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UNIVERSITY OF  
THESSALONIKI

# Basic principles and limitations in endoscopic removal of sinonasal malignancies

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# Sinonasal malignancies - Classification

## Malignant epithelial tumors

- Squamous cell carcinoma: Lymphoepithelial carcinoma, SNUC
- Adenocarcinoma
- Salivary gland-type carcinomas: Adenoid cystic carcinoma, Mucoepidermoid Ca
- Neuroendocrine tumours : Typical carcinoid , Atypical carcinoid

## Soft tissue tumours

- Malignant tumours: Fibrosarcoma, Malignant fibrous histiocyoma , Leiomyosarcoma , Angiosarcoma
- Malignant peripheral nerve sheath tumours
- Borderline and low malignant potential tumours: Desmoid-type fibromatosis, Inflammatory myofibroblastic tumour, Sinonasal type haemangiopericytoma

## Tumors of bone and cartilage

- Chondrosarcoma, Osteosarcoma, Chordoma

## Haematolymphoid tumors

- Extranodal NK/T cell lymphoma, Diffuse IB-cell lymphoma, Extramedullary plasmacytoma and sarcoma

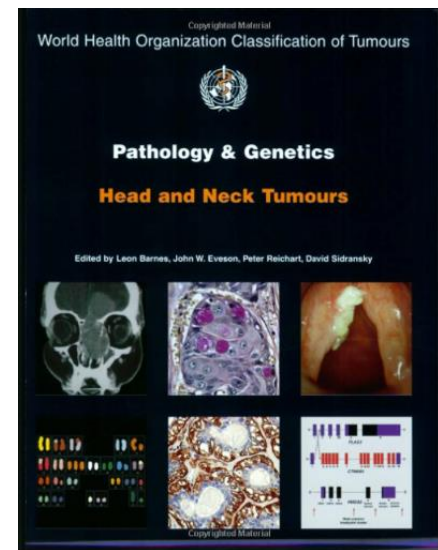
## Neuroectodermal

- Ewing sarcoma, Olfactory neuroblastoma, Mucosal malignant melanoma

## Germ cell tumors

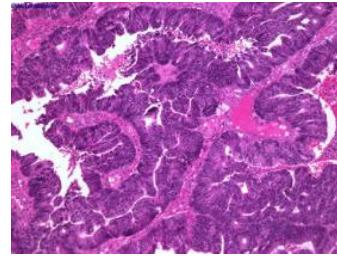
- Teratoma with malignant transformation, Sinonasal teratocarcinosarcoma

## Secondary tumors

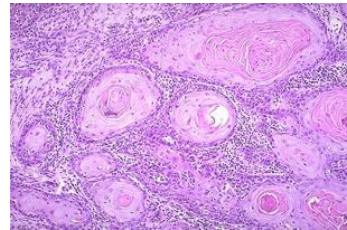


# Anterior skull base tumors (second opinion!)

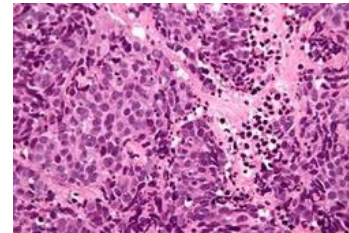
- Intestinal-type adenocarcinoma



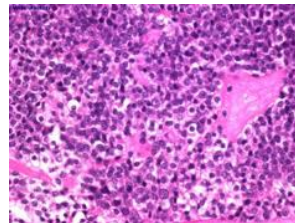
- Squamous cell carcinoma



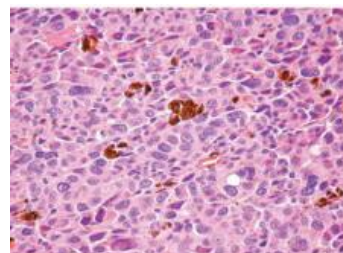
- Sinonasal undifferentiated carcinoma



- Olfactory neuroblastoma

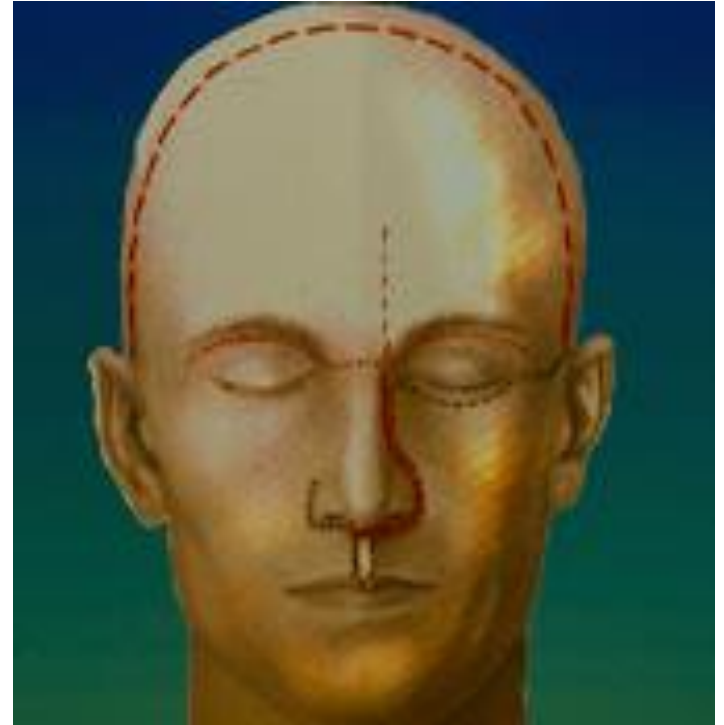


- Melanoma



# Surgery of sinonasal neoplasms

- Endonasal
- Midfacial degloving
- Transfacial approaches
- Combined, or other approaches
  - endonasal + Caldwell-Luc, osteoplastic flap, subcranial

