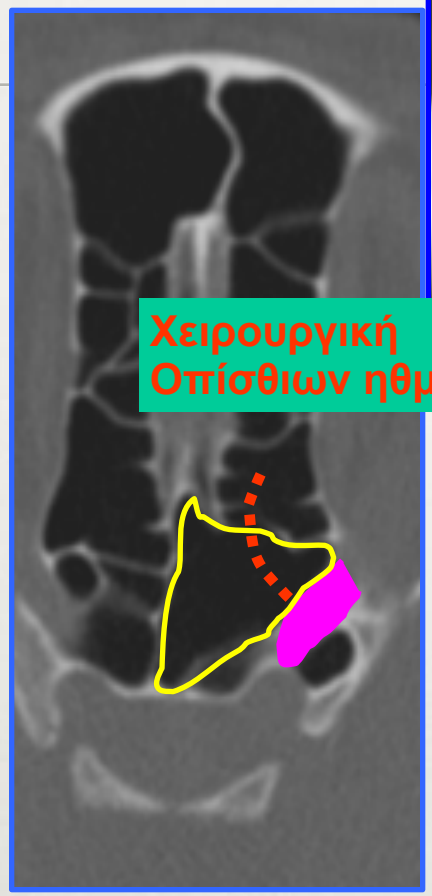
Dehiscent κανάλι καρωτίδας (8%)



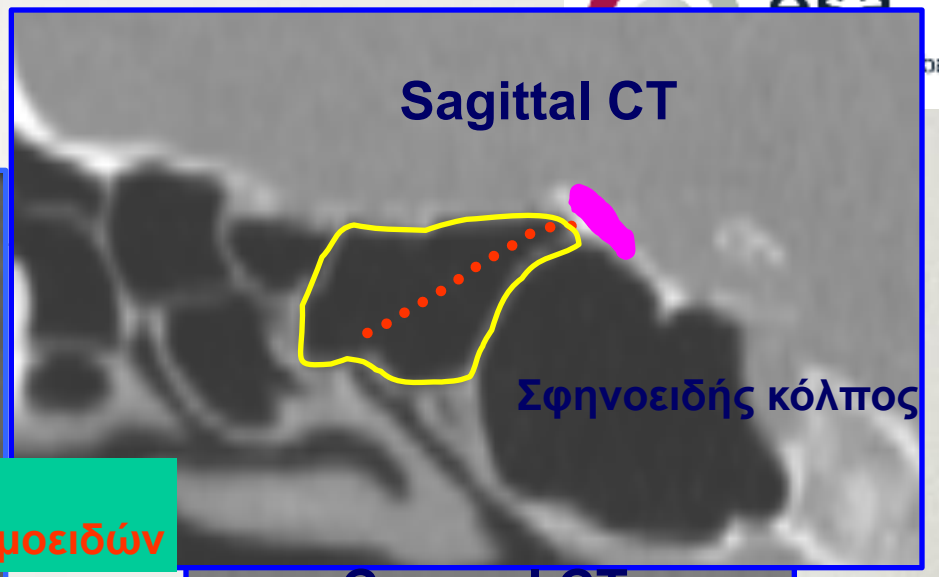


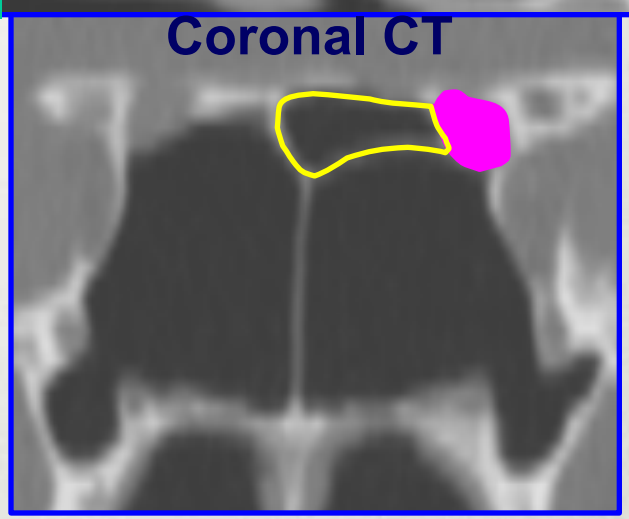
Κυψέλη Onodi





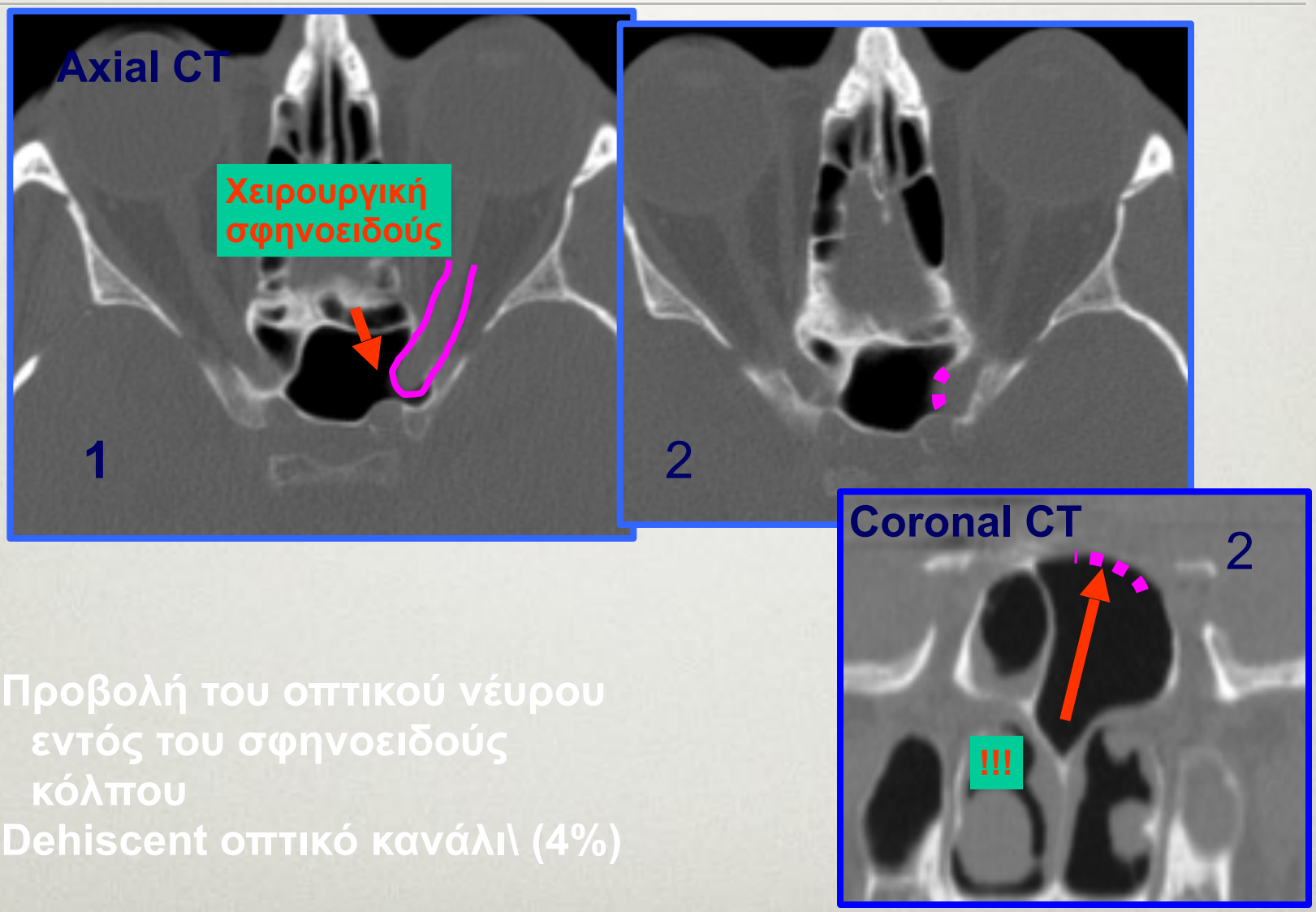
Χειρουργική
Οπίσθιων ηθμοειδών





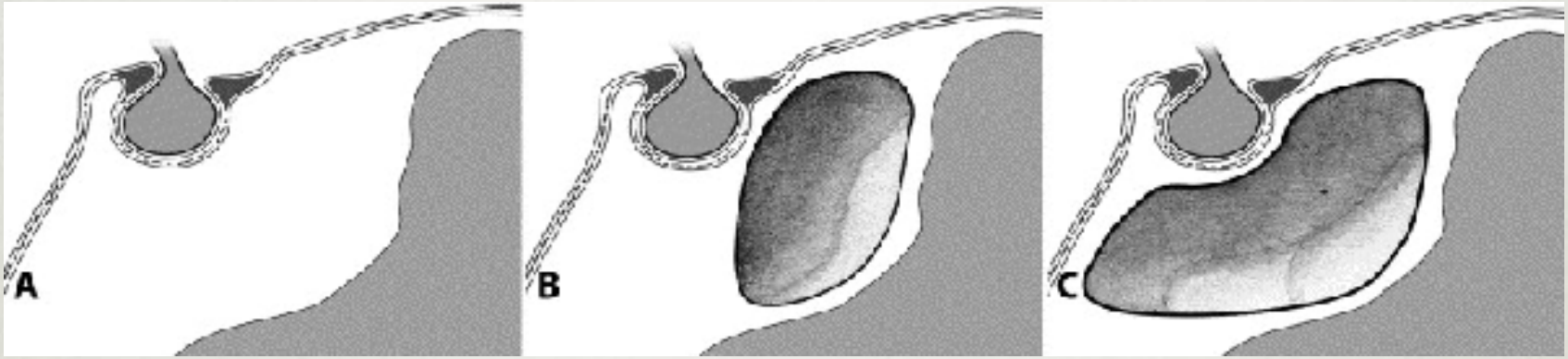
Οπίσθια ηθμοειδής κυψέλη που επεκτείνεται μέσα στο σφηνοειδή κόλπο και περιέχει το οπτικό νεύρο

Το οπτικό νεύρο είναι ευάλωτο!



1. Προβολή του οπτικού νεύρου εντός του σφηνοειδούς κόλπου
2. Dehiscent οπτικό κανάλι\ (4%)

Τυποι πνευμάτωσης του σφηνοειδούς



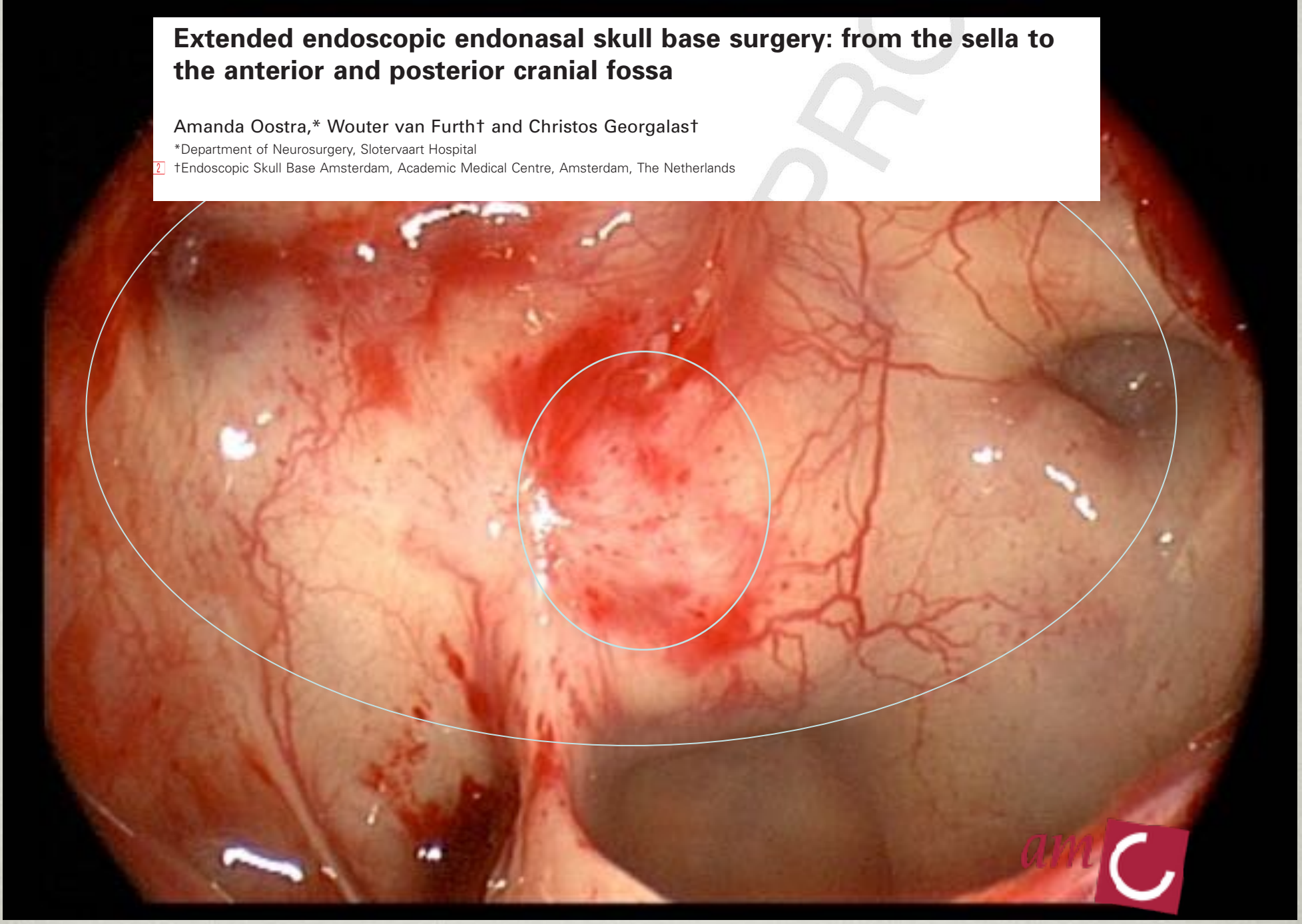
A. Κογχικός (Conchal) B. Προ εφιπιακός (Pre-sellar)
C.Εφιπτπιακός (Sellar)

