

## Head and Neck Imaging Pearls



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## Objectives

Review several basic concepts that aid in image interpretation:

- Beware of the common lesion
- Location and significance of named nodes in the image based classification system
- Common patterns of vascular displacement and the location of normal structures with reference to vessels
- Recognize complications of common pathologies on cross-sectional imaging

## Pearl # 1

You should be reading current literature, attending CME and interdepartmental conferences

Best ways to improve diagnostic skills:

- **Broad Approach**
  - Read a large volume of cases and obtain follow – up
  - Save interesting cases and those with nice normal anatomy
- **Focused Approach**
  - Evaluate a large number of cases based on pathology or location
  - Typically performed in the process of writing papers and creating exhibits

The information I'm presenting today are excerpts from several of the many exhibits I've worked on with Wendy Smoker, Lindell Gentry and Roy Holliday. In the process of creating these exhibits I've learned:

- Relevant imaging anatomy
- An approach for the analysis of pathology in various locations in the H&N
- Pertinent clinical information
- How to share information in a fashion that promotes understanding and encourages life long learning

## Pearl # 2

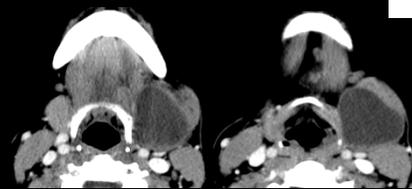
**Beware of what you think is a common lesion !**

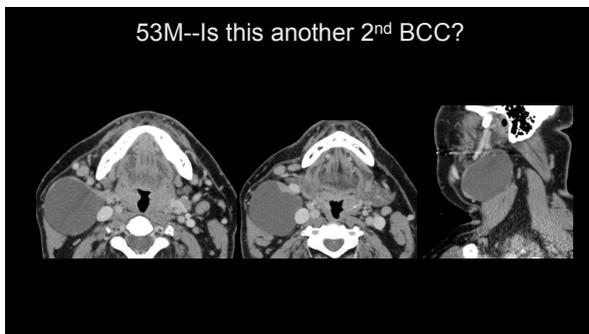
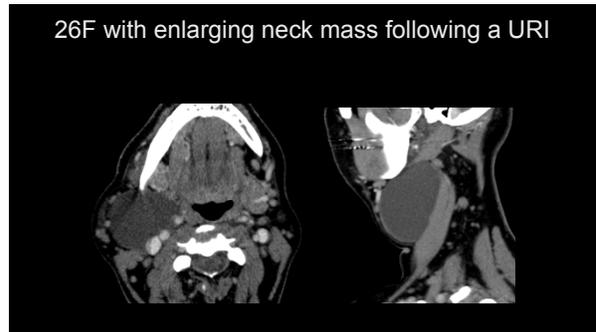
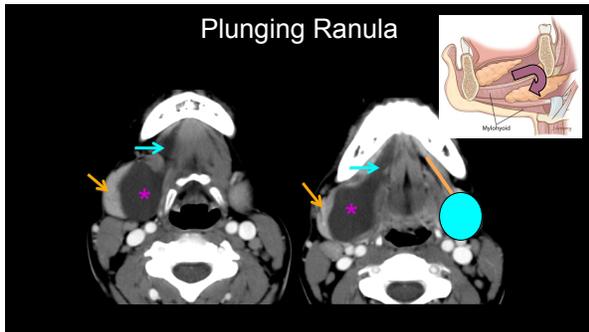
Whenever you read a study, answer the following questions:

- What do you see?
- What do you think it is ?
- Are you sure ?



What do you see?  
What do you think it is ?  
Are you sure ?