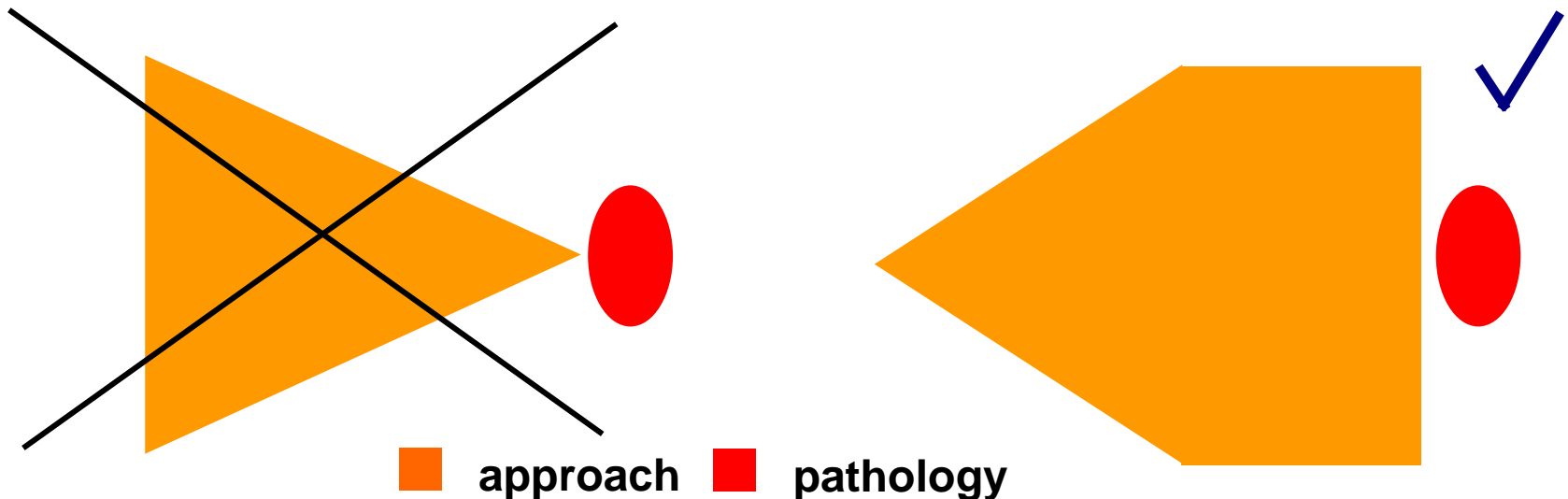


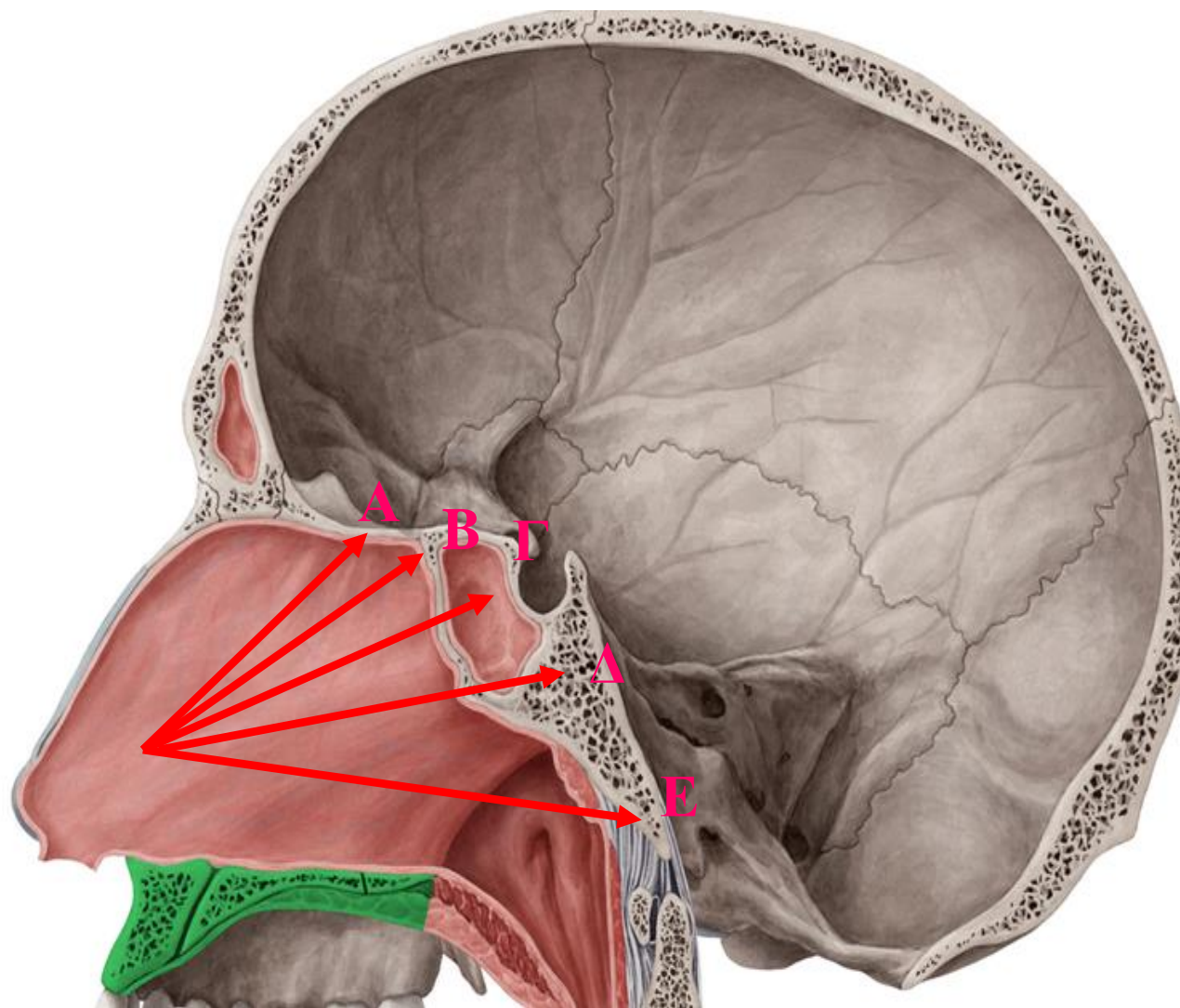
**Constantinidis J.** Craniofacial approaches to the anterior skull base. In: Rhinology and Facial Plastic Surgery. Stucker F, Souza C, et al (eds), 2009, pp. 439-446

# Sinonasal & skull surgery: main thoughts

**key note: misunderstanding of approaches with primarily small openings**

**no wide opening at the beginning, but broad access at the lesion**







# Treatment strategies

- Histology
- Local extension
- Grading
- Metastasis
- Patient
- Quality of life

## **Sinonasal Malignancies of Anterior Skull Base**

### **Histology-driven Treatment Strategies**



Paolo Castelnuovo, MD<sup>a,b</sup>, Mario Turri-Zanoni, MD<sup>a,b,\*</sup>,  
Paolo Battaglia, MD<sup>a,b</sup>, Paolo Antognoni, MD<sup>c</sup>, Paolo Bossi, MD<sup>d</sup>,  
Davide Locatelli, MD<sup>b,e</sup>

# Basic principles

- Define the extent of tumor (MRI!)
- Establish operative plan
- Control bleeding and improve visibility
- Control margins of the tumor
- Reconstruct skull base defects
- Switch to external approaches



# Endoscopic removal of sinonasal neoplasms (2008-2018)

|   |    |
|---|----|
| • Pituitary tumors                              | 78 |
| • Osteoma, ossifying fibroma, fibrous dysplasia | 38 |
| • Inverted papilloma                            | 68 |
| • Juvenile angiofibroma                         | 32 |
| • Meningioma                                    | 6  |
| • Aneurysmal bone cyst                          | 2  |
| • Adenocarcinoma                                | 24 |
| • Olfactory neuroblastoma                       | 19 |
| • Squamous cell carcinoma                       | 31 |
| • Clivus chordoma                               | 8  |
| • Melanoma                                      | 9  |
| • Chondrosarcoma                                | 6  |

Total 321

# Adenocarcinoma

(Surg and/or RT and/or CHT)

**Intestinal type adenocarcinoma of the ethmoid: Outcomes of a treatment regimen based on endoscopic surgery with or without radiotherapy**

Piero Nicolai, MD,<sup>1\*</sup> Alberto Schreiber, MD,<sup>1</sup> Andrea Bolzoni Villaret, MD,<sup>1</sup> Davide Lombardi, MD,<sup>1</sup> Laura Morassi, MD,<sup>2</sup> Elena Raffetti, MD,<sup>3</sup> Francesco Donato, MD,<sup>3</sup> Paolo Battaglia, MD,<sup>4</sup> Mario Turri-Zanoni, MD,<sup>4</sup> Maurizio Bignami, MD,<sup>4</sup> Paolo Castelnovo, MD<sup>4</sup>

<sup>1</sup>Unit of Otorhinolaryngology, University of Brescia, Brescia, Italy, <sup>2</sup>Unit of Pathology, University of Brescia, Brescia, Italy, <sup>3</sup>Unit of Epidemiology and Public Health, University of Brescia, Brescia, Italy, <sup>4</sup>Unit of Otorhinolaryngology, Insubria University, Varese, Italy.

*Accepted 31 May 2015*

**169 patients**, October 1997 - September 2013

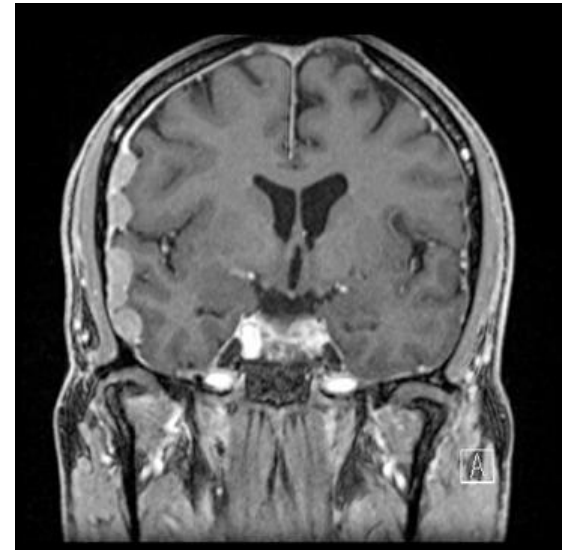
- Mean age **66 years**
- Median follow-up **42.8 months** (1-170)
- Male **89%**
- Ethmoid **100%**