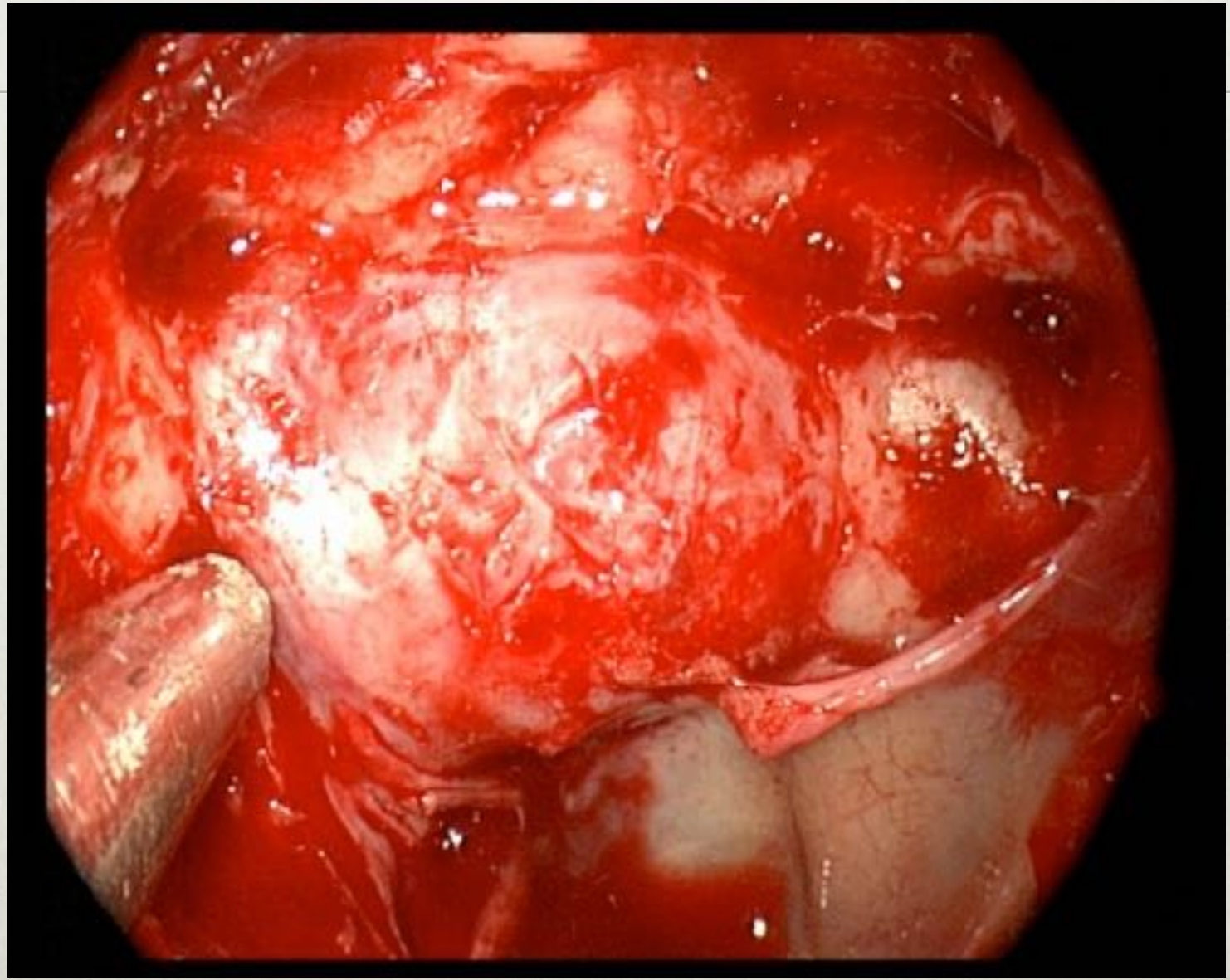
Extended endoscopic endonasal skull base surgery: from the sella to the anterior and posterior cranial fossa

Amanda Oostra,* Wouter van Furth† and Christos Georgalas†

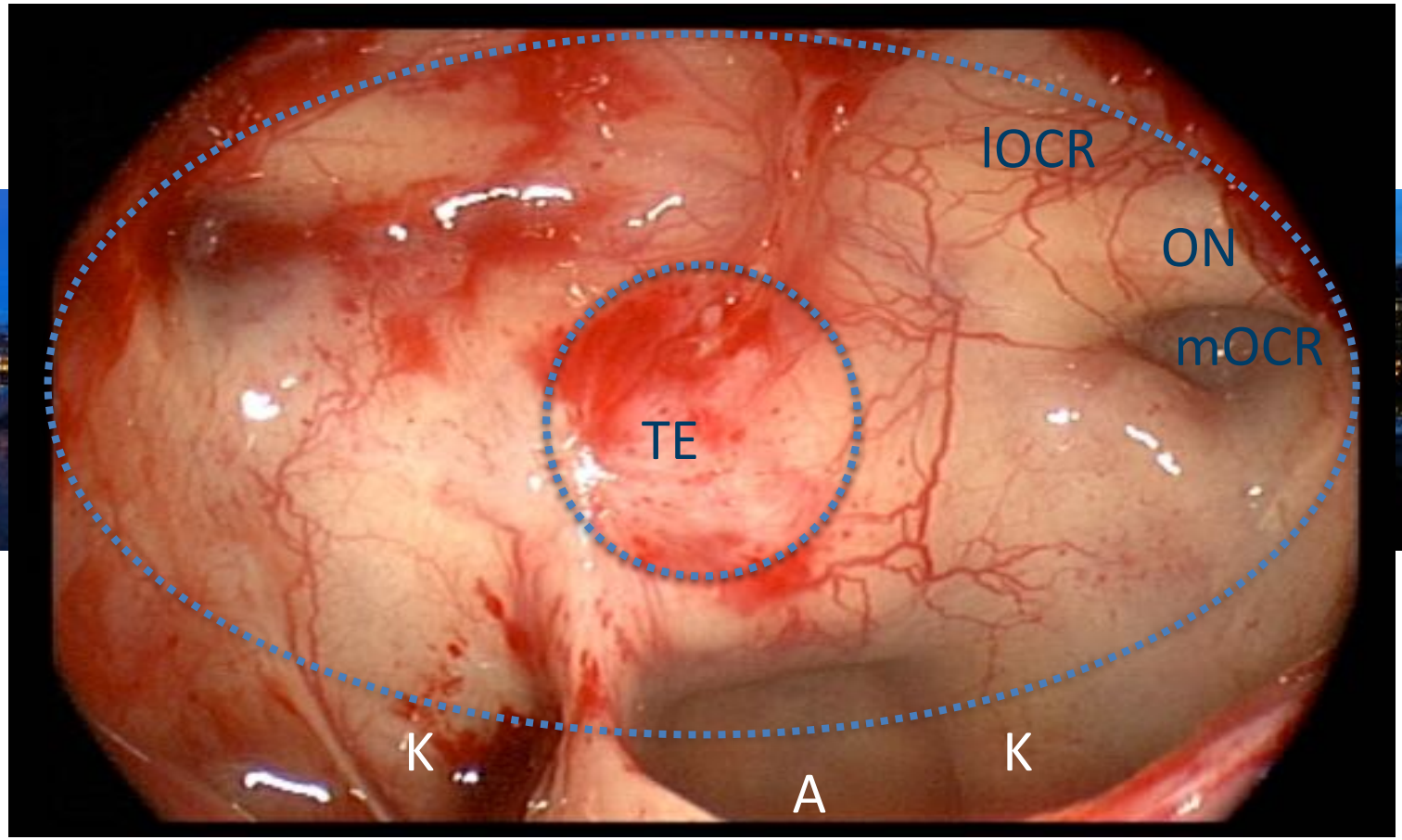
*Department of Neurosurgery, Slotervaart Hospital

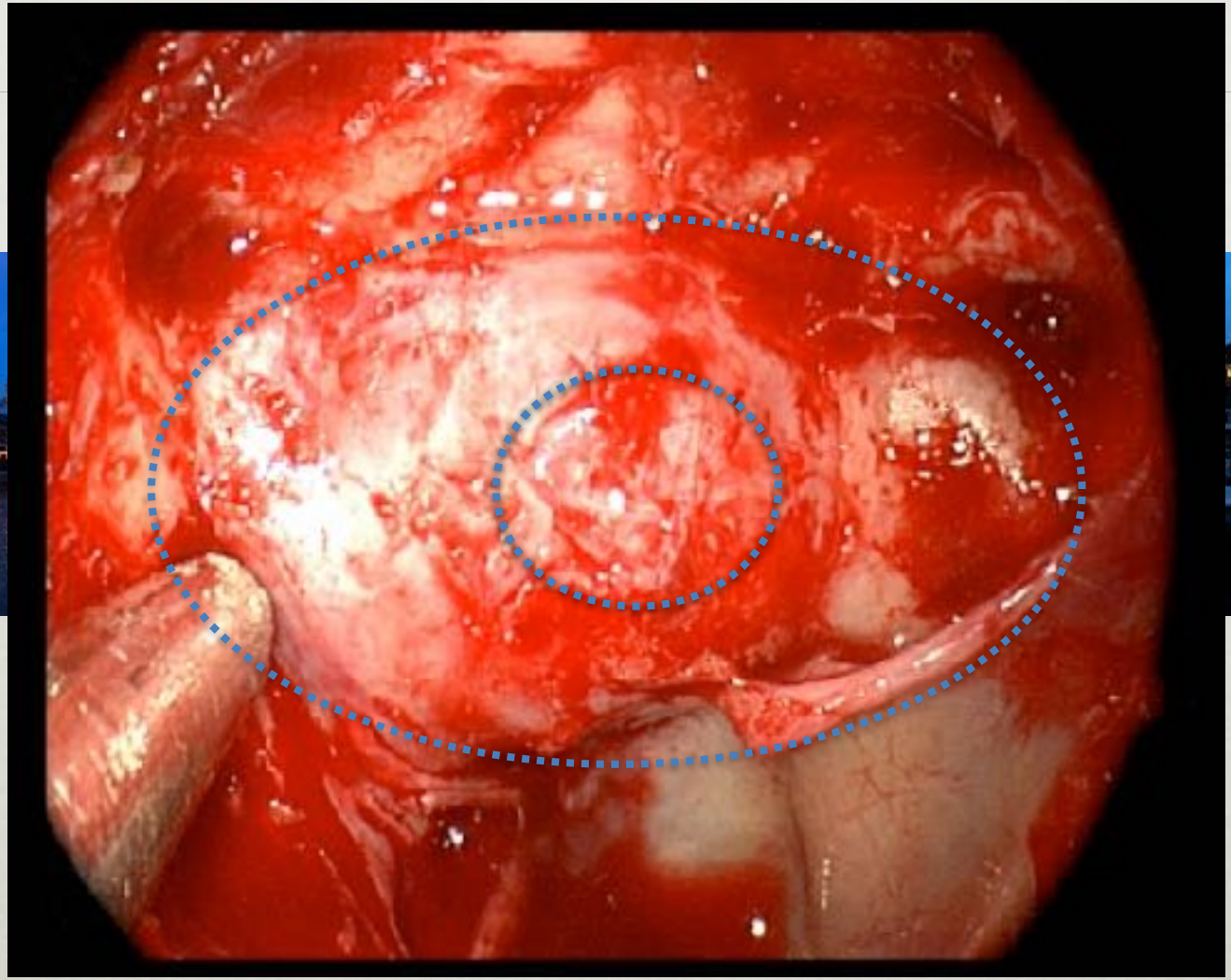
†Endoscopic Skull Base Amsterdam, Academic Medical Centre, Amsterdam, The Netherlands