### Pearl # 3

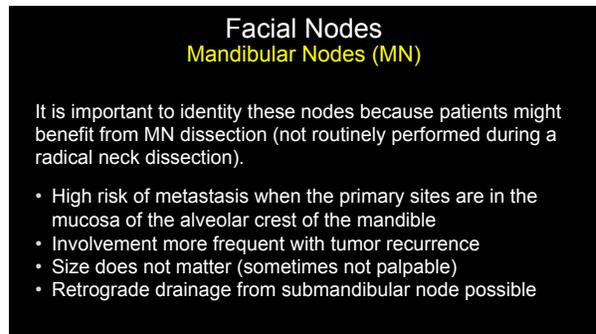
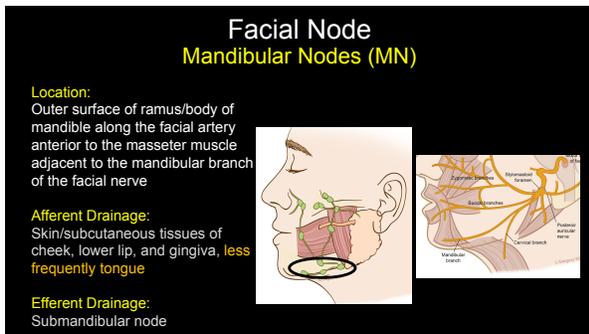
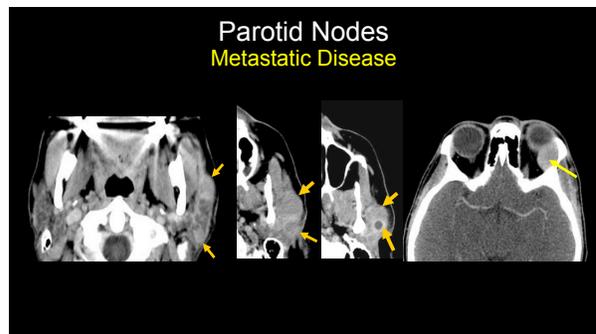
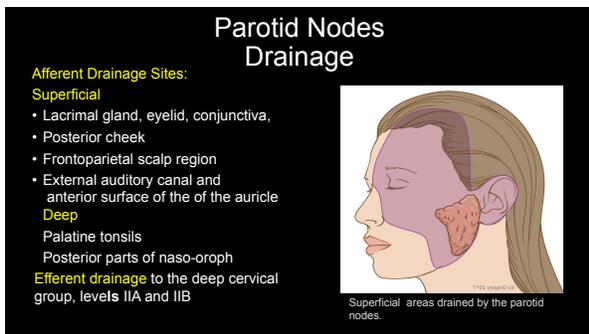
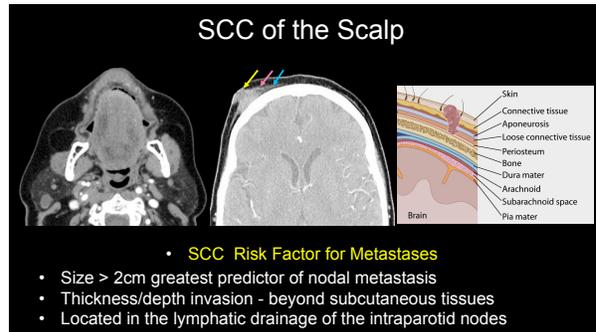
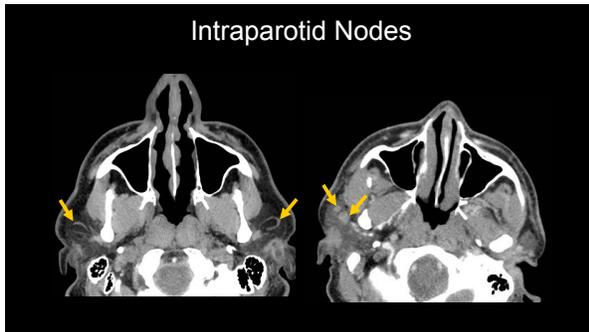
Learn the location and significance of the named nodes in the image-based classification system.