# Adenocarcinoma

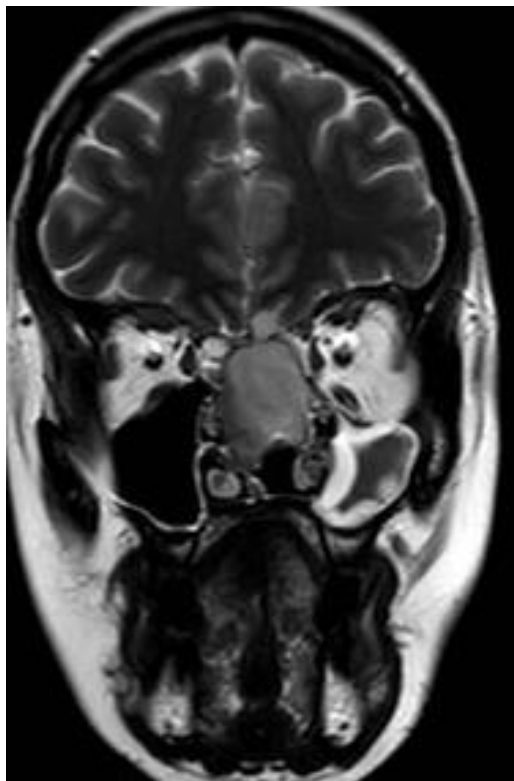
Median follow-up **42.8** months (1-170)

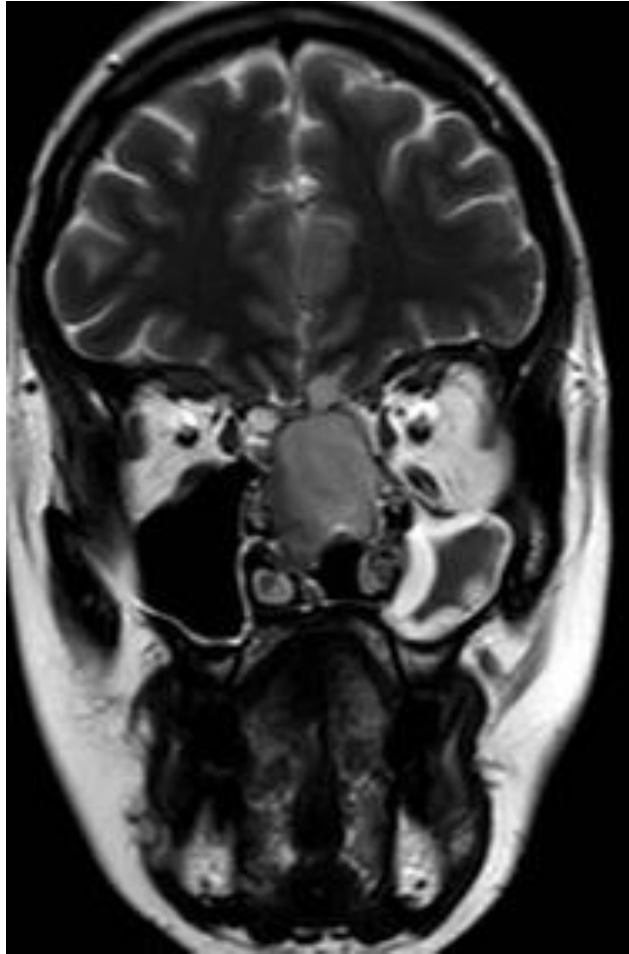
## Metastasis

- Local (16.1%)
- Distant (7.1%)
- Leptomeningeal (5.3%)
- Regional (1.8%)



*Nicolai et al, Head Neck 2015*





# Olfactory neuroblastoma

Kadish A

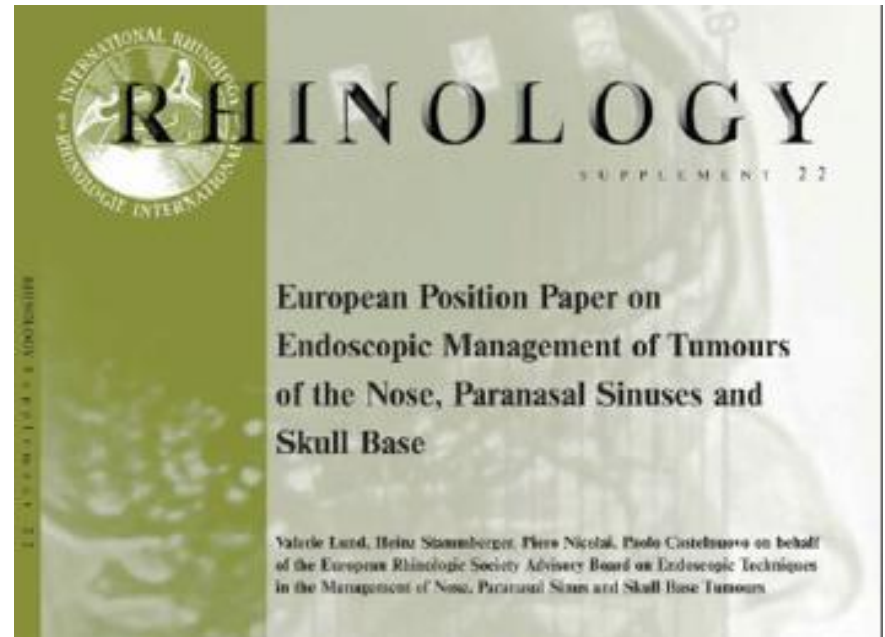
**S**

Kadish B

**S + (CHT) RT**

Kadish C/D

**CHT (RT) + S + (CHT) RT**



Prognostic factors: intracranial extension, orbital invasion, positive surgical margins

# Nasoethmoidal squamous cell carcinoma

Recommended strategy: CHT + S + RT

## **Endoscopic surgery for malignant tumors of the sinonasal tract and adjacent skull base: A 10-year experience**

Piero Nicolai, M.D.,\* Paolo Battaglia, M.D.,# Maurizio Bignami, M.D.,# Andrea Bolzoni Villaret, M.D.,\* Giovanni Delù, M.D.,# Tarek Khrais, M.D.,§ Davide Lombardi, M.D.,\* and Paolo Castelnuovo, M.D.#

Am J Rhinol. 2008 May-Jun;22(3):308-16. doi: 10.2500/ajr.2008.22.3170.

Original Article

## **Paranasal Sinus Squamous Cell Carcinoma Incidence and Survival Based on Surveillance, Epidemiology, and End Results Data, 1973 to 2009**

Benjamin Ansa, MD, MSCR<sup>1</sup>; Michael Goodman, MD, MPhE<sup>2</sup>; Kevin Ward, PhD, MPhE<sup>2</sup>; Scott A. Kono, DO<sup>3</sup>; Taofeek K. Owonikoko, MD<sup>4</sup>; Kristin Higgins, MD<sup>5</sup>; Jonathan J. Beitler, MD<sup>6</sup>; William Grist, MD<sup>5</sup>; Trad Wadsworth, MD<sup>5</sup>; Mark El-Deiry, MD<sup>5</sup>; Amy Y. Chen, MD<sup>5</sup>; Fadjo Raja Khuri, MD<sup>5</sup>; Dong M. Shin, MD<sup>5</sup>; and Nabil F. Saba, MD<sup>5</sup>



# Sinonasal undifferentiated carcinoma (SNUC)

Multimodal approach provides higher local control and DM-free survival compared to other treatments

**CHT + S + RT (CHT)**

## Trimodality Management of Sinonasal Undifferentiated Carcinoma and Review of the Literature

Mourad, Waleed F. MD, MSc, PhD<sup>\*,†</sup>; Hauerstock, David MD<sup>\*</sup>; Shourbaji, Rania A. MPH<sup>\*</sup>; Hu, Kenneth S. MD<sup>\*,†</sup>; Culliney, Bruce MD<sup>†</sup>; Li, Zujun MD<sup>†</sup>; Jacobson, Adam MD<sup>§</sup>; Tran, Theresa MD<sup>§</sup>; Manolidis, Spiros MD<sup>§</sup>; Schantz, Stimson MD<sup>§</sup>; Urken, Mark MD<sup>§</sup>; Persky, Mark MD<sup>§</sup>; Harrison, Louis B. MD<sup>\*,†</sup>

American Journal of Clinical Oncology:

