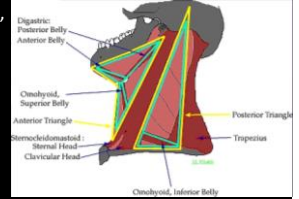


# Head and Neck Radiology

Prof.Dr.Nail Bulakbaşı

## Traditional approach

- Use major gross anatomic landmarks to divide neck into pharynx, hypopharynx, larynx; muscles serve as landmarks for various superficial triangles.
- Ignores important deep anatomic relationships
- Works poorly with cross-sectional imaging.

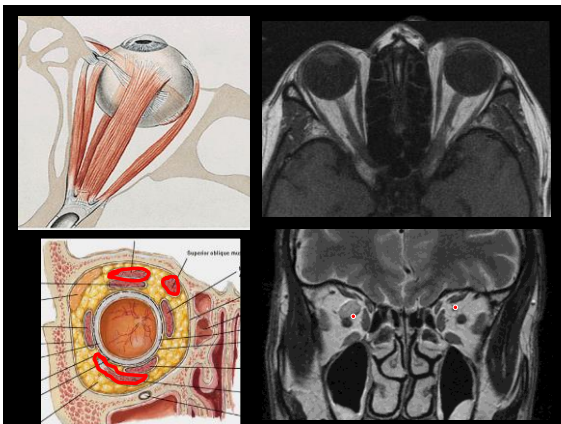
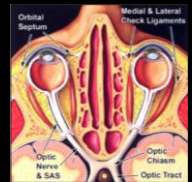


## Cross-sectional anatomy

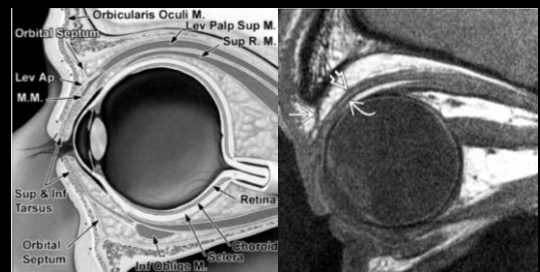
- Neck is imaged primarily with axial images.
- Fascial planes divide the anatomy into various compartments
- Commonly separate the anatomy into supra- and infrahyoid neck
- Each compartment "space" contains distinct anatomic structure
- Eye and orbit
- Nasal cavity and sinuses
- Supra-hyoid neck
- Infra-hyoid neck

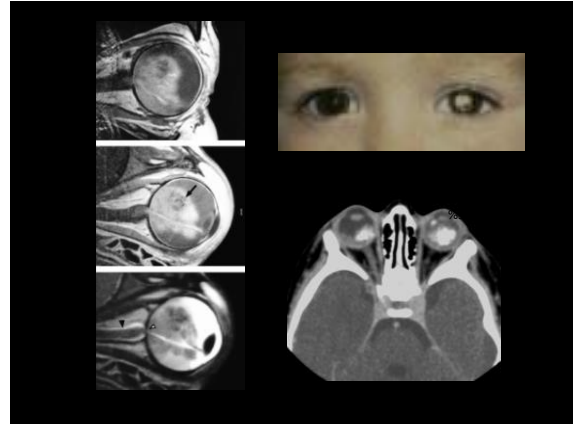
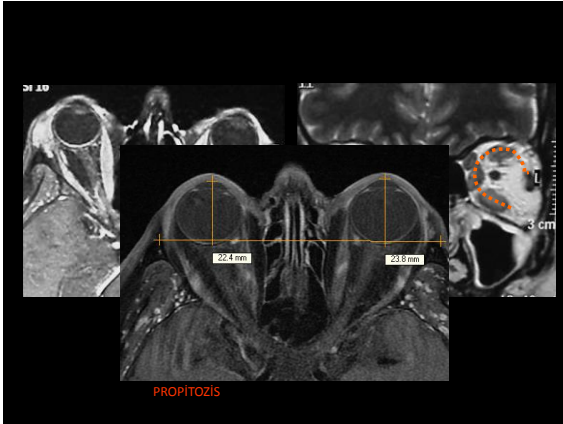
## Eye and Orbit

- Globe
- Orbital septum
- Muscle cone (extraocular mm.)
- Optic nerve
- Orbital fat
- Lacrimal gland (makes tears)
- Lacrimal sac (collects tears)