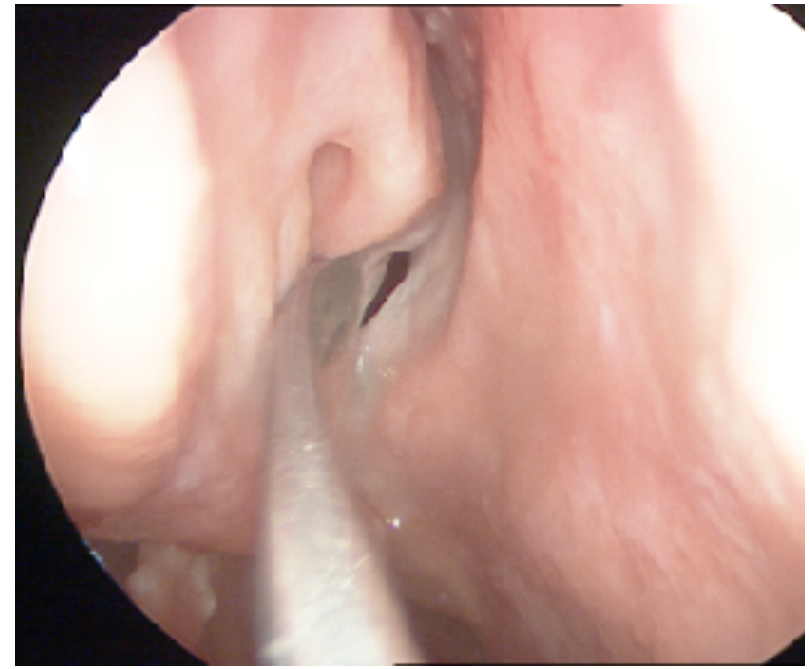


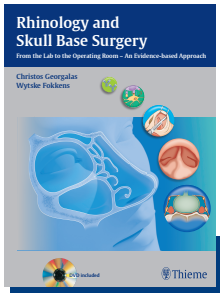
Πανοραμική θέα





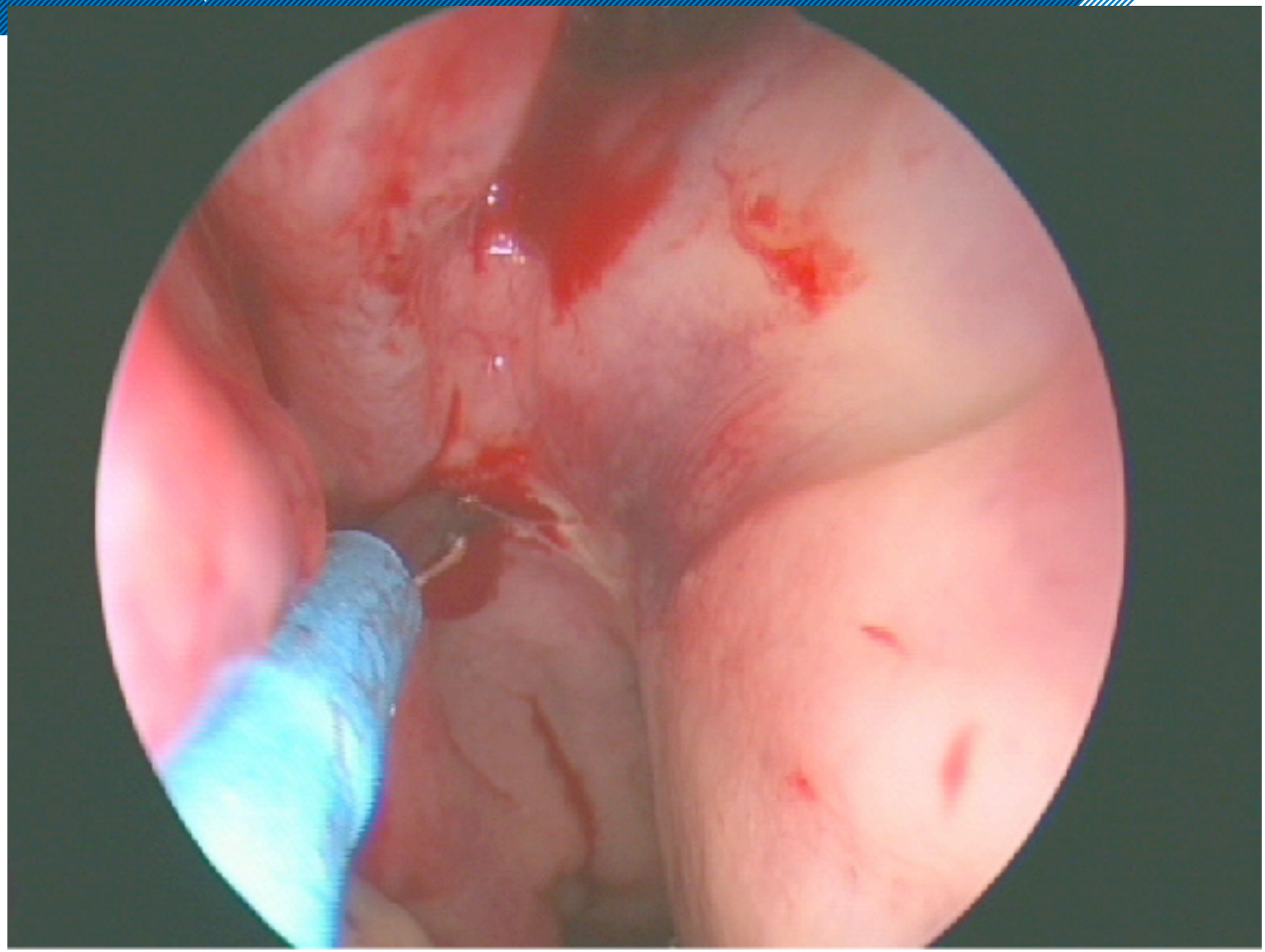
Βημα 1 - Σφηνοειδεκτομη αμφω

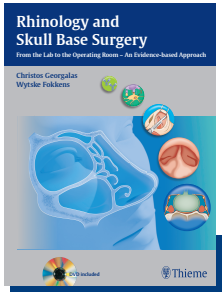




Georgalas C: et al: Rhinology and Skull Base surgery, Thieme , 2013

Βημα 2 - Αφαιρεση οπισθιου διαφραγματος/ Παρασκευη κρημνου (ΑΝ χρειάζεται)





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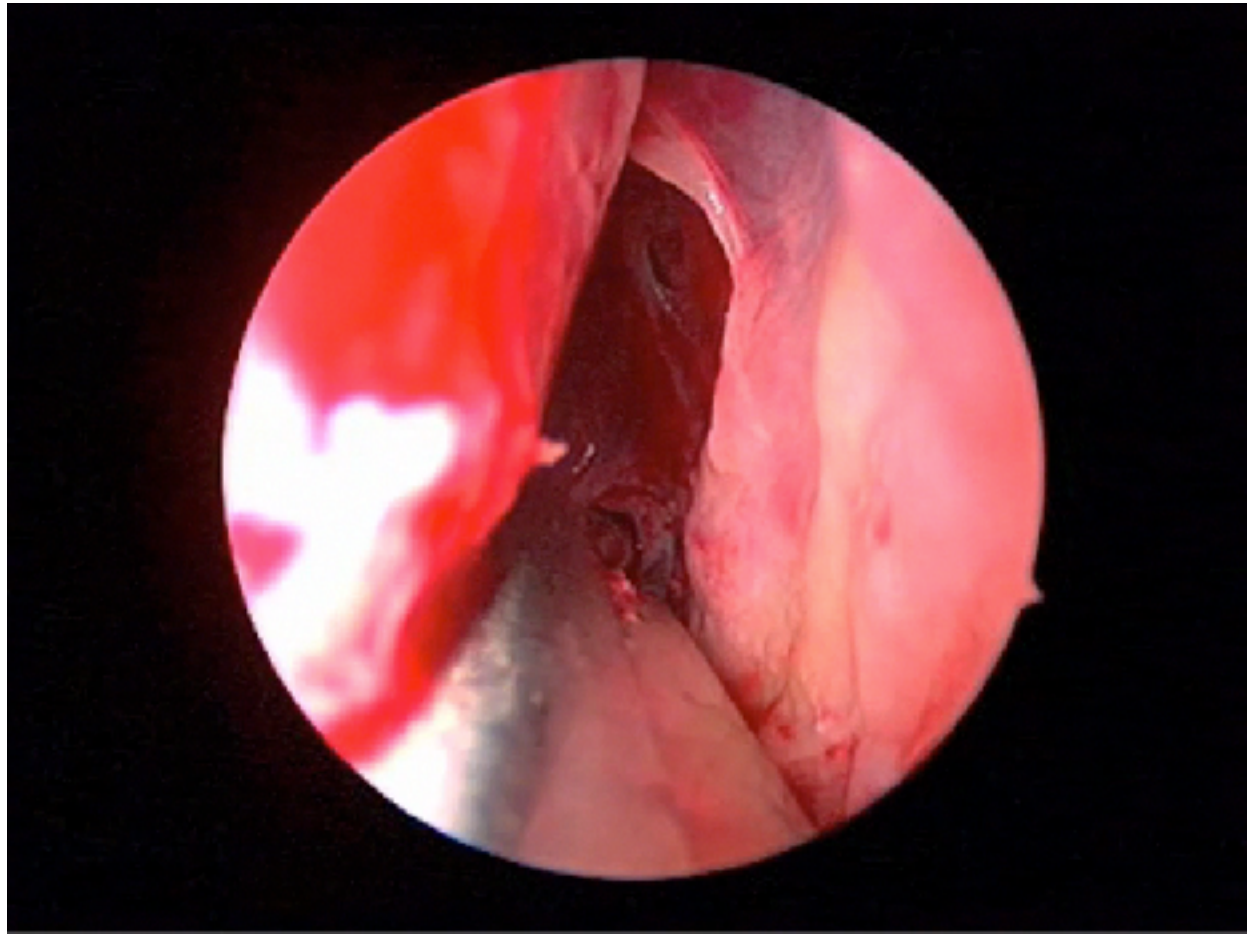
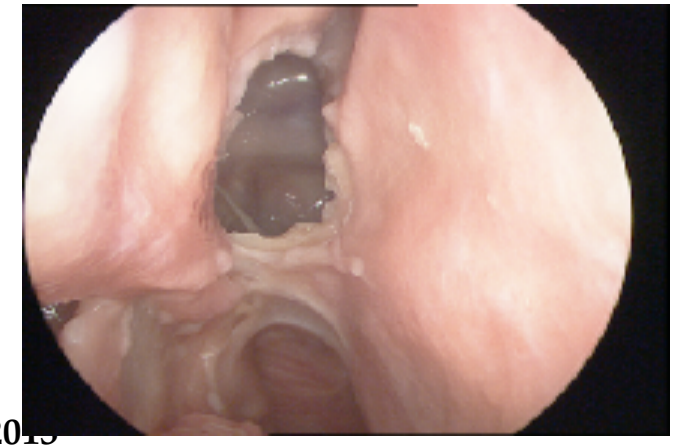
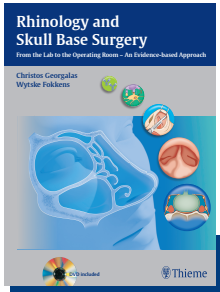
The pedicled nasoseptal

Hadad G, Bassagasteguy L, Carrau RL, Mataza JC, Kassam A, Snyderman CH, Mintz A. A novel reconstructive technique after endoscopic expanded endonasal approaches: vascular pedicle nasoseptal flap. Laryngoscope. 2006 Oct;116(10):1882-6.