December 2013 - Volume 36 - Issue 6 - p 584–588

# Limitations of endoscopic surgery

Nasal bones

Lacrimal pathways & antero-medial wall of maxillary sinus

Hard palate

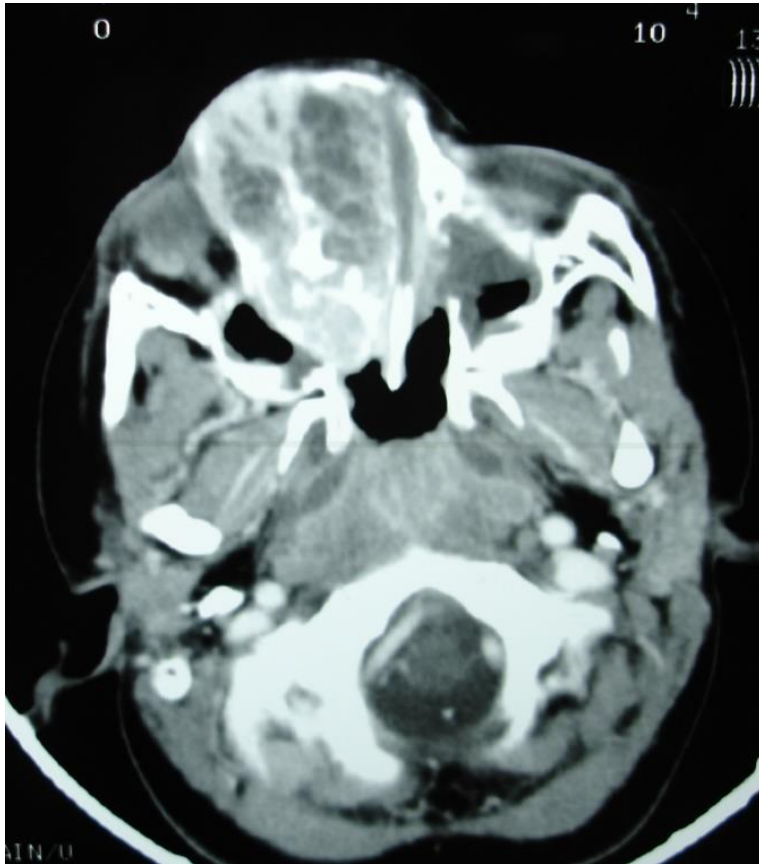
Anterior & lateral extension to the frontal sinus & bone

Intracranial extension?

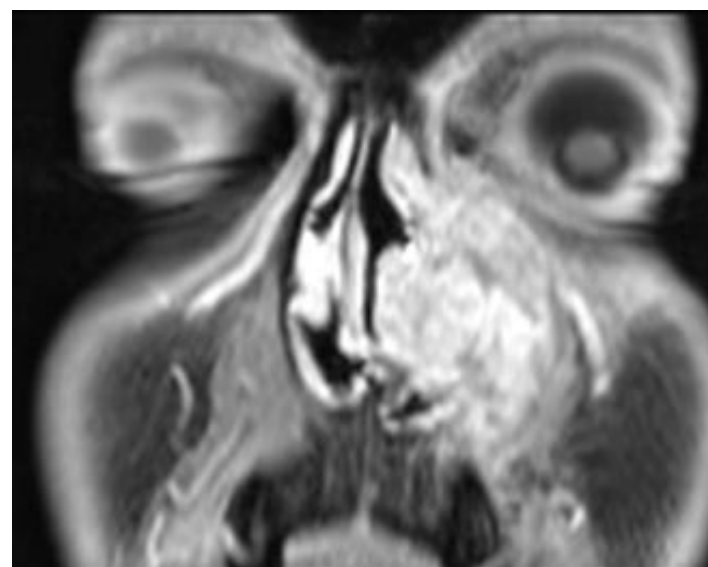
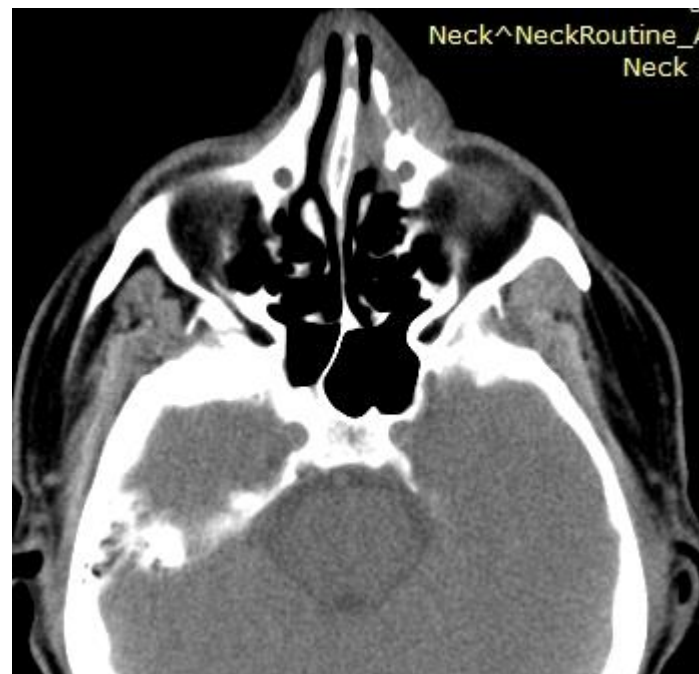
Intraorbital extension?

Indications for open procedures in the endoscopic era. Constantinidis J et al.  
Curr Opin Otolaryngol Head Neck Surg 2016, 24:50-56

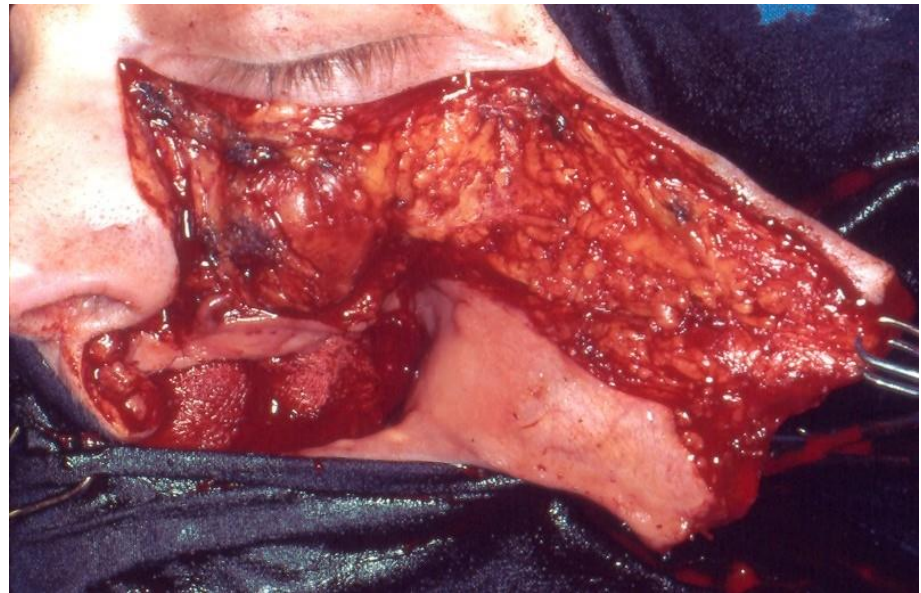
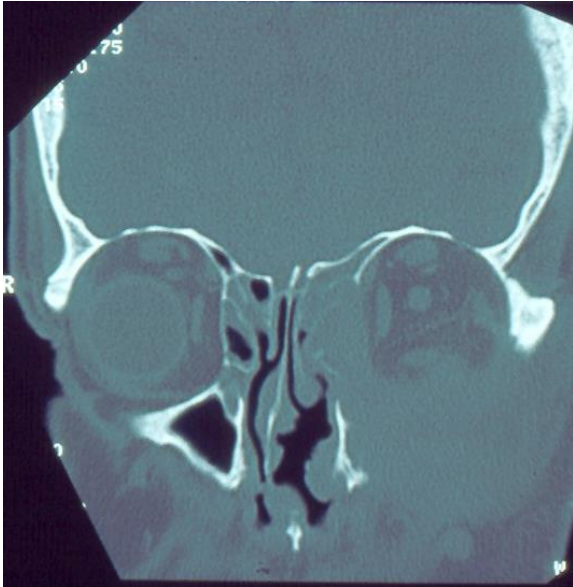
## SNUC – nasal bones infiltration