### Parotid Nodes

- Last salivary gland to encapsulate
- Only salivary gland with intraglandular nodes

**Location:**

- Superficial (preauricular nodes)
- Intraglandular (parotid nodes)



### Facial Nodes Mandibular Nodes (MN)

Recurrent Cheek Melanoma: Enlarged Rt. MN anterior to the masseter with increased uptake on PET.

Recurrent Facial SCC: Enlarged right MN anterior to the masseter with increased uptake on PET.

Courtesy of Dr. Larry Ginsberg

### Facial Node Buccinator Nodes (BN)

**Location:** Lateral to the buccinator m. or in the buccal fat pad

**Afferent Drainage:** Lower eyelid, nose, and cheek

**Efferent Drainage:** Submandibular nodes (Level IIB)

Usually not palpable even when enlarged

Courtesy of Dr. Larry Ginsberg

### Facial Node Buccinator Nodes (BN)

Recurrent Olfactory Neuroblastoma: Bilateral enlarged BNs lateral to buccinator m. and Lt. lateral retropharyngeal node with increased uptake on PET.

Metastatic Nasal Melanoma: Enlarged left BN lateral to the buccinator m. with increased uptake on PET.

Courtesy of Dr. Larry Ginsberg

### Facial Node Infraorbital Node (IN)

**Location:** Canine fossa or nasolabial fold

**Afferent Drainage:** Medial eye, nasolabial fold, and nose

**Efferent Drainage:** Buccinator and submandibular nodes (Level IIB)

Lymphoma has a predilection for IN

Courtesy of Dr. Doug Phillips

### Facial Node Infraorbital Node (IN)

Orbital NHL: T1 isodense soft tissue masses in the orbits and infraorbital regions.

Courtesy of Dr. Doug Phillips

### Facial Node Malar

**Location:** Superficial to malar eminence, and lateral to the eyes

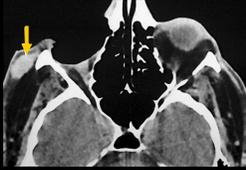
**Afferent Drainage:** Eyelid, lateral eye, and temporal region

**Efferent Drainage:** Parotid gland

The only FN that drains to the parotid

Courtesy of Dr. Doug Phillips

## Facial Node Malar



Ocular Melanoma: S/P enucleation of the Rt. globe.  
Enlarged Rt. malar node, adjacent to the malar eminence.  
Courtesy of Anthony Mahoush MD. "Facial Lymph Node: Normal and Abnormal CT Appearance." Radiology. 1993;188:695-700

## Pearl # 4

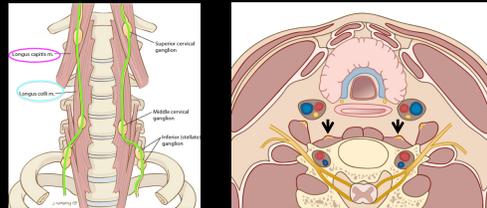
Go with the Flow

Know common patterns of vascular displacement and the location of normal structures with reference to adjacent vessels.

## Displacement of the Carotid Sheath

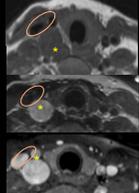
## Cervical Sympathetic Chain (CSC)

The CSC runs longitudinally over the longus colli and capitis muscles, posteromedial to the CS, deep to the prevertebral fascia. Lesions involving the CSC typically cause anterior or anterolateral displacement of the CS.



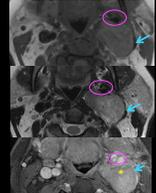
## Cervical Sympathetic Chain Schwannoma

### Infrahyoid CSCS



Anterolateral displacement of the CS structures

### Suprahyoid CSCS

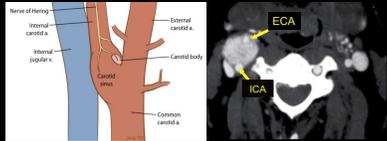


Ant. displacement of the CA and lateral displacement and compression of the IJV

## Displacement of Vessels in the Carotid Sheath

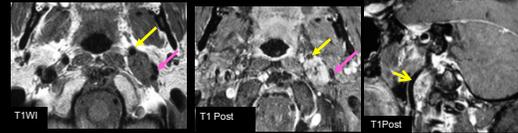
## Carotid Paraganglioma Aka Carotid Body Tumor