Βημα 3 - Ευρεια αποκαλυψη σφηνοειδους

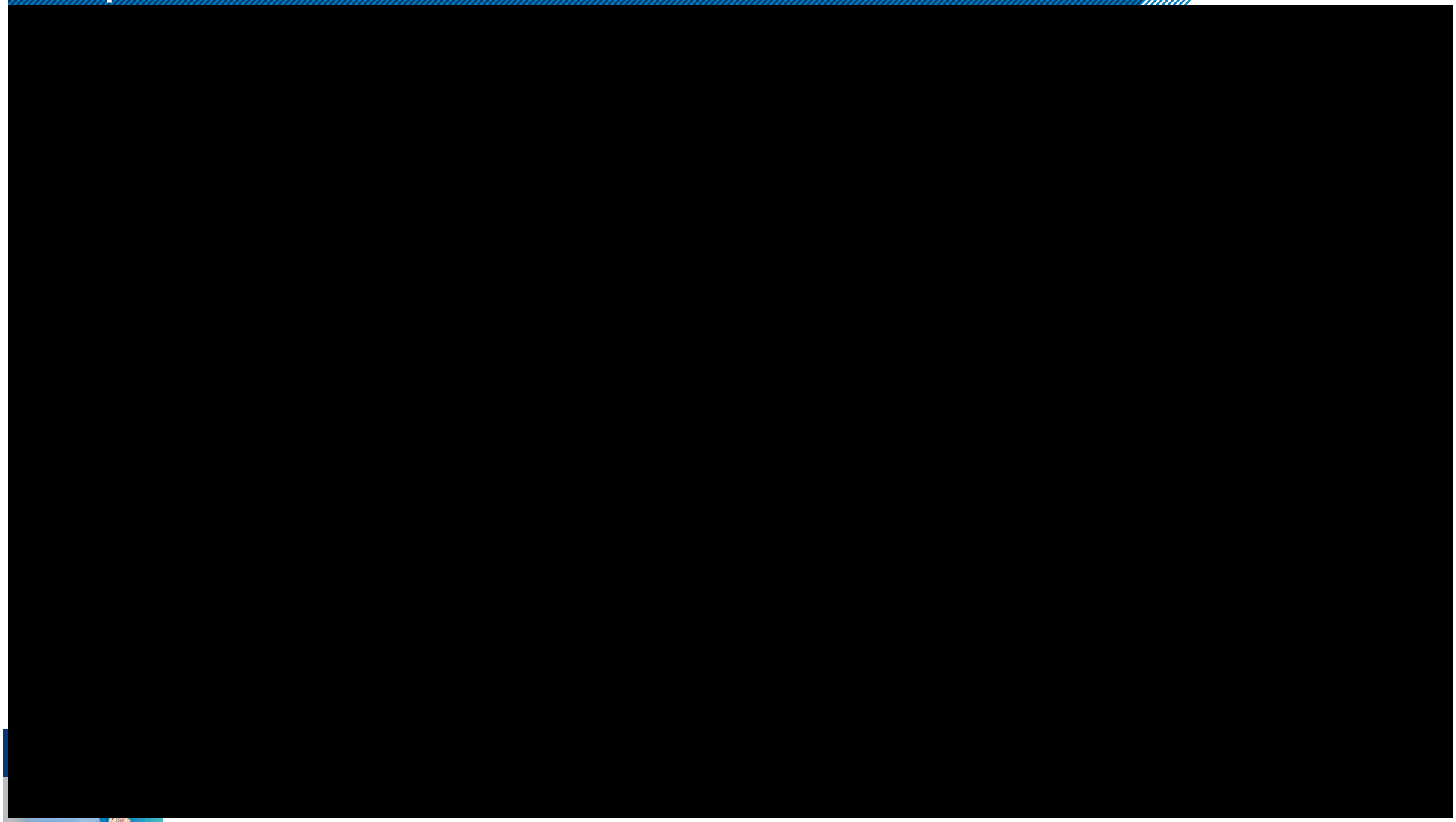


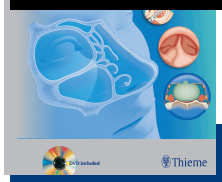




Georgalas C: et al: Rhinology and Skull Base surgery, Thieme , 2015

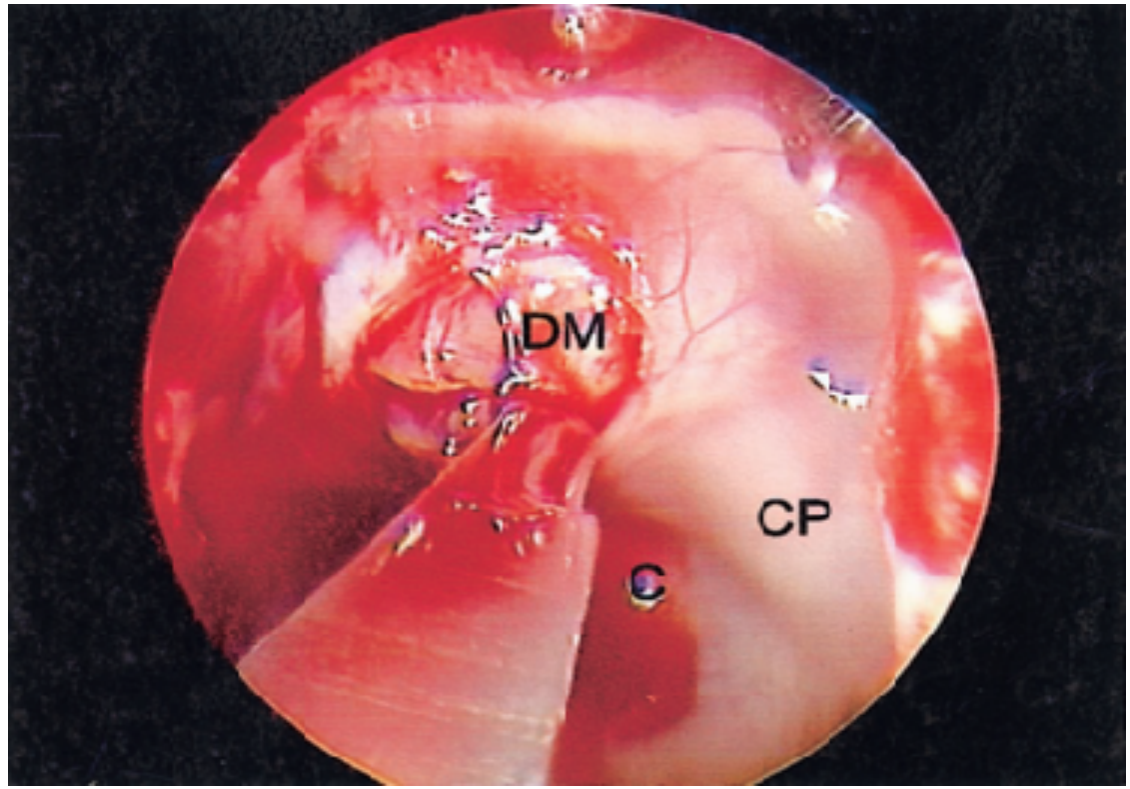
Βημα 4 - αφαιρεση προσθιου τοιχωματος εφιππιου

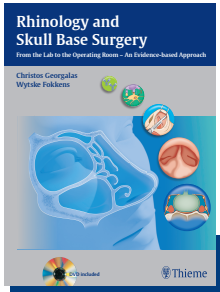




Georgalas C: et al: Rhinology and Skull Base surgery, Thieme , 2013

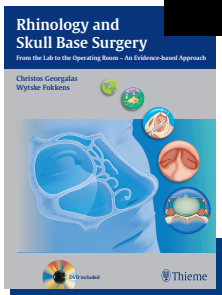
Βημα 5 - τομη μήνιγγας





Georgalas C: et al: Rhinology and Skull Base surgery, Thieme , 2013

Βημα 6 - αφαιρεση αδενώματος



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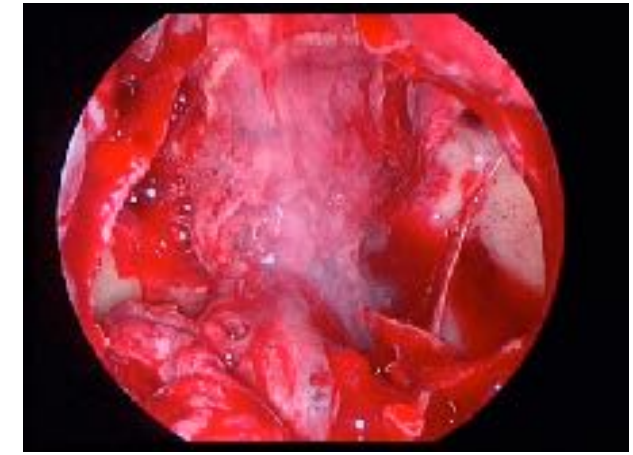
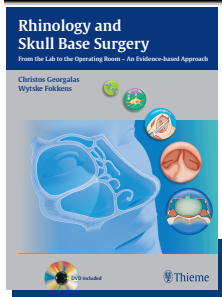
Βημα 7 - ανακατασκευή

Pituitary surgery: Sellar closure

C Georgalas R Willemse

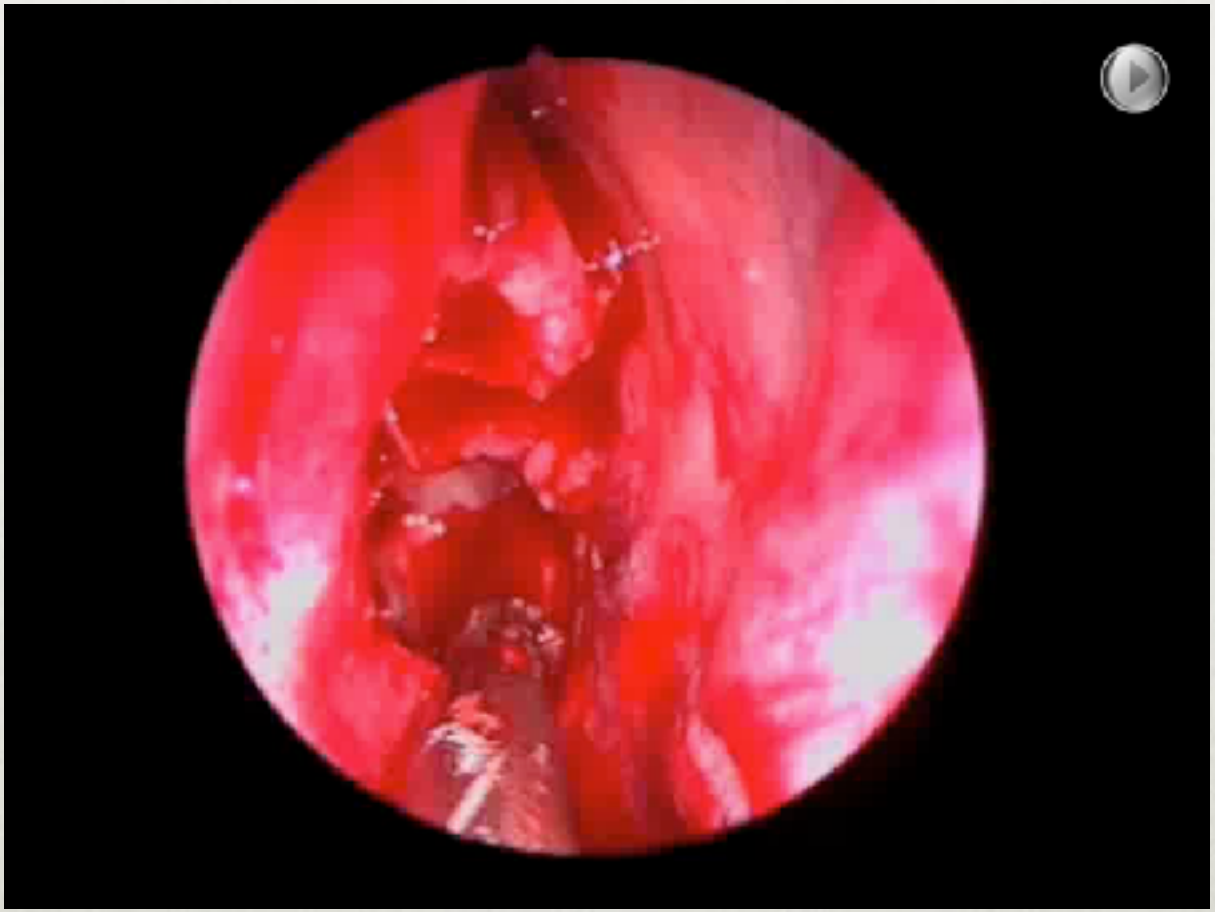




Georgalas C: et al: Rhinology and Skull Base surgery, T

Περιεχόμενα

Σφηνοειδεκτομή για προσπέλαση σε κύστη Rathke



Βιβλιογραφία

Κεφάλαια σε βιβλία :

- **Revision Sinus Surgery, Springer Editions, New York, NY, 2008** Pathophysiology of inflammation in the surgically failed sinus cavity Georgalas C, Fokkens W , Rinia B

- **Nasal Polyposis, Springer Editions, New York, NY, 2009** Evidence – based surgery in nasal polyposis Georgalas C, Ebbens F , Fokkens W