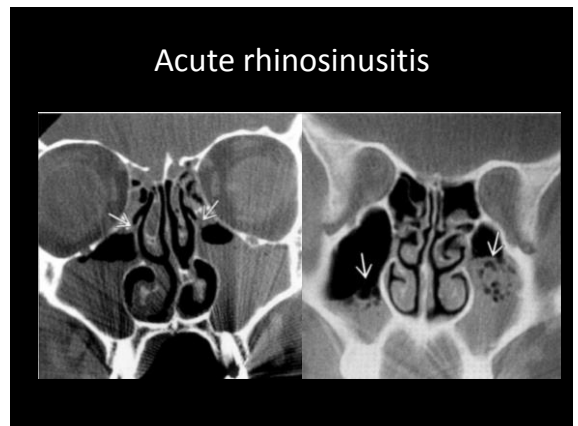
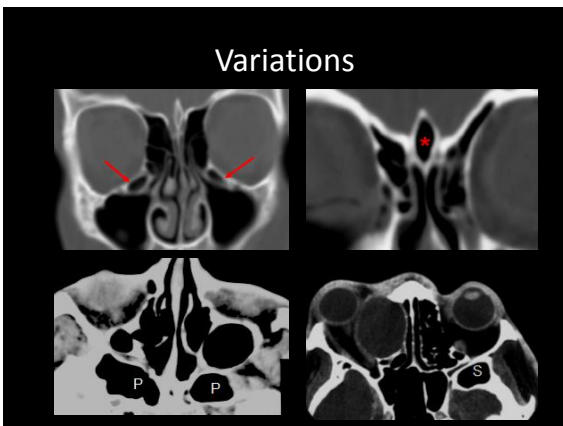
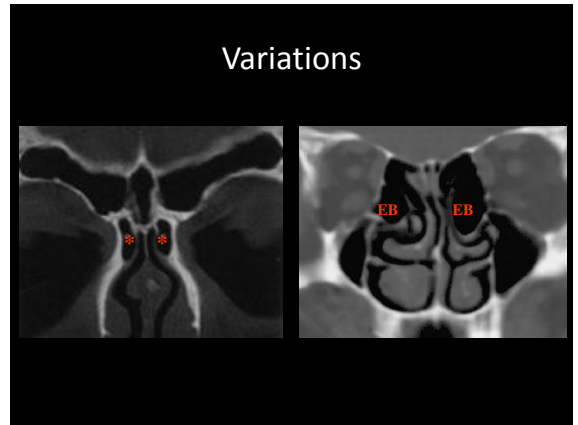
## Eye and Orbit





### Nasal Cavity and Sinuses

- Nasal cavity
  - Nasal turbinates
  - Nasal septum
  - Lacrimal sac
- Sinuses
  - Frontal
  - Ethmoid
  - Sphenoid
  - Maxillary



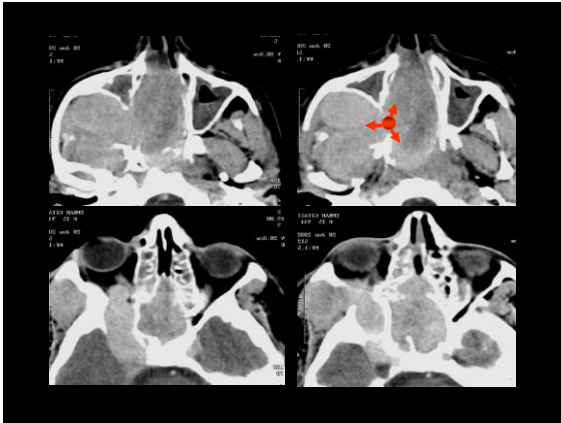
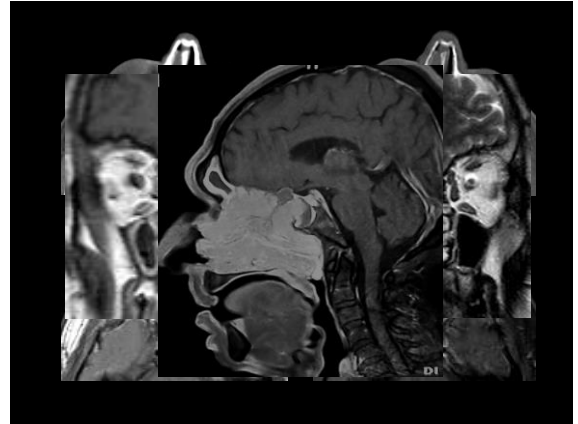
## Benign lesions