These lesions originate from the carotid body, at the carotid bifurcation.  
CT Findings:  
Intense enhancement  
Splays carotid bifurcation (anterior displacement of the ECA)  
Can encase but does not alter the caliber of the vessels



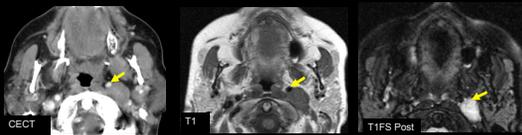
## Vagal Paraganglioma

ICA displaced anteriorly  
Splaying ICA and IJV

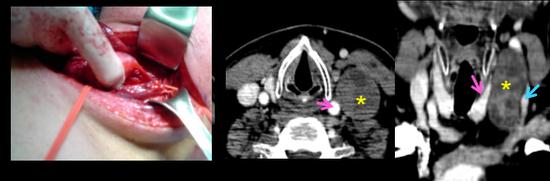


## Vagal Schwannoma

ICA is displaced anteriorly  
No signal voids in the lesion

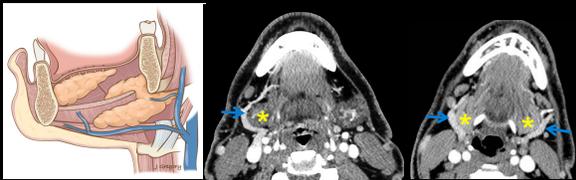


## Vagal Schwannoma Infrathyoid Carotid Space

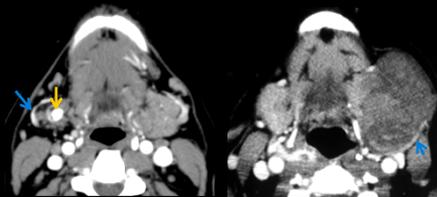


Heterogenous mass splaying the CCA and IJV.

## Anterior Facial Vein and Submandibular Gland



## Anterior Facial Vein and Submandibular Gland



Submandibular Stone

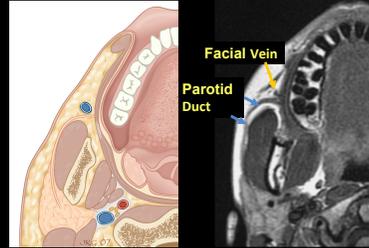
Benign Mixed Tumor

### Submandibular Nodes

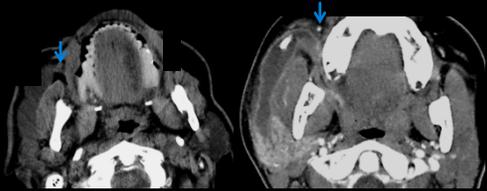


### Parotid Duct

How do you find the parotid duct ?



### Parotid Duct



### Sialocele



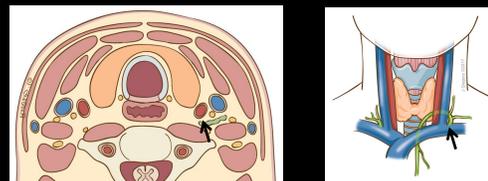
25 y/o M with a history of facial trauma.

### Mucoepidermoid Ca of the Gingiva

There should be a fat plane between the AFV and the buccinator muscle. Look at the distance between the maxilla and the AFV.