Αρθρα:

- Georgalas C, Kania R, Sauvaget K, Tran Ba Huy P, Herman P
  Endoscopic transsphenoidal surgery for cholesterol granulomas involving the petrous apex: a case series. Clinical Otolaryngology 2008 Feb; 33(1):38-4

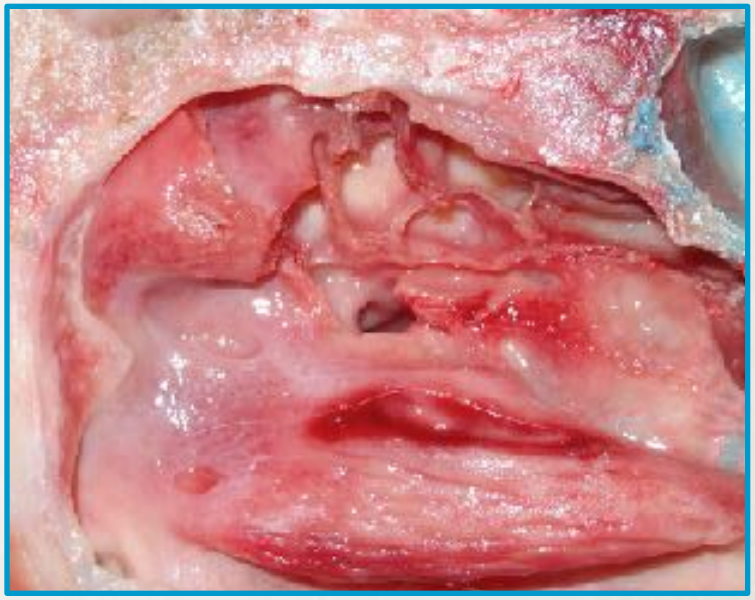
- Ebbens FA, Georgalas C, Rinia AB, van Drunen CM, Lund VJ, Fokkens WJ.
  The fungal debate: where do we stand today?
  Rhinology. 2007 Sep;45(3):178-89.

- Maxillary mucosal cyst is not a manifestation of rhinosinusitis: Results of a prospective three-dimensional CT study of ophthalmic patients. Kanagalingam J, Bhatia K, Georgalas C, Fokkens W, Miszkiel K, Lund VJ. Laryngoscope. 2008 Dec 31;119(1):8-12.

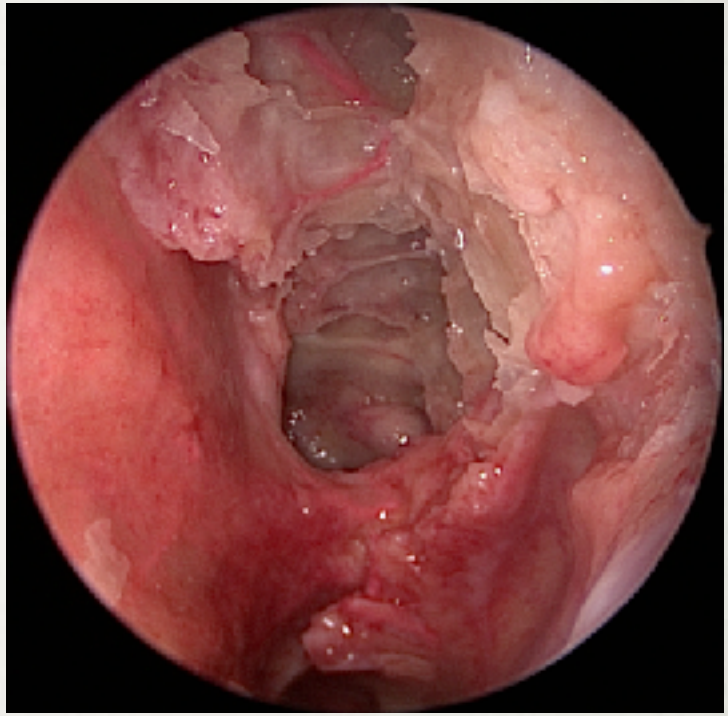
- A randomized trial of Rapid Rhino Riemann and Telfa nasal packs following endoscopic sinus surgery. Cruise AS, Amonoo-Kuofi K, Srouji I, Kanagalingam J, Georgalas C, Patel NN, Badia L, Lund VJ. Clin Otolaryngol. 2006 Feb;31(1):25-32.

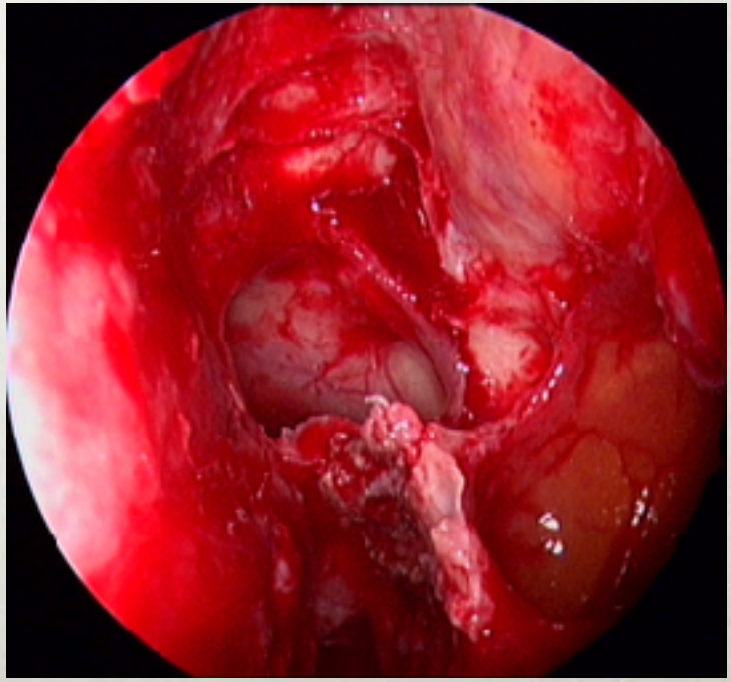
- Basu S, Georgalas C, Kumar BN, Desai S Correlation between symptoms and radiological findings in patients with chronic rhinosinusitis: an evaluation study using the Sinonasal Assessment Questionnaire and Lund-Mackay grading system. European Archives of Otorhinolaryngology. 2005 Sep;262(9):751-4

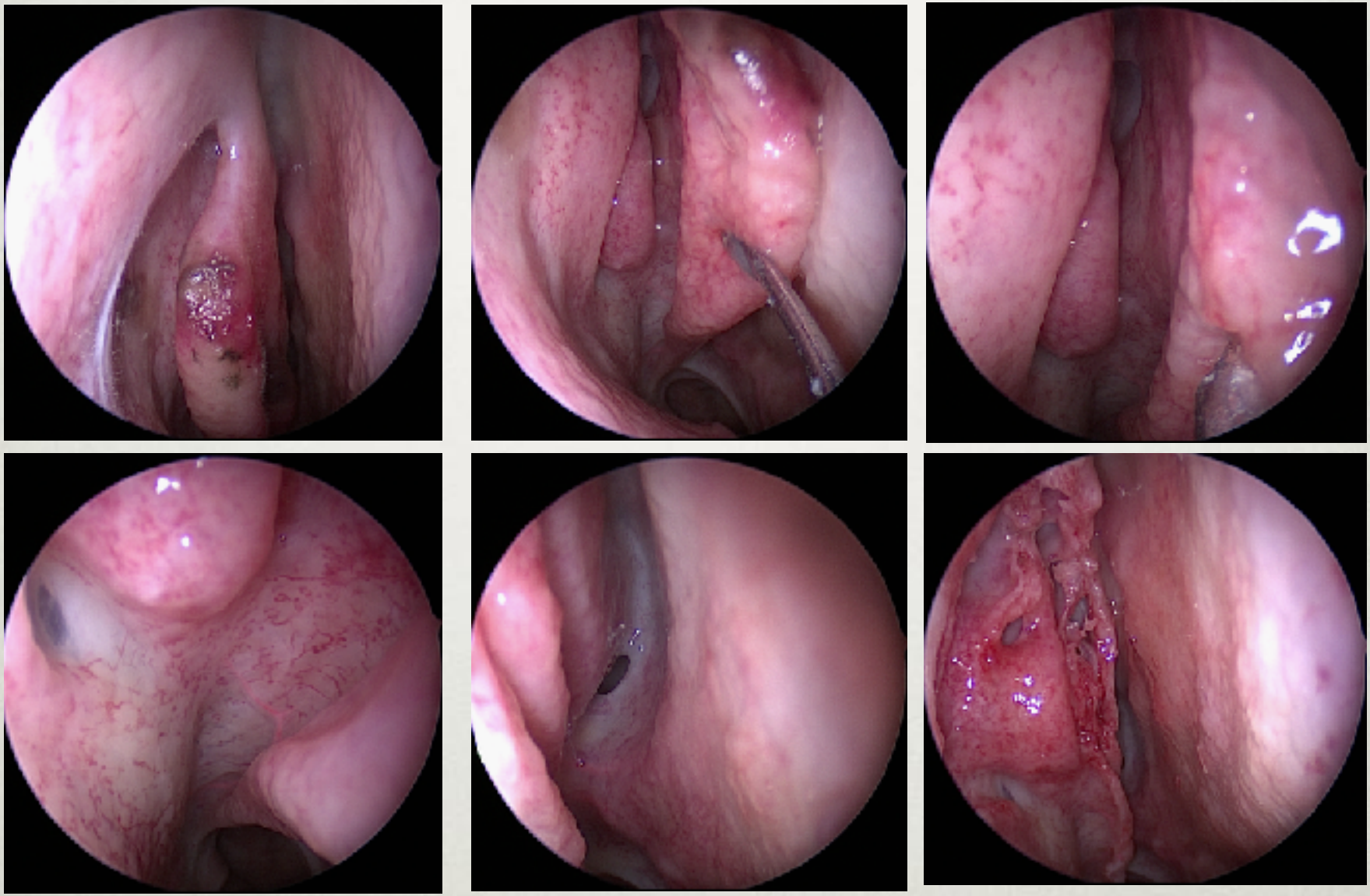
Ethmoidal dissassembly & papiracea exposure