### Epithelial

- Papillomas
- Squamous
- Inverted 75%
- Cylindrical cell

### Mesenchymal

- Neural ectodermal tumors
- Juvenile angiofibroma



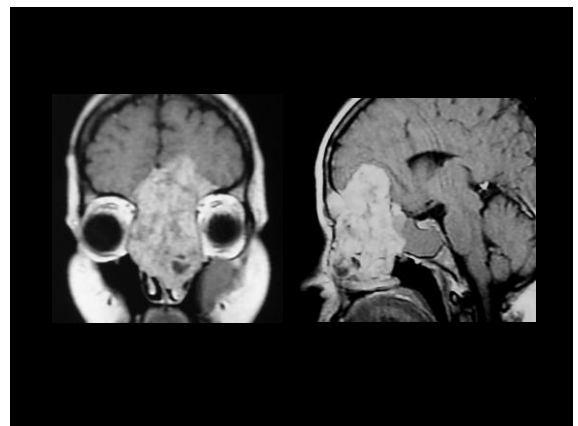
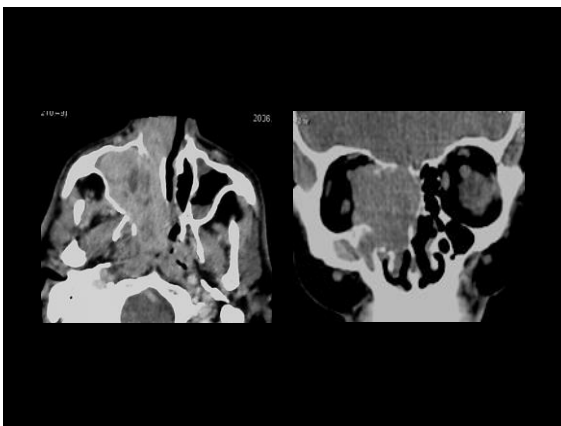
## Malignant lesions

### Epithelial

- Squamous cell carcinoma
- Adenocarcinoma
- Adenoid cystic carcinoma
- Mucoepidermoid carcinoma
- Malignant melanoma
- Olfactory neuroblastoma

### Nonepithelial

- Rhabdomyosarcoma
- Fibrosarcoma
- Chondrosarcoma
- Osteogenic sarcoma
- Malignant fibrous histiocytoma
- Lymphoma
- Extramedullary plasmocytoma

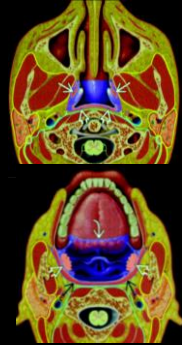


## Neck compartments

Neck spaces	Suprahyoid	Infrahyoid
Pharyngeal mucosal space	+	
Parapharyngeal space	+	
Masticator space	+	
Parotid space	+	
Carotid space	+	+
Retropharyngeal space	+	+
Danger space	+	+
Perivertebral space	+	+
Visceral space	+	
Posterior cervical space		+

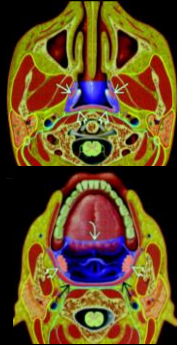
## Pharyngeal mucosal space

- Contents:
  - Mucosal surface; also lymphoid tissues, tonsils muscles of pharynx and palate
- Most common mass:
  - Squamous cell carcinoma (SCCA)
  - Lymphoma minor salivary gland tumors less common
- Only space completely visible to referring physician