# Adenoidcystic Ca lacrimal pathways



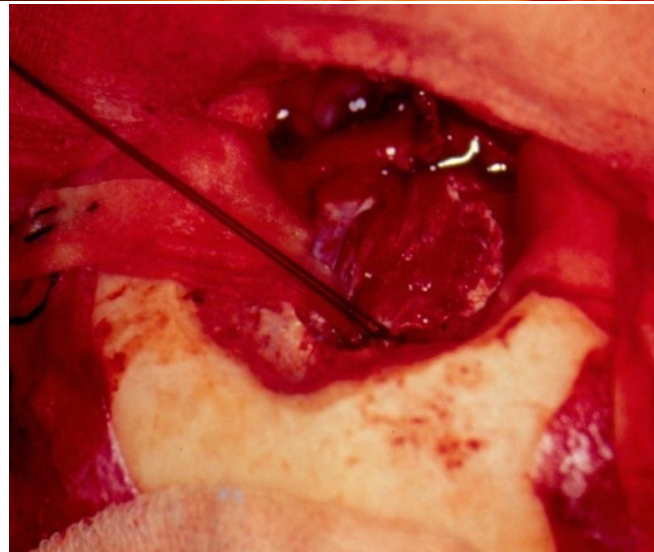
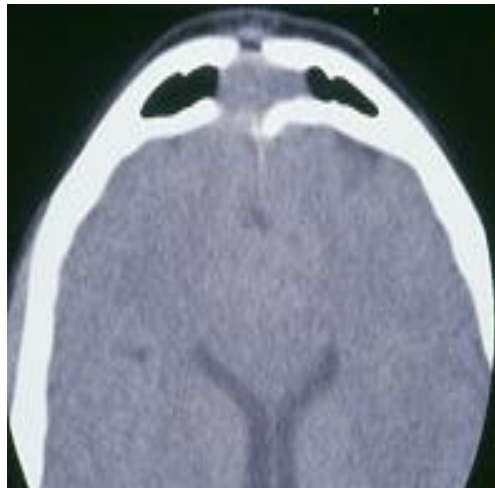
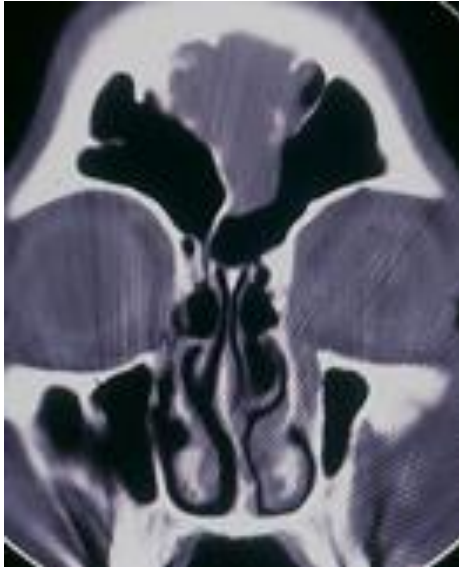
# Hard palate – anterior maxillary sinus wall - orbit





# Anterior & lateral extension to the frontal sinus & bone

## Primary frontal sinus carcinoma



Reconstruction of frontal defects with calvarial grafts. Dova S, Karkos P, **Constantinidis J.**  
Rhinology 2018, 56:297-302

# Brain parenchyma infiltration





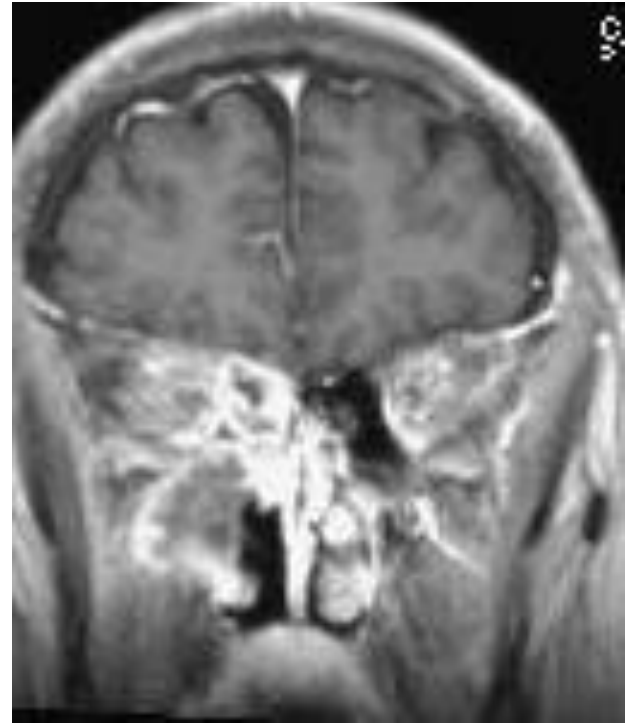
# What Are the Limits of Endoscopic Sinus Surgery?: The Expanded Endonasal Approach to the Skull Base

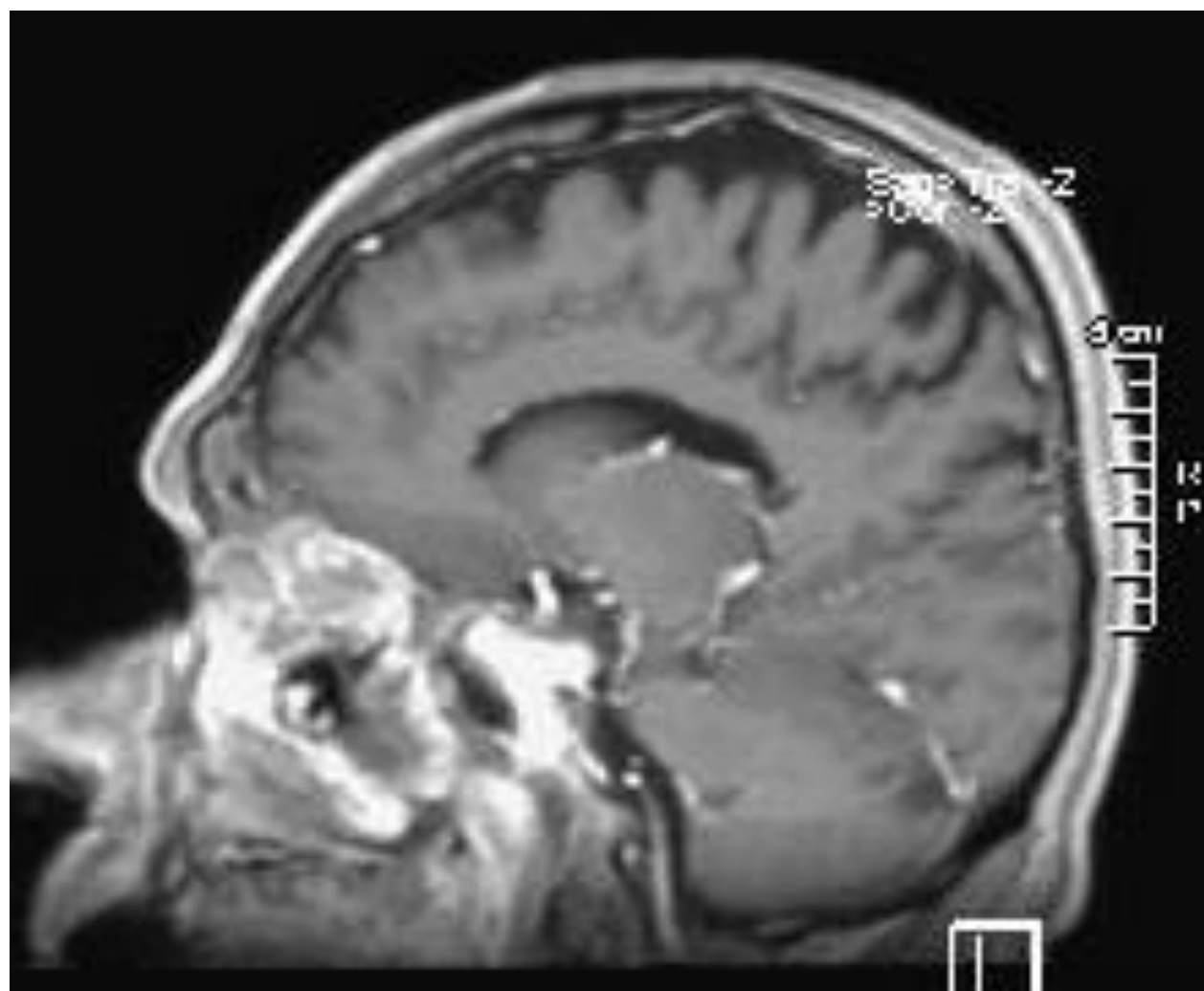
Carl H. Snyderman et al, Keio J Med 58: 152—160, 2009

**Conclusions:** The limits of endonasal cranial base surgery have not been realized. The choice of a surgical approach depends on **patient co-morbidities, tumor characteristics, and the skill and comfort level of the surgeons. If nerves or vessels need to be mobilized to reach the tumor, then an alternative approach should be considered.** Relative contraindications to an endonasal approach include tumor **involvement of superficial tissues**, the need for **vascular reconstruction** and the **duration of surgery**. If sinusitis is identified, an intradural approach should not be undertaken until the infection has cleared.

Final decision intraoperatively!