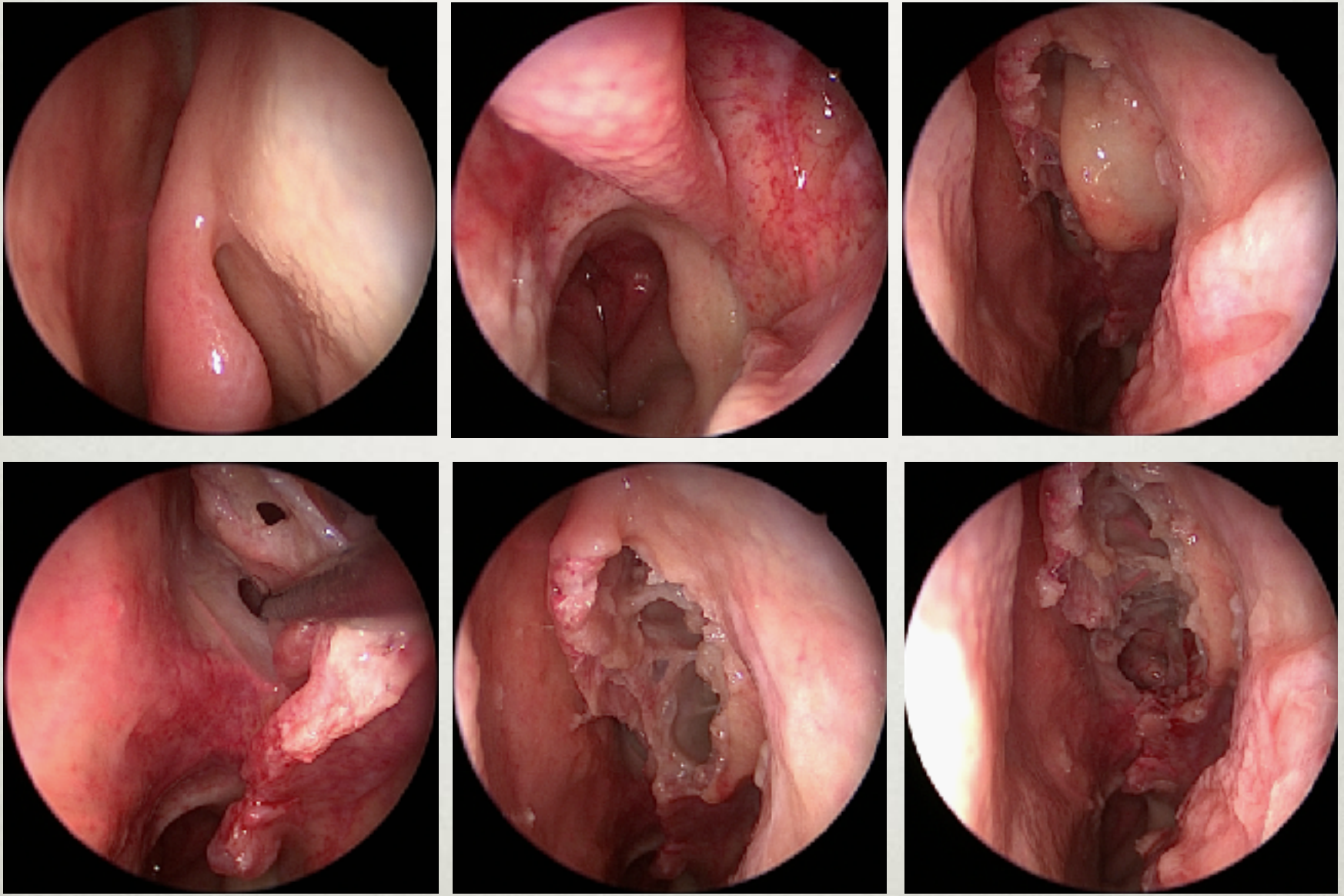


Complete ethmoidectomy

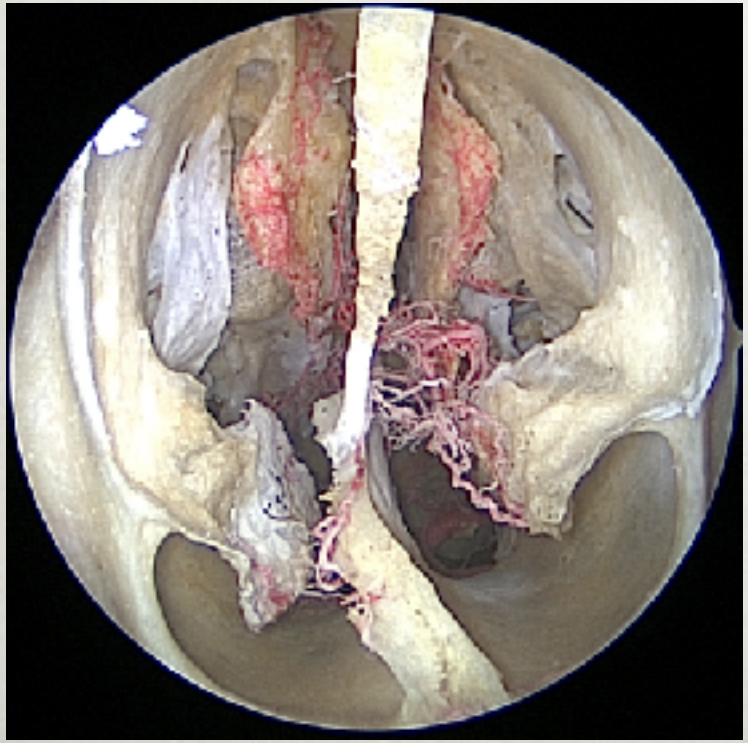


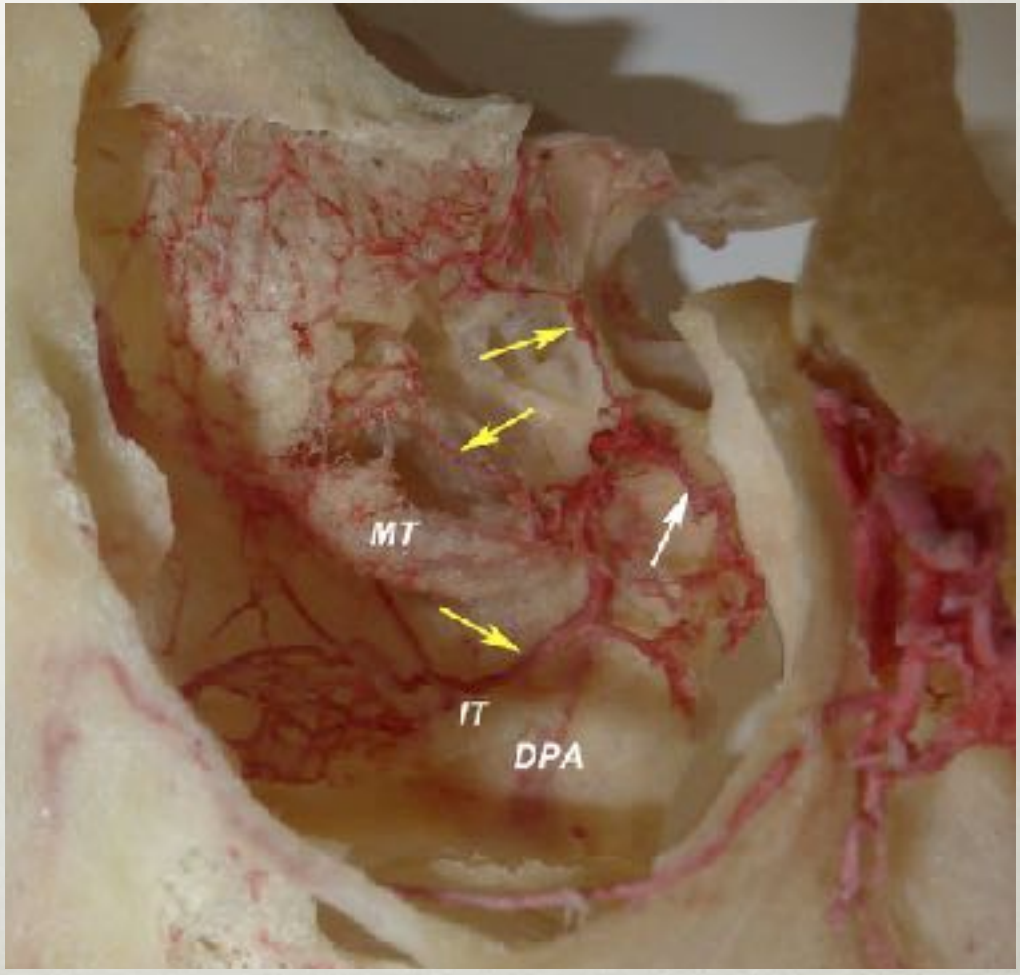




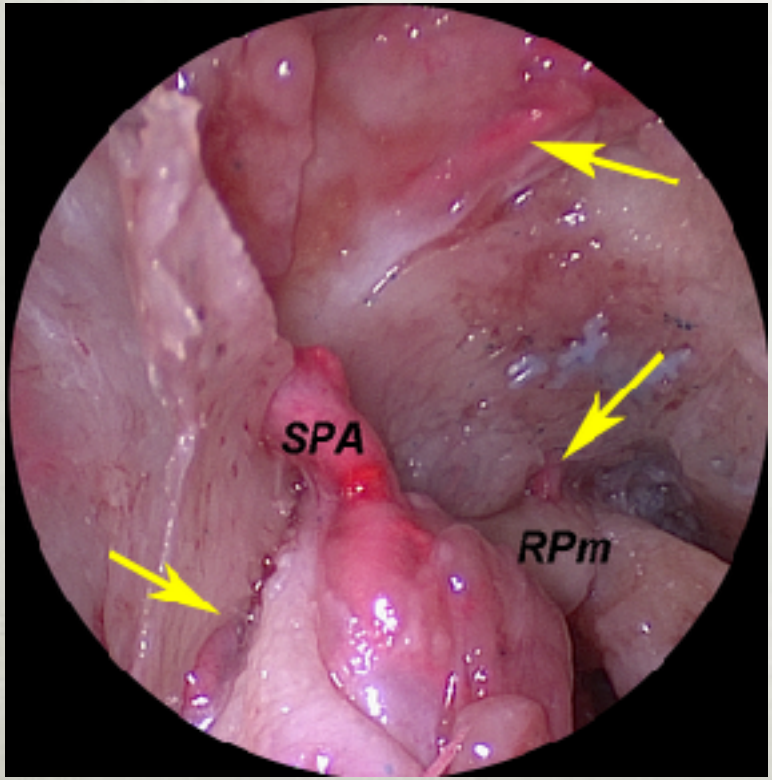


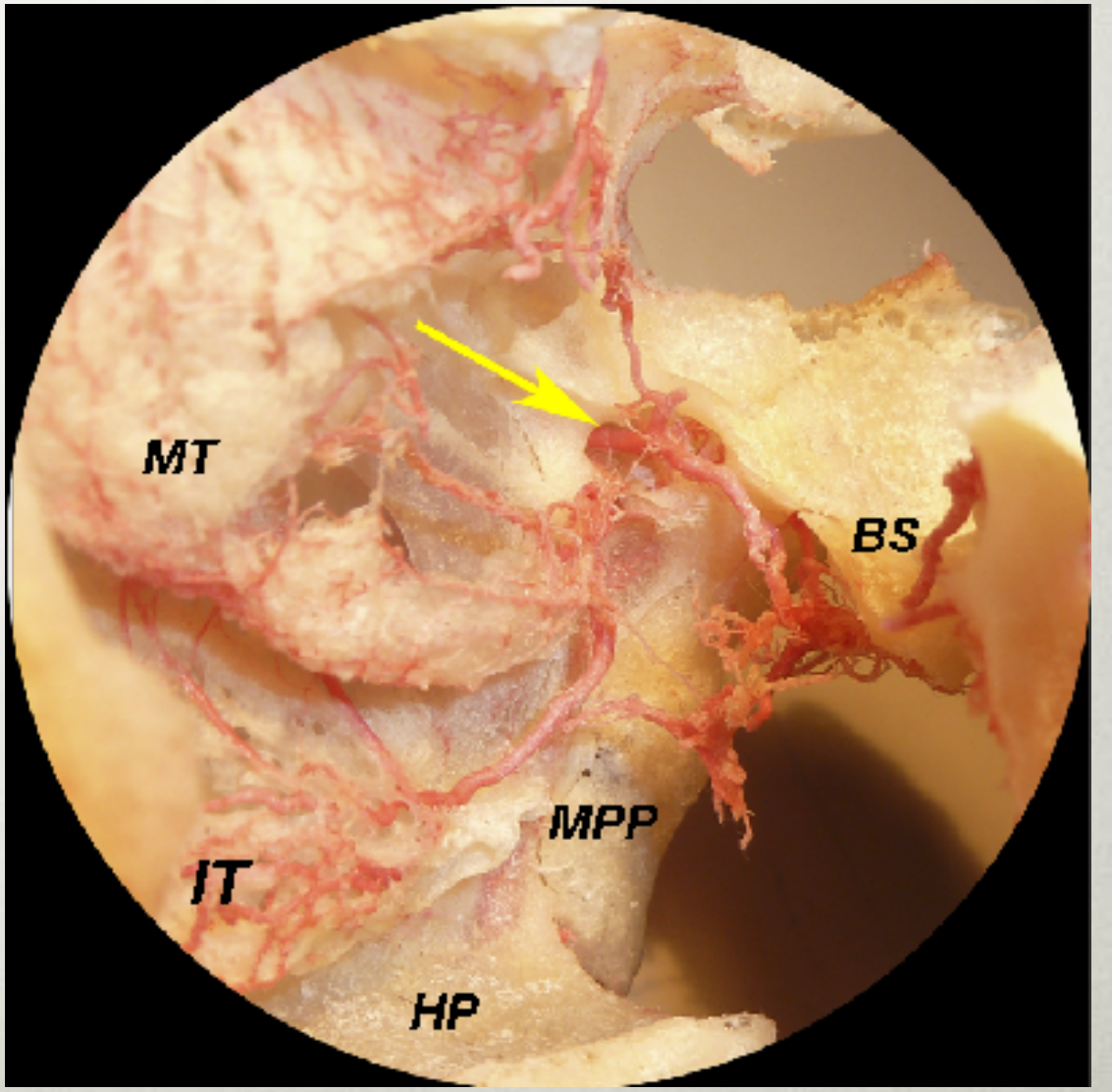
Lateral wall vascular network



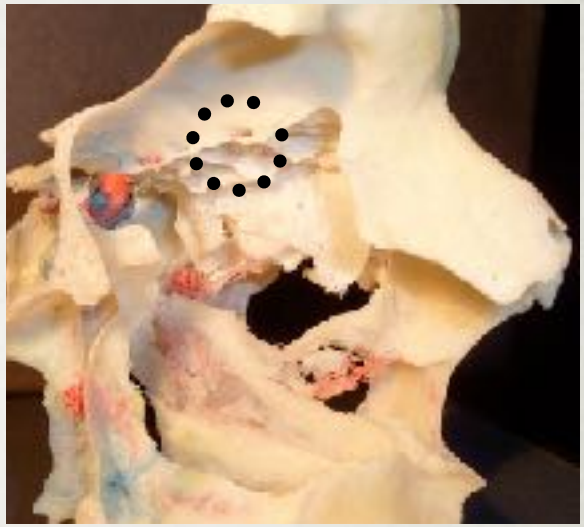


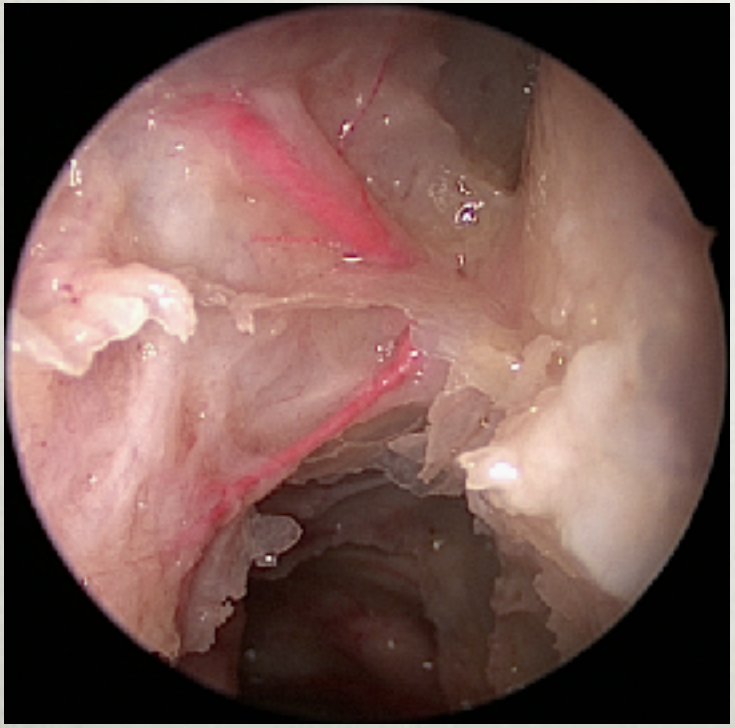