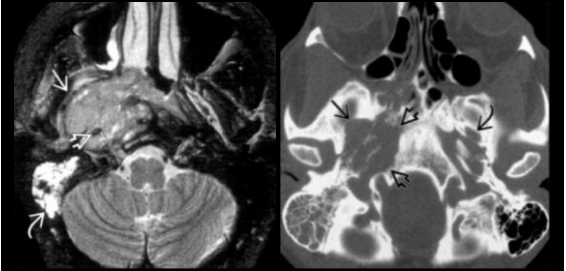


## Parapharyngeal Space

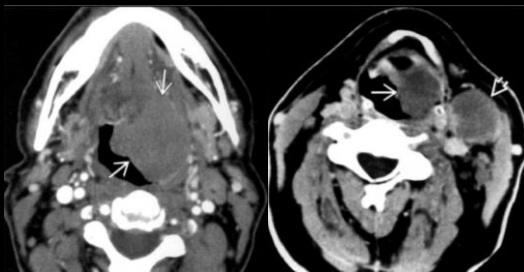
- Contents
  - Mostly fat; also arteries, veins, branches of trigeminal nerve.
- Most common mass
  - Abscess spread from adjacent space
  - Masses originating from PPS are rare
- Most important use is mass effect upon this space from lesions arising in other spaces.



## Nasopharyngeal carcinoma

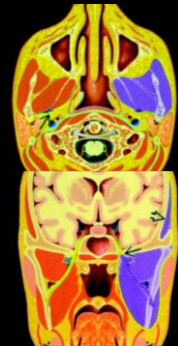


## Non-Hodgkin lymphoma

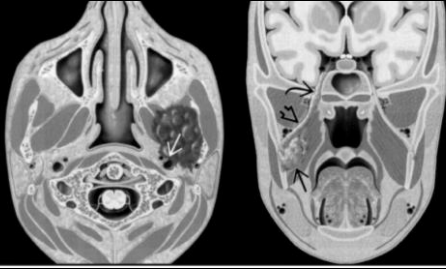


## Masticator space

- Contents
  - Mandible
  - Muscles attached to it
  - Branch of trigeminal nerve
- Most common mass
  - Dental stuff (odontogenic abscess)
  - Sarcoma
  - Invasive carcinomas (SCCA from oral cavity) less common

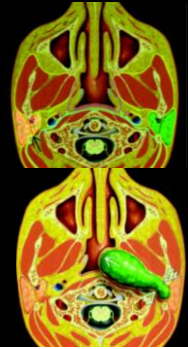


### Masticator space tumor



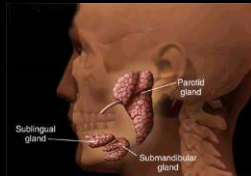
### Parotid space

- Contents:
  - Parotid gland
  - Facial nerve
  - Lymph nodes
  - Arteries and veins
- Most common mass:
  - Parotid tumor (benign or malignant)
  - Metastatic disease to lymph nodes.
  - Parotid is only salivary gland with both lymph nodes and glandular tissue



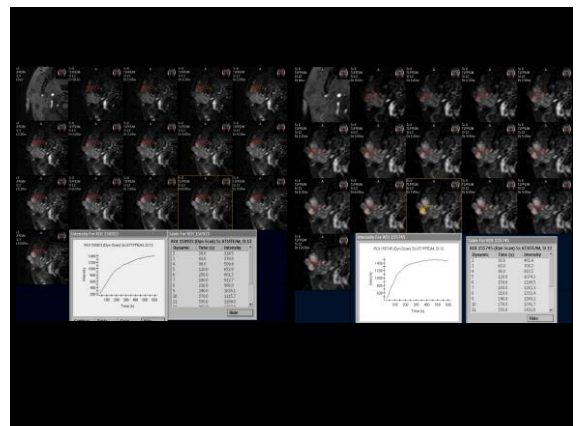
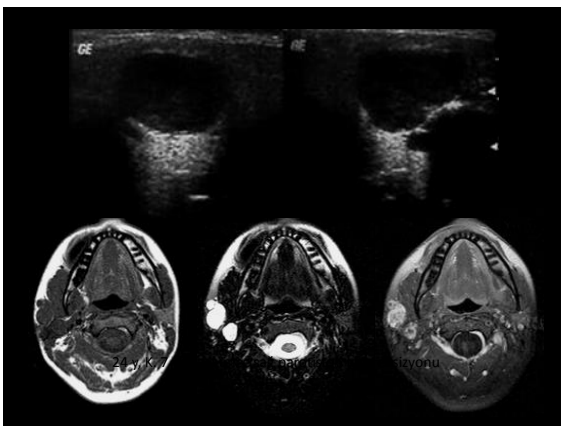
### Salivary gland