# Sinonasal undifferentiated carcinoma (SNUC)







# Follow up

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## Malignant sinonasal tumours

Follow-up for life



Post-operative baseline MRI is recommended



Endoscopy and MRI every 4 months  
the 1st year



Endoscopy and MRI every 6 months for 5 year, and subsequently yearly

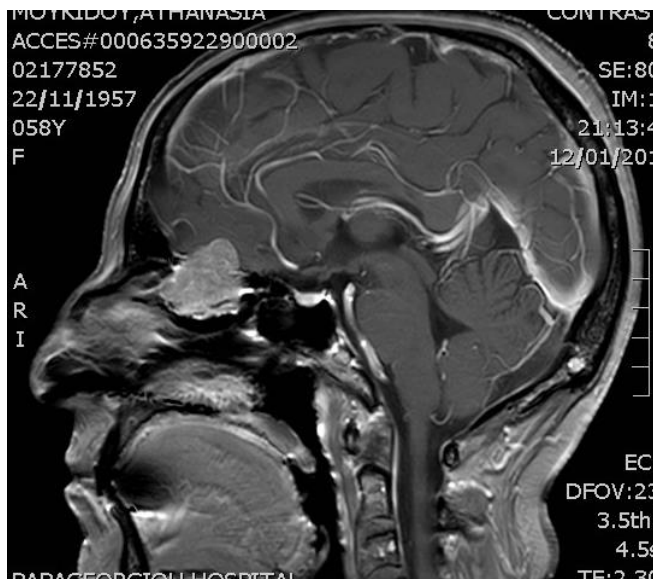
# Management of sinonasal neoplasms

## **Multidisciplinary team approach**

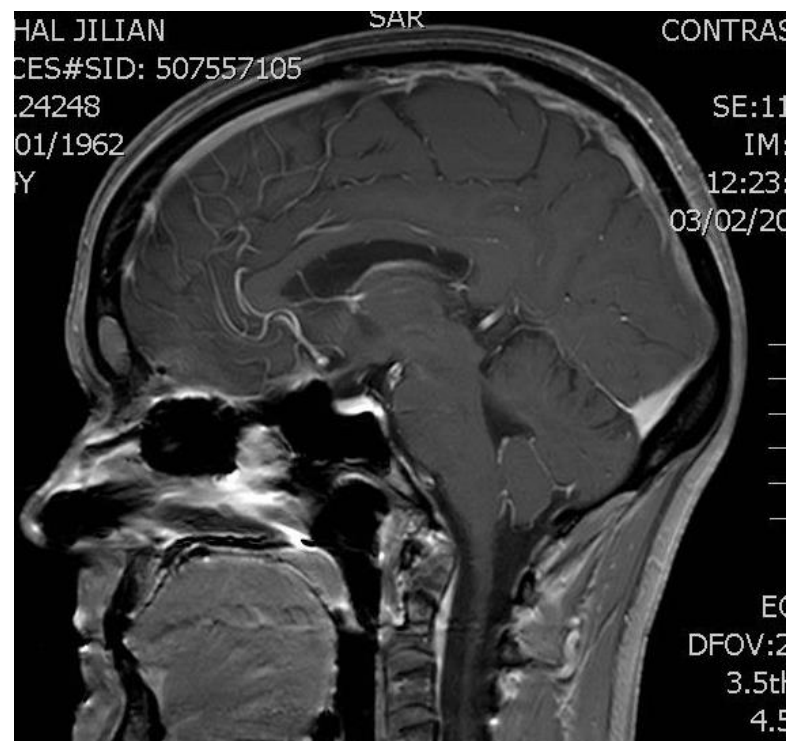
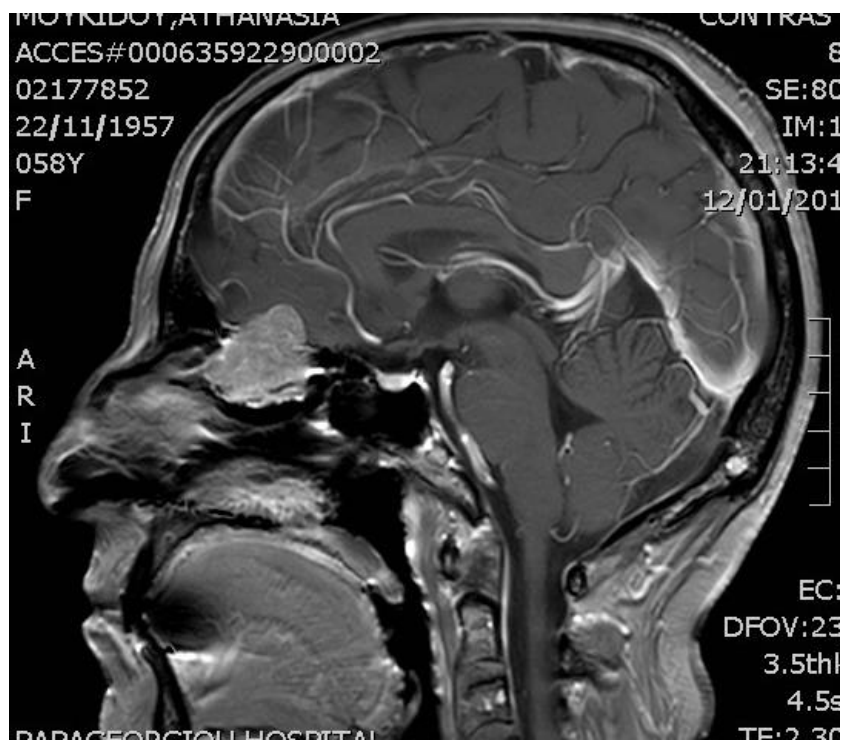
- Pediatrician
- Radiologist
- Head & Neck Surgeon
- Neurosurgeon
- Oral prosthetics specialist
- Radiation oncologist



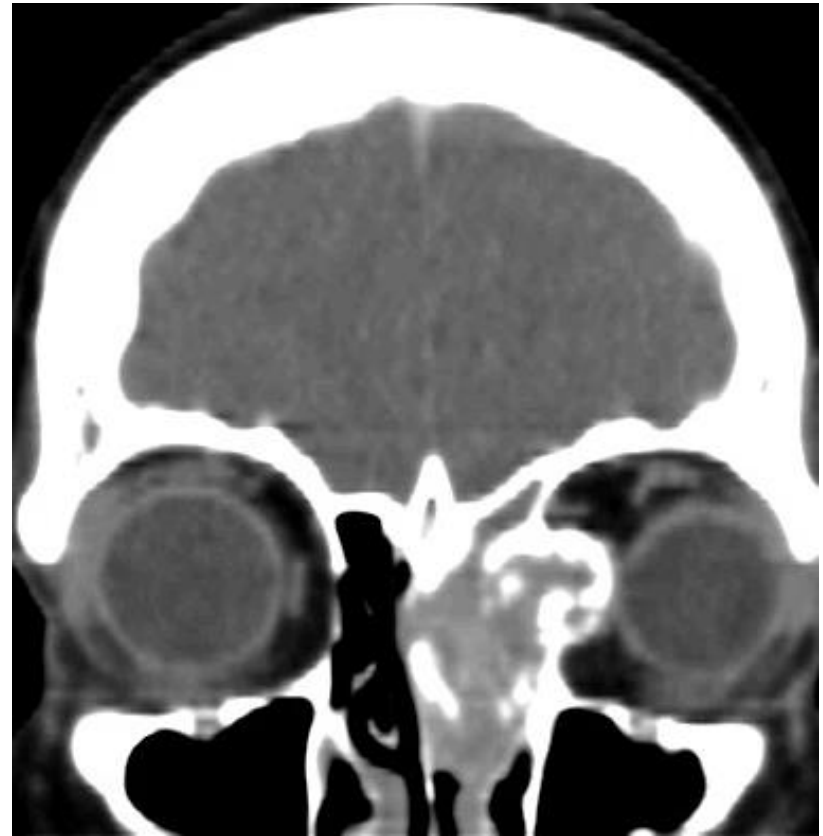
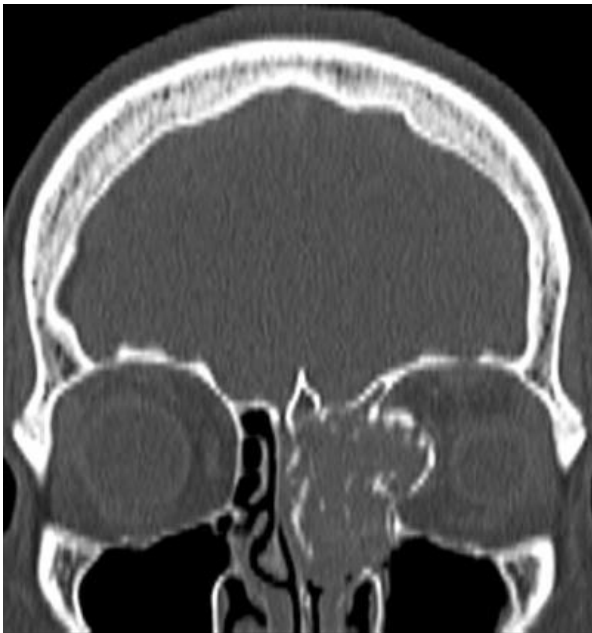
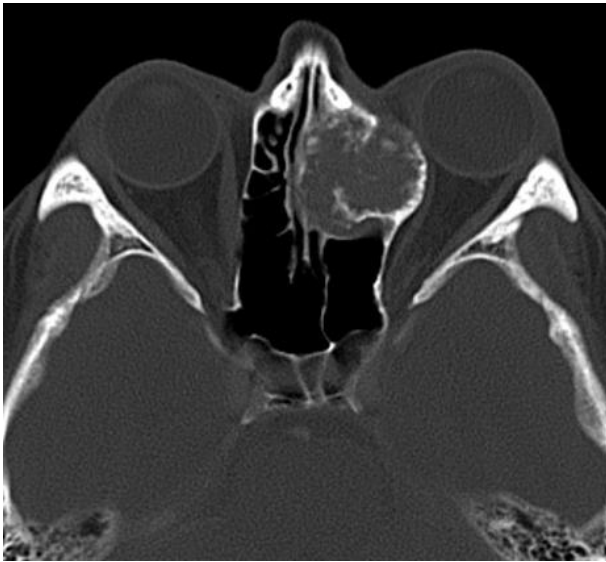
# Case 1: olfactory neuroblastoma