Lateral wall vascular network

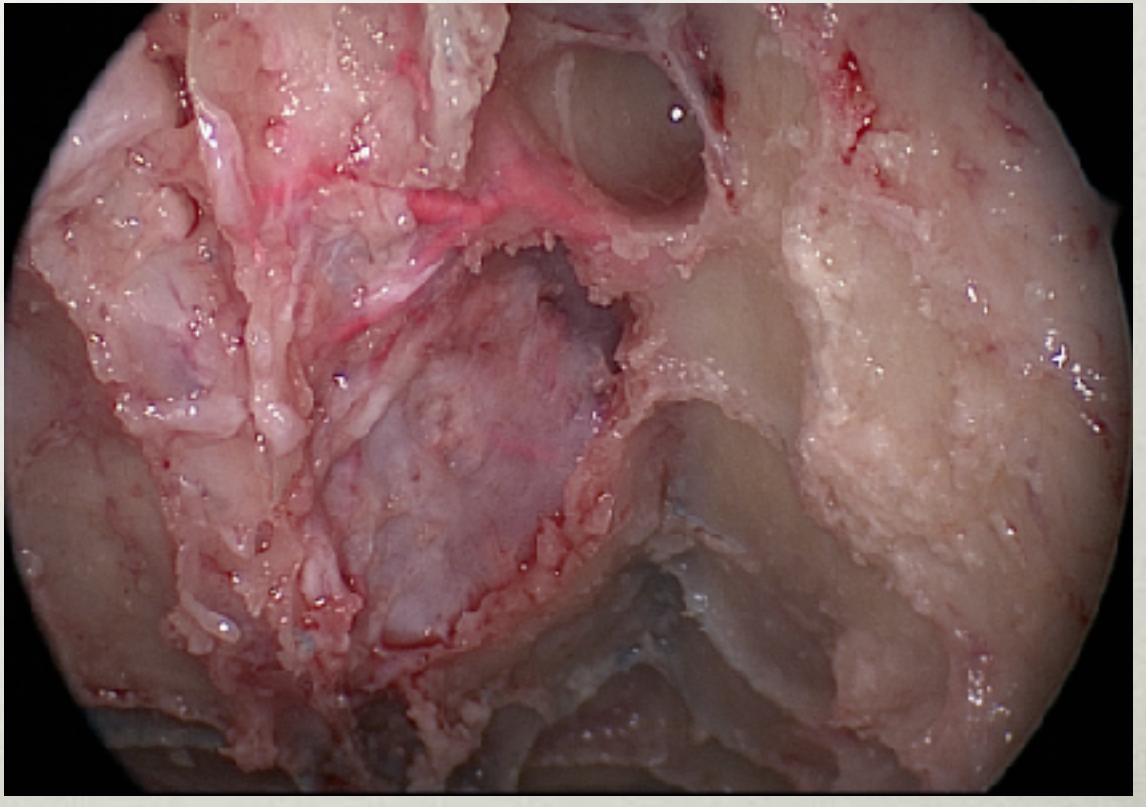




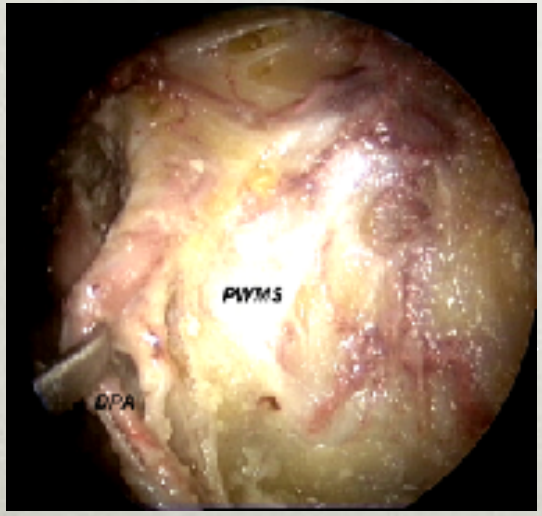
Anterior ethmoidal artery

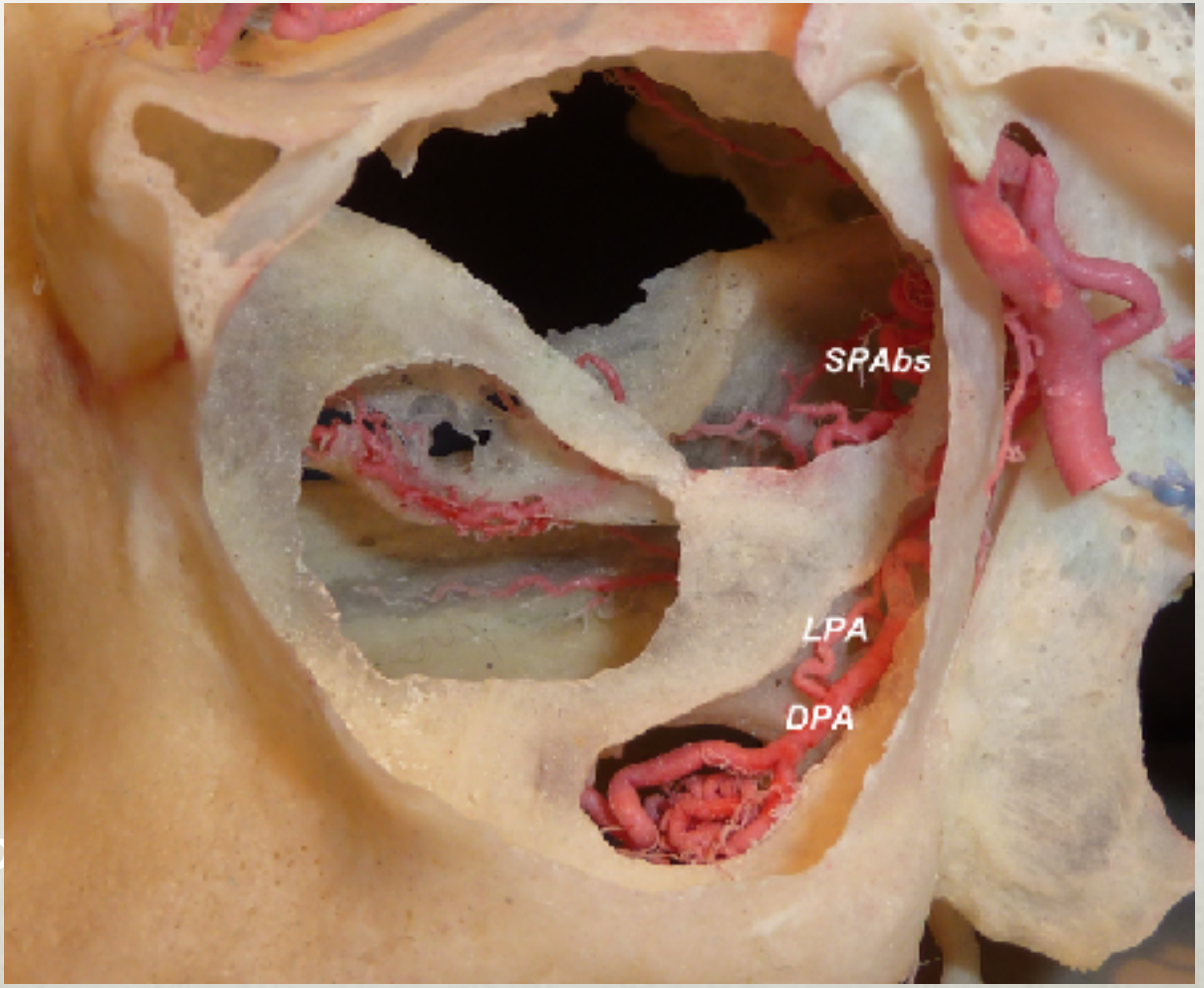




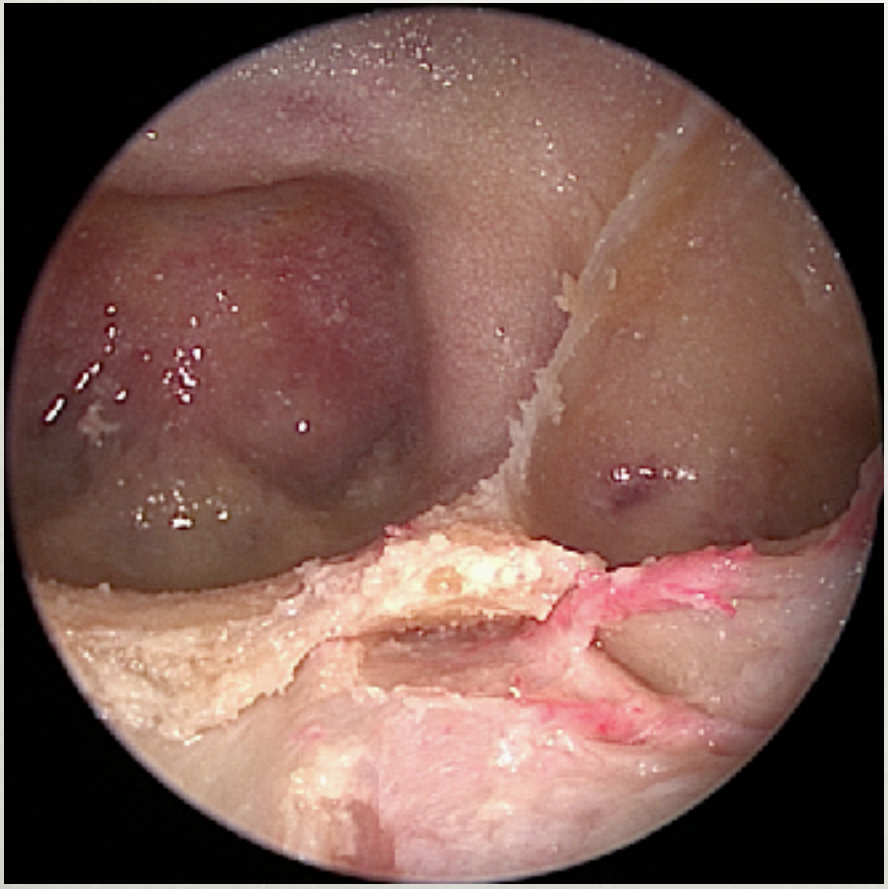


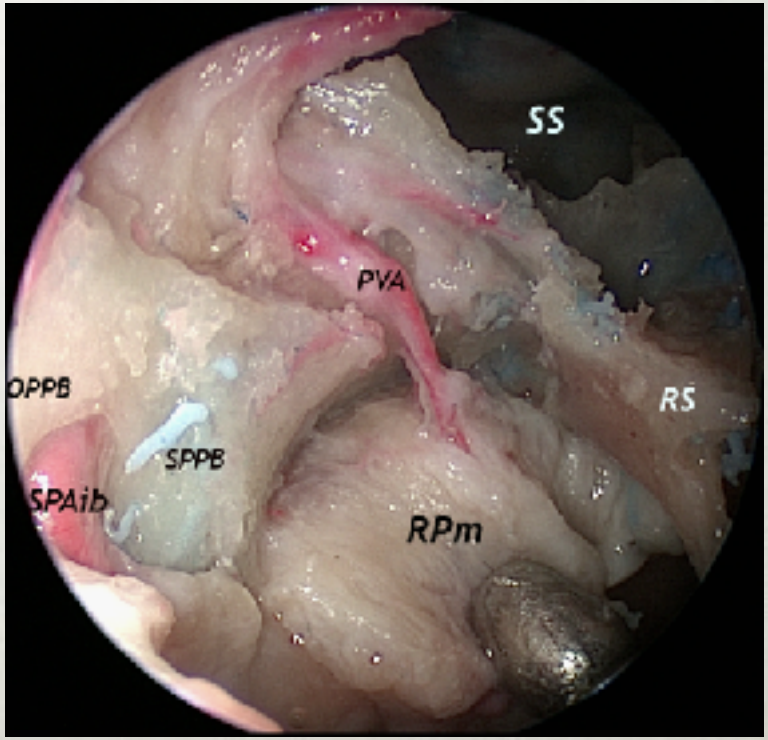
Descending palatine artery and lesser palatine artery