- Inflammations
- Stone disease
- Tumors
  - Adenomas
  - Carcinomas
  - Non-epithelial tumors
  - Lymphoma
  - Metastases
  - Tumor like lesions



### Pleomorphic adenoma

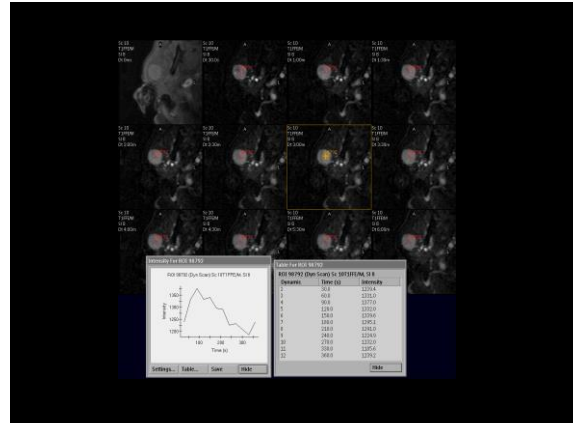
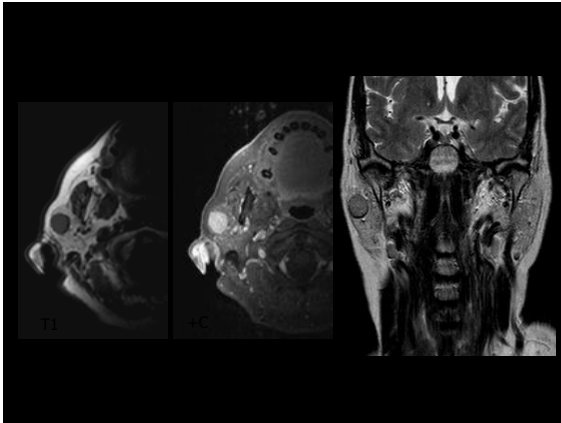
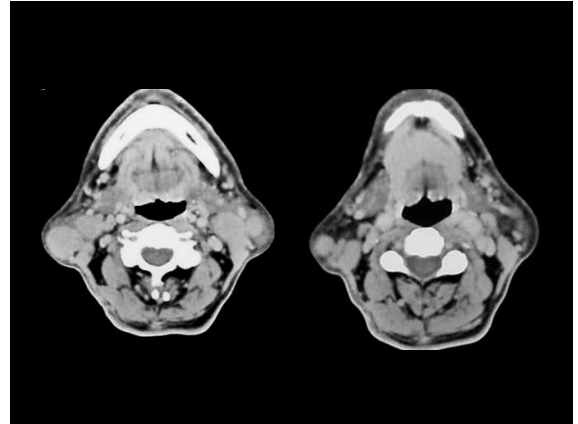
- 80% to 90% of salivary gland tumors
  - 80-90% at parotid, 80% to 90 at superficial lobe
- US: microlobulated contours, well-circumscribed, hypoechoic lesion
- Markedly hyperintense on T2!
- Necrosis, hemorrhage, calcification!
- Malignancy and multicentric recurrence rate of 15%!





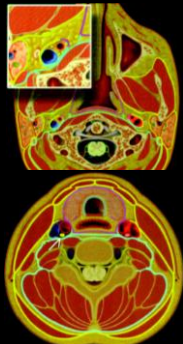
## Warthin's tumor

- Well-circumscribed, homogeneous mass in the parotid tail
- 6-8% of salivary gland tumors
- 6-10% bilateral, 10-20% multicentric
- LAP + / -
- Solid / cystic / cysts + focal solid areas
- Typically hyperactive in scintigraphy
- Dynamic contrast-enhanced MRI