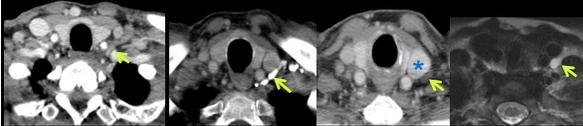
### Thoracic Duct



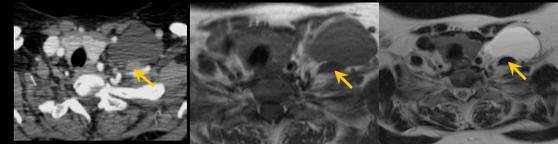
The TD travels posterior to the left CS and terminates in the posterior lateral aspect of the venous angle (junction of the left IJ and subclavian vein).

### Thoracic Duct

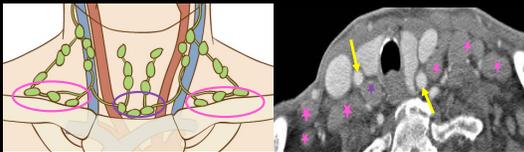
The TD can have a number of different appearances on cross-sectional imaging.



### Thoracic Duct Lymphocele



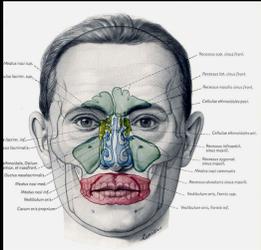
### Supraclavicular Nodes



### Pearl # 5

Recognize complications of common pathologies on cross-sectional imaging

The parameningeal and periorbital location of the sinuses is responsible for potential intracranial and orbital complications.



### Complications of Sinusitis

#### Frontal/Ethmoid Sinusitis

- Orbital cellulitis and abscess and subperiosteal abscess
- Meningitis
- Epidural abscess
- Subdural empyema
- Frontal lobe abscess
- Superior sagittal sinus thrombosis
- Potts Puffy tumor (frontal)

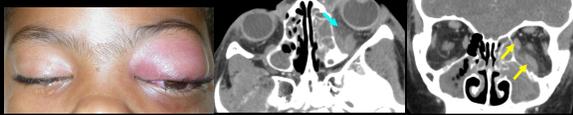
#### Sphenoid Sinusitis

- Cavernous sinus thrombosis
- Meningitis
- Temporal lobe and epidural abscess
- Superior orbital fissure syndrome: proptosis, orbital pain, and ophthalmoplegia (CN III, IV, VI) + numbness in ophthalmic division of trigeminal nerve

Direct extension from the maxillary sinus to critical structures is rare.

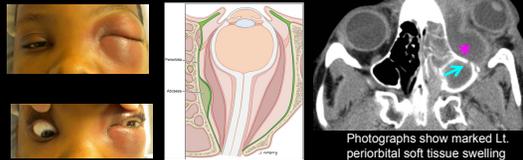
## Orbital Complications Cellulitis

Inflammation of the intraorbital soft tissues posterior to the orbital septum



## Orbital Complications Subperiosteal Abscess

Collections of purulent material between the bone and periosteum



Photographs show marked Lt. periorbital soft tissue swelling and restricted Lt EOM movement.

## Intracranial Complication Cavernous Sinus Thrombosis

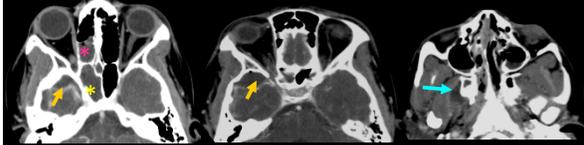
### Imaging Findings:

- Filling defects in, or lack of, enhancement of CS
- Enlargement of CS (look for lateral convexity)
- Engorgement of superior ophthalmic vein (SOV) +/- thrombosis
- Enlarged EOM and proptosis

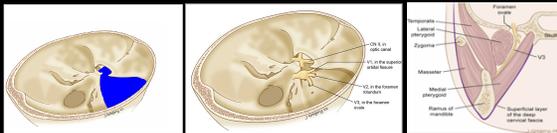


## Intracranial Complications

Epidural Abscess with Extension into Masticator Space



## Intracranial Complications Epidural Abscess with Extension into Masticator Space



## Intracranial Complications

Subdural Empyema with Extension into Masticator Space