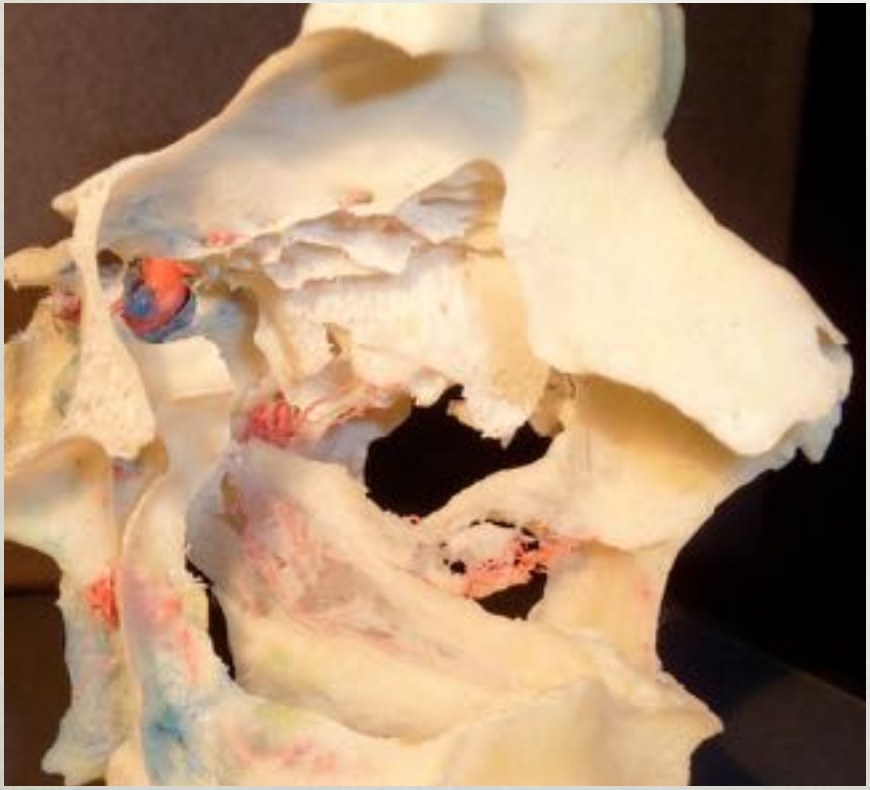


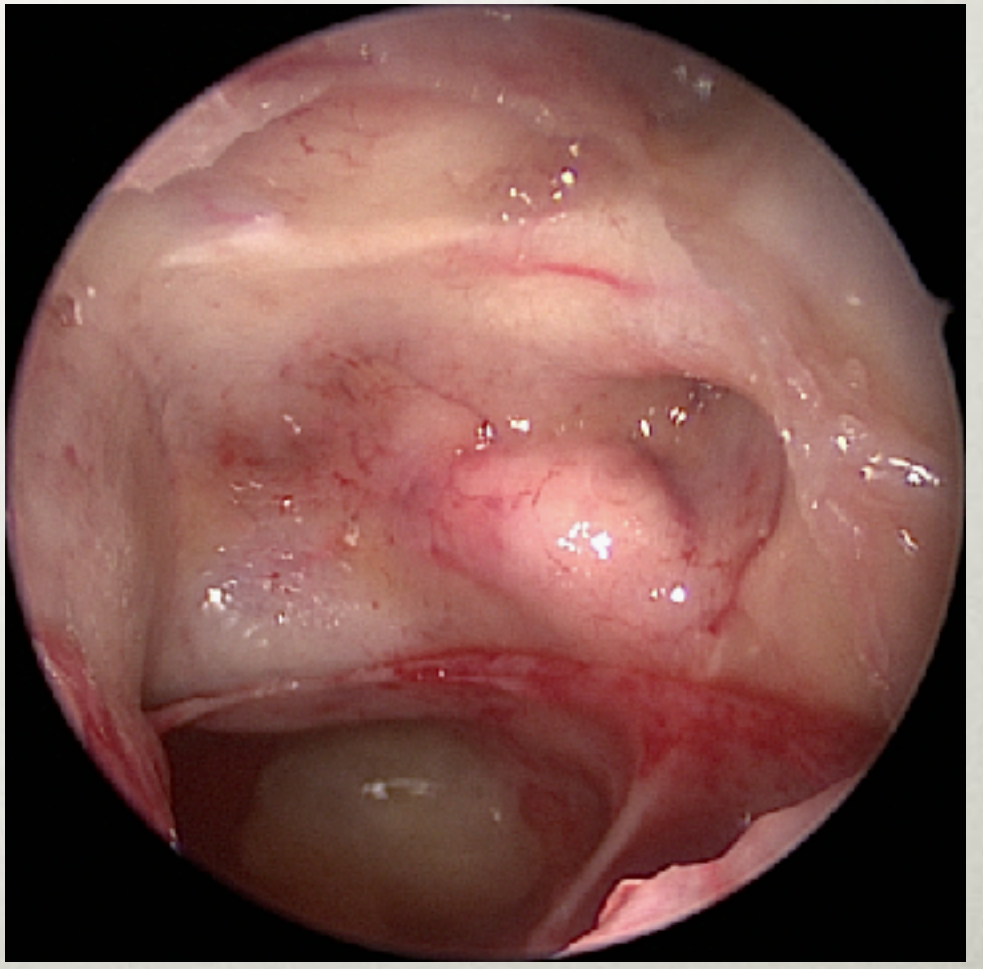
Palatovaginal artery



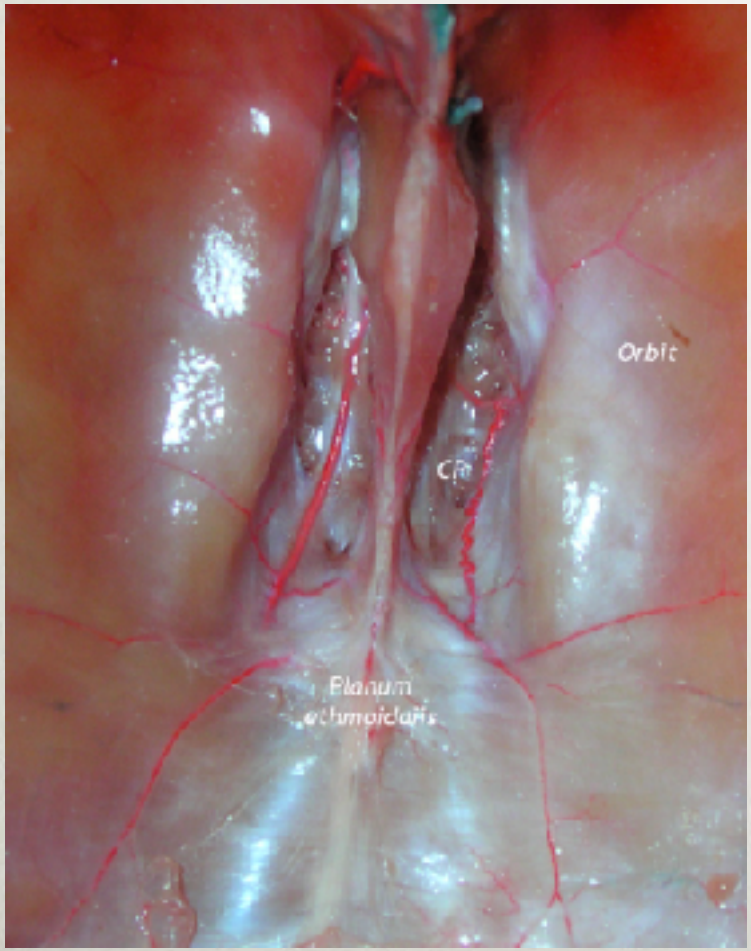


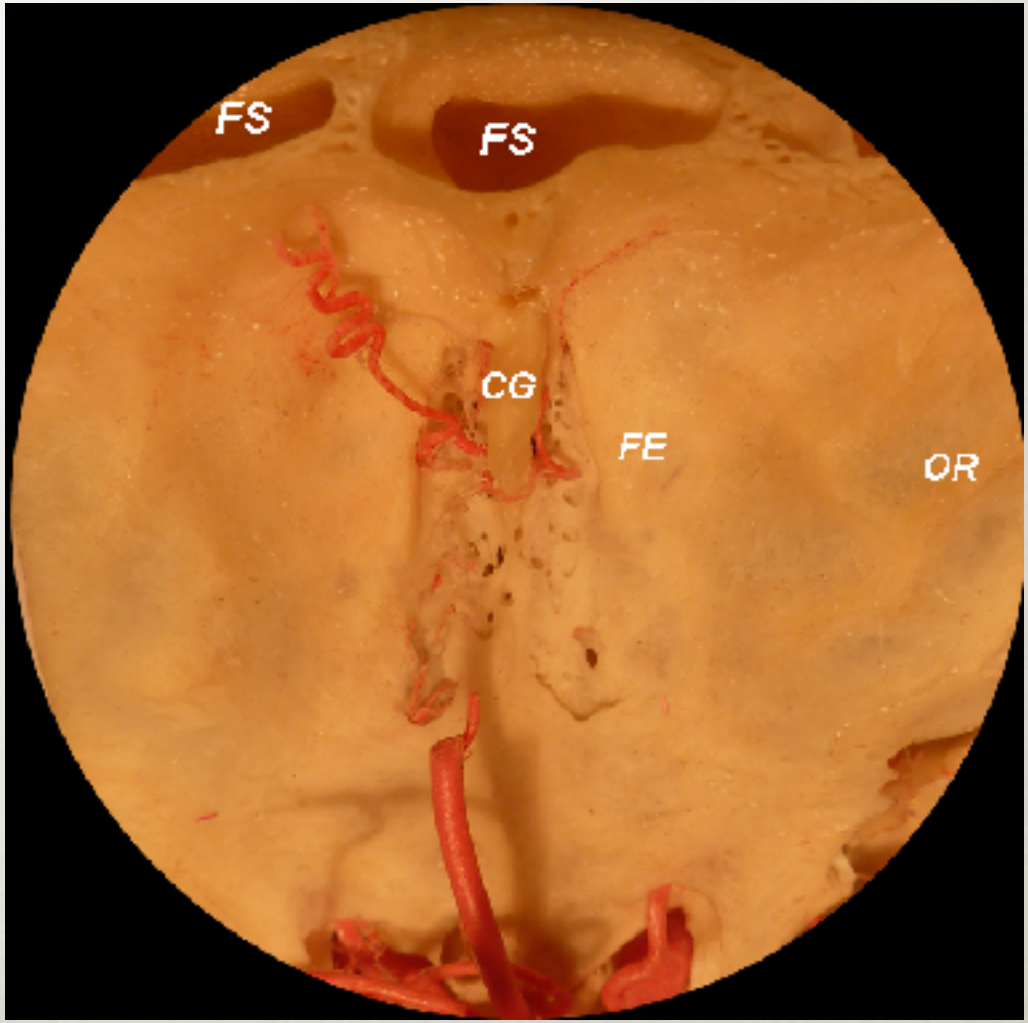
Posterior ethmoidal artery





Meningeal arteries
Cranial vision





Venous channels