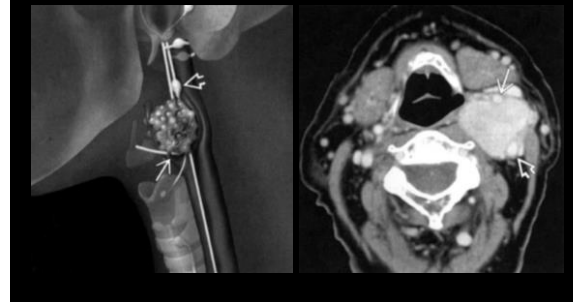


## Carotid space

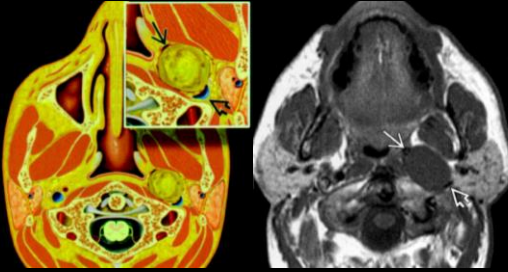
- Contents:
  - Carotid and jugular vessels
  - Lymph nodes
  - Cranial and sympathetic nerves
- Most common mass:
  - Paraganglioma, schwannoma, metastatic disease to lymph nodes
- Prominent normal vessels also common
- Long space --skull base to arch of aorta



## Carotid body paraganglioma

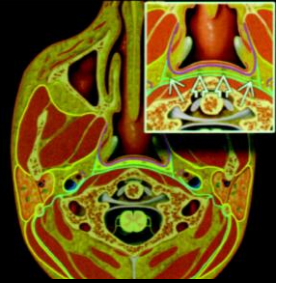


### Carotid space schwannoma

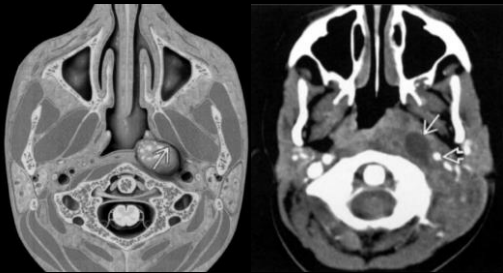


### Retropharyngeal space

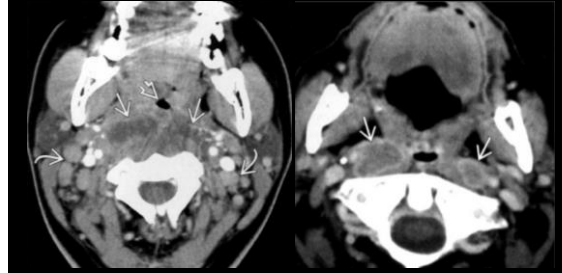
- Contents:
  - Fat
  - Lymph nodes
- Most common mass:
  - Adenopathy (reactive or intranodal abscess)
  - Metastatic
  - SCC
  - Lymphoma
- Long space --skull base to about T3 level in chest



### Suppurative adenopathy

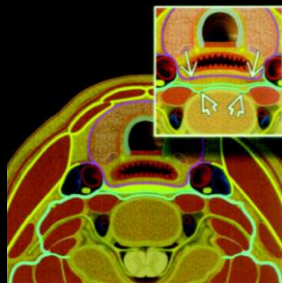


### Abscess / Nodal metastases



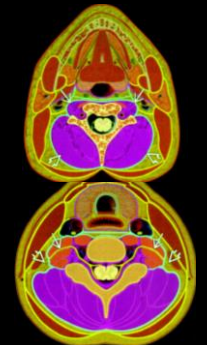
### Danger space

- Contents:
  - Fat
- Most common mass:
  - Infection or tumor spread from retropharyngeal space
- In reality a potential space composed of fat, extends down to mediastinum.
- Cannot be distinguished by imaging from retropharyngeal space