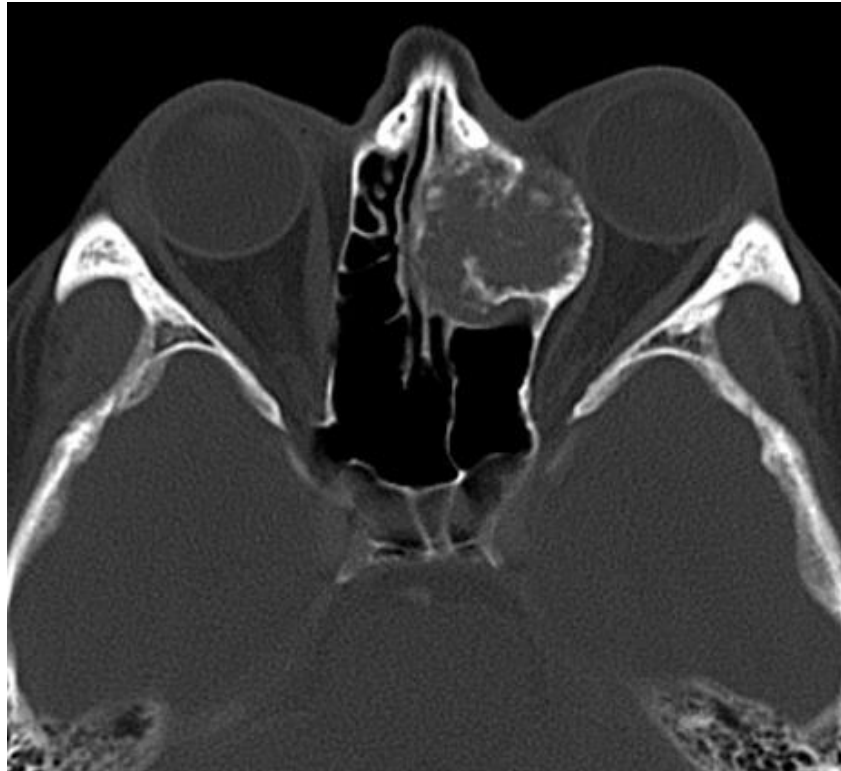






# Biphenotypic sinonasal sarcoma (*disassembling of lesion – cavitation technique*)



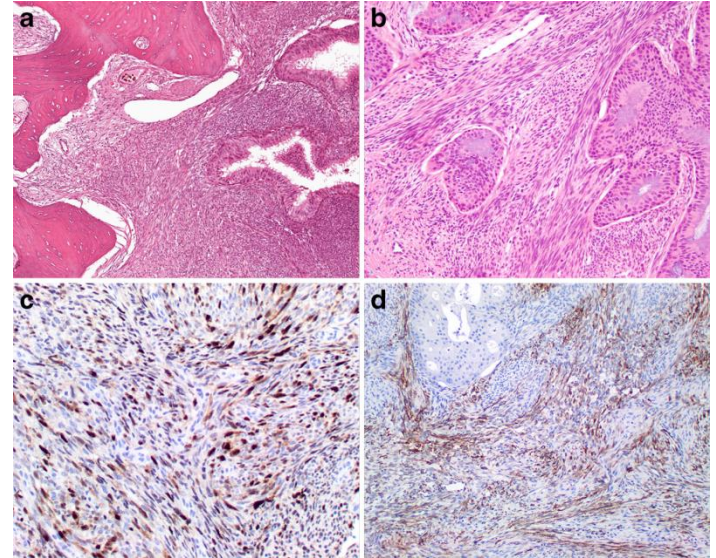






# Update from the 4th Edition of the World Health Organization Classification of Head and Neck Tumours: Tumors of the Nasal Cavity, Paranasal Sinuses and Skull Base, 2017

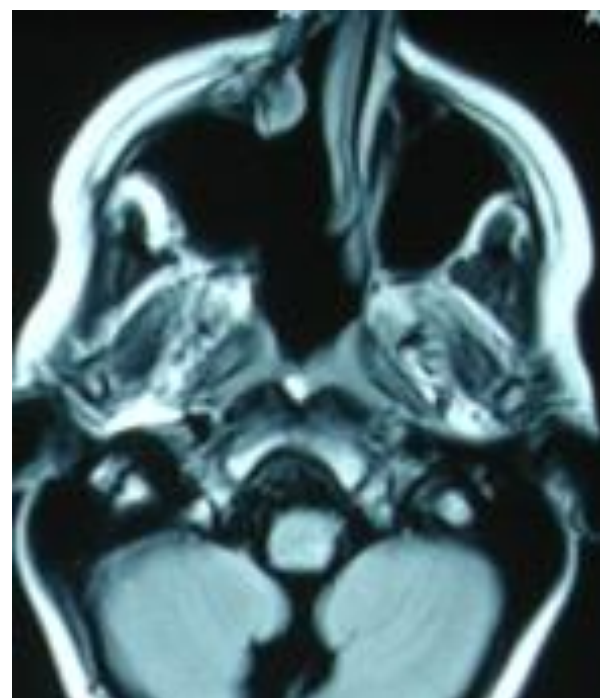
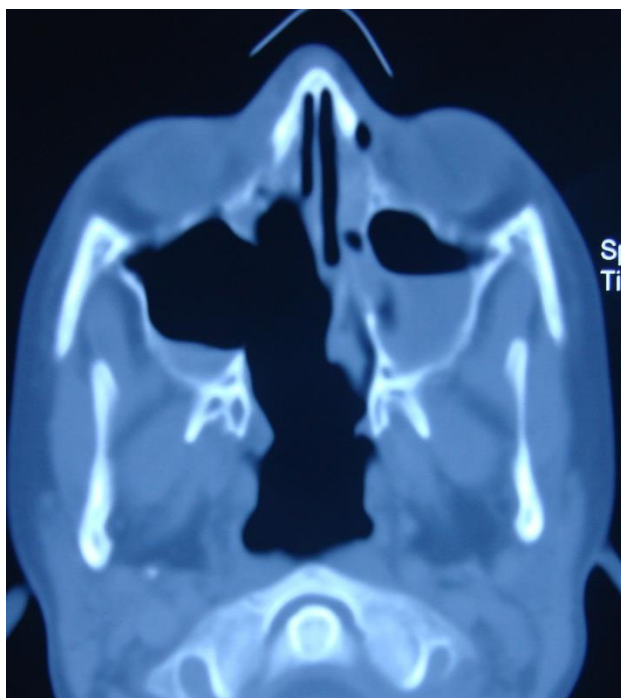
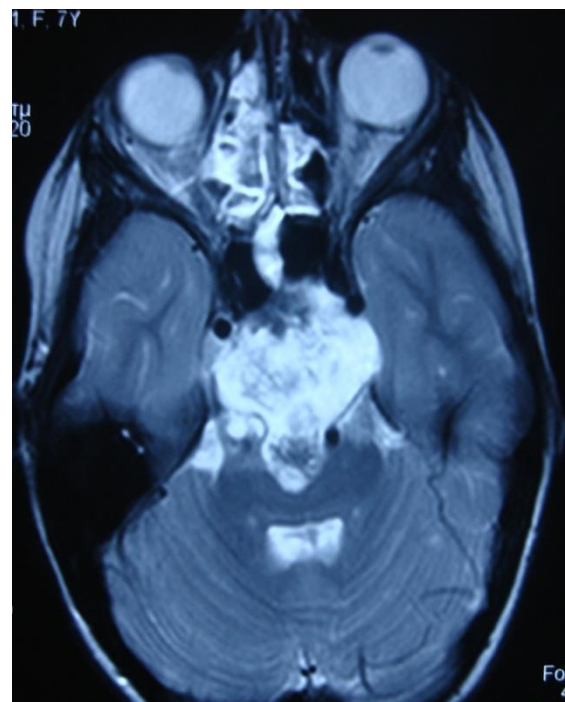
## Biphenotypic sinonasal sarcoma (BSNS)