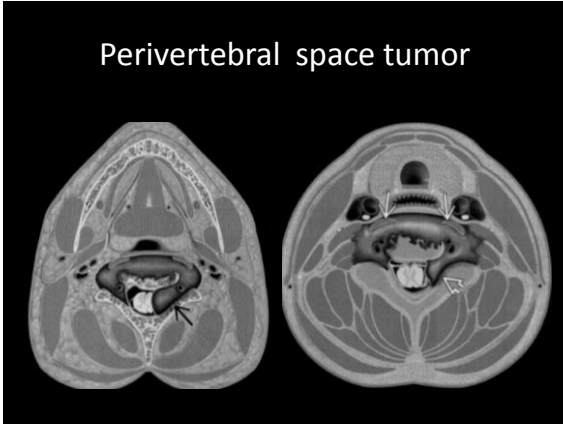


### Perivertebral space

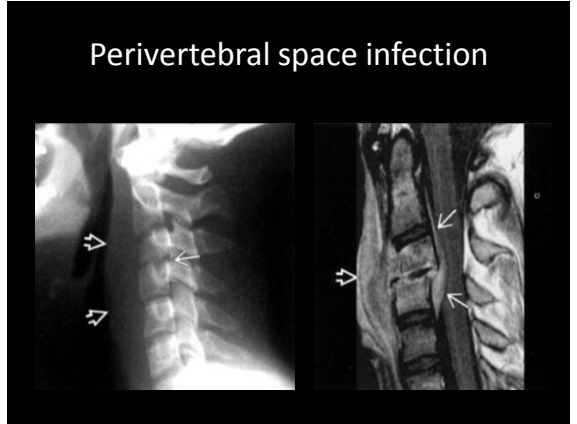
- Contents:
  - Spine and adjacent structures
  - Vertebrae
  - Pre- and paraspinal muscles
  - Vertebral artery
  - Phrenic nerve, brachial plexus
- Most common mass:
  - Vertebral body mass
  - Infection
  - Degenerative osteophyte



### Perivertebral space tumor

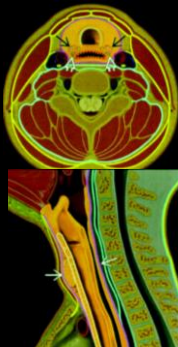


### Perivertebral space infection

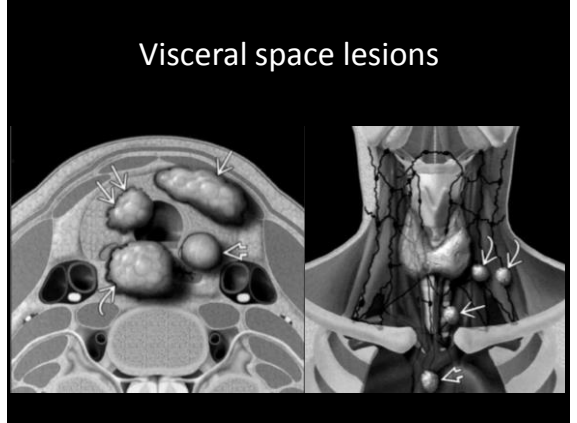


### Visceral space

- Extends from hyoid bone to mediastinum
- Contents:
  - Thyroid, parathyroid
  - Larynx, trachea, esophagus
  - Lymph nodes
  - Recurrent laryngeal nerves
- Identity of mass lesions depends upon organ of origin:
  - Thyroid tumors, nodal disease, esophageal tumors, laryngeal SCCA

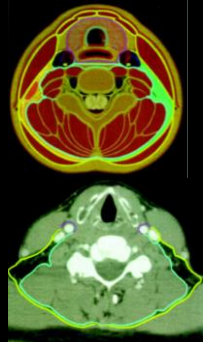


### Visceral space lesions

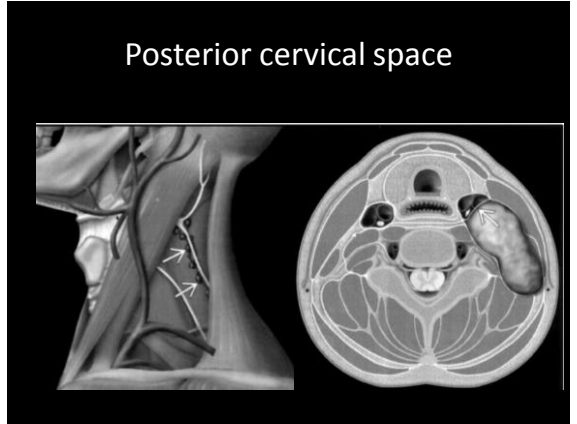


### Posterior cervical space

- Complex fascial margins; comprises tissues posterior to visceral space and separate from perivertebral, carotid, and retropharyngeal spaces
- Contents
  - Fat
  - Lymph nodes
  - Nerves (including accessory CN XI)
- Most common mass
  - Adenopathy (infection or tumor)
  - Nerve sheath tumors
  - Congenital lesions such as cystic hygroma



### Posterior cervical space





# Lymph nodes

- Size
  - Increase the roundness of the S/L
- The internal structure
  - Necrosis
  - Calcification
  - Cystic
- Contour irregularities
- Increase the number / aggregation
- Localization
- Whether loss of fatty hilum
- Doppler in the U.S.
  - Anarchic in vascularity
  - A peripheral vascularity