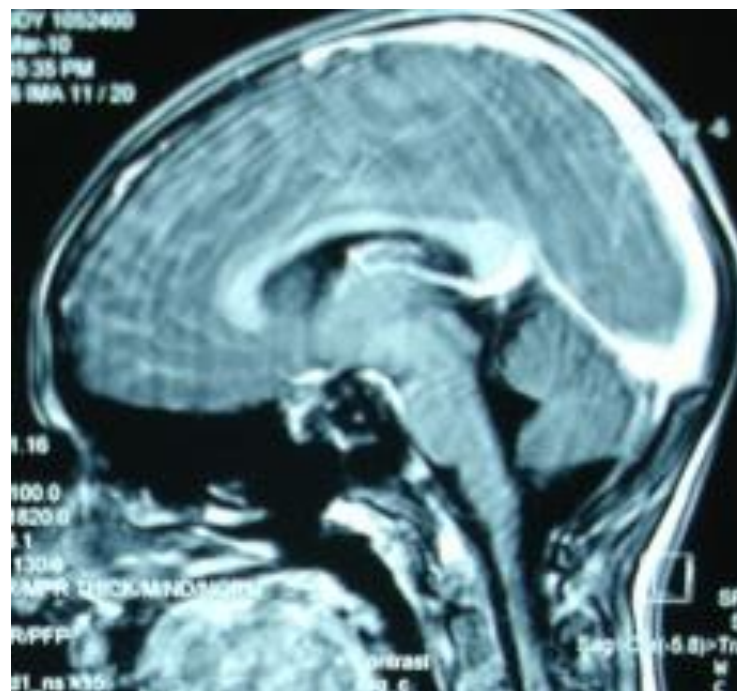
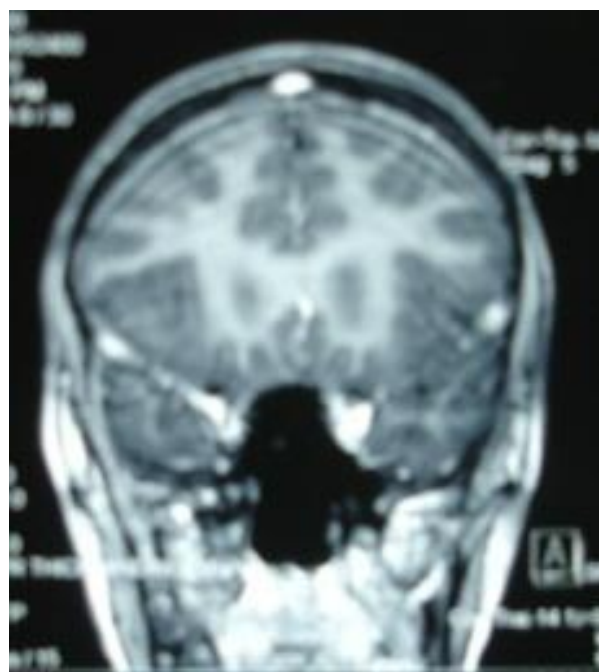
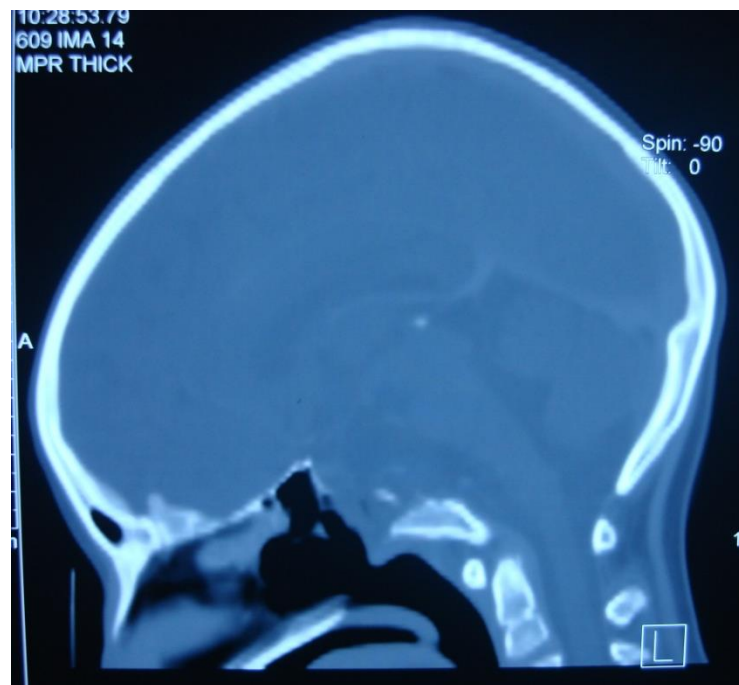
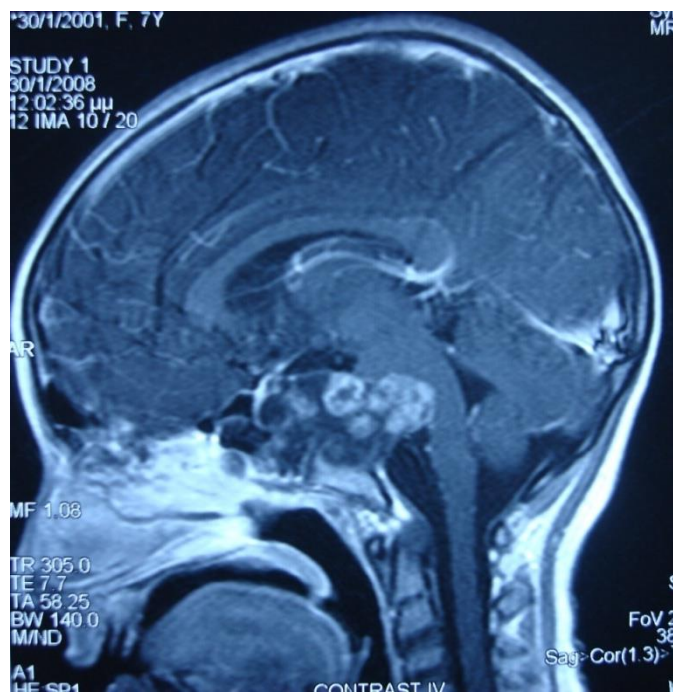
Is a “low-grade sinonasal sarcoma with neural and myogenic differentiation,” which can arise anywhere in the sinonasal tract, it has a predilection for the superior aspects of the nasal cavity and ethmoid sinuses. BSNS tends to demonstrate slow, progressive growth. While almost half of patients with BSNS ((50 published) experienced local recurrences, none of the tumors have metastasized, and only one patient to date has died of their disease.











ΙΩΑΝΝΗΣ Α. ΚΩΝΣΤΑΝΤΙΝΙΔΗΣ

# ΡΙΝΟΛΟΓΙΑ

Παθήσεις και χειρουργική ρινός, παραρρινίων κόλπων και βάσεως του κρανίου





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THE DATE

# ERS 2021

September 26-30, 2021  
Thessaloniki, Greece



**ERS-ISIAN-IRS**

at the Mediterranean waterfront of Thessaloniki

"The nose across the lifespan"

28<sup>th</sup> Congress of European Rhinologic Society -  
39<sup>th</sup> Congress of the International Society of  
Inflammation and Allergy of the Nose (ISIAN) &  
21<sup>st</sup> Congress of the International  
Rhinologic Society (IRS)