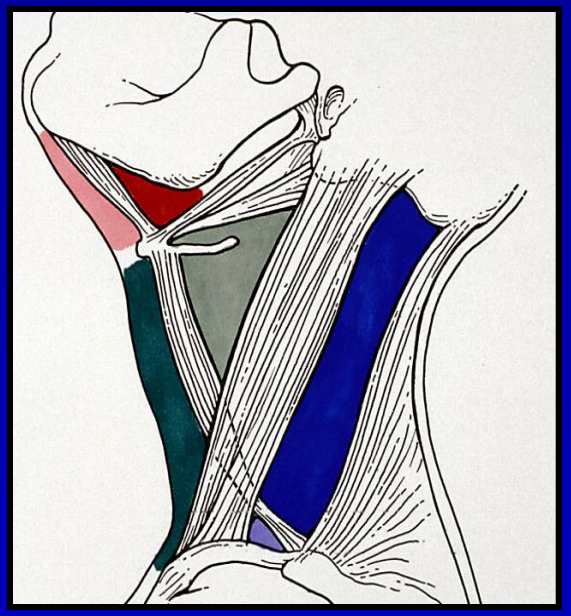
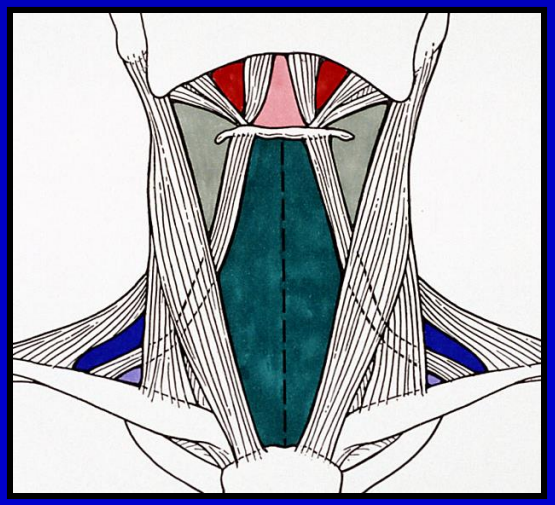
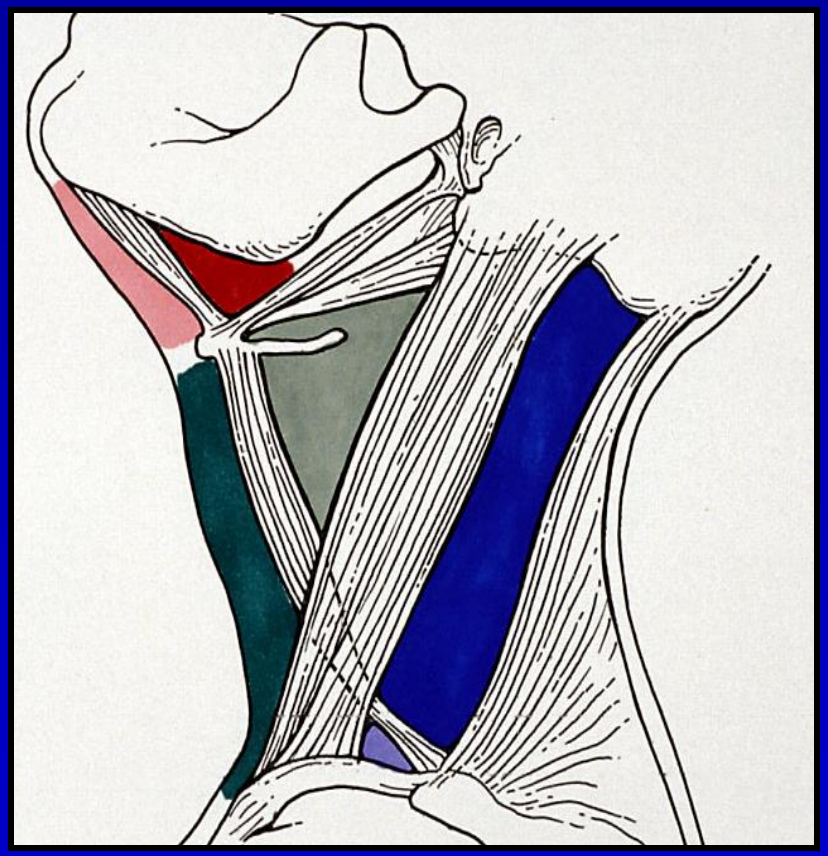
Old Terms – “Triangles” of the Neck

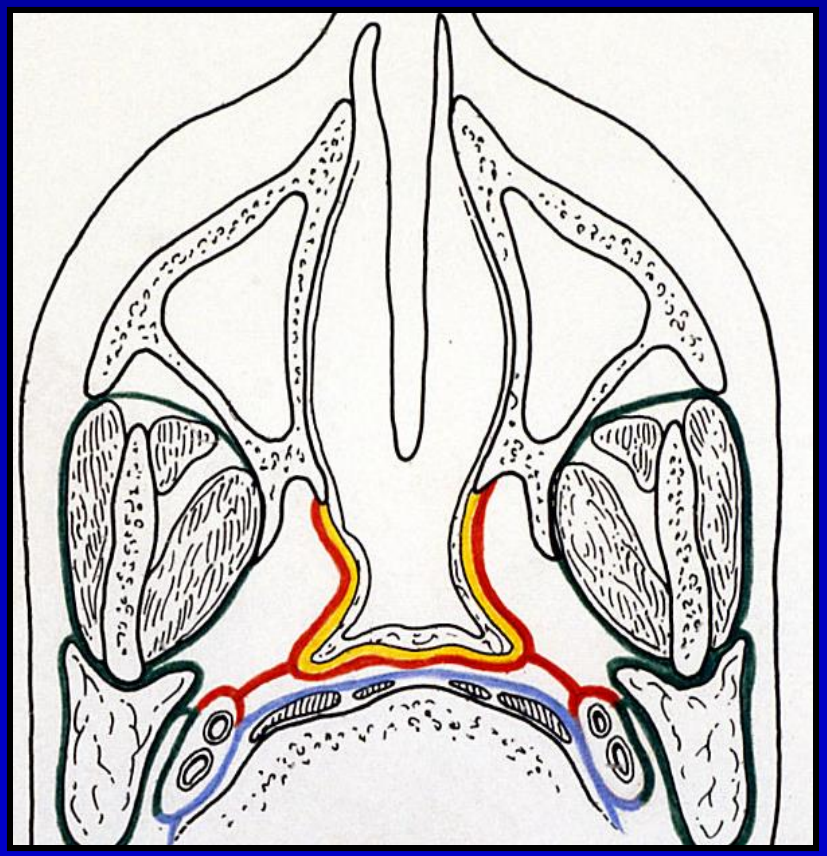
- Submandibular
- Submental

- Carotid (lt.green)
- Muscular (dk.green)
- Posterior
  - Occipital
  - Subclavian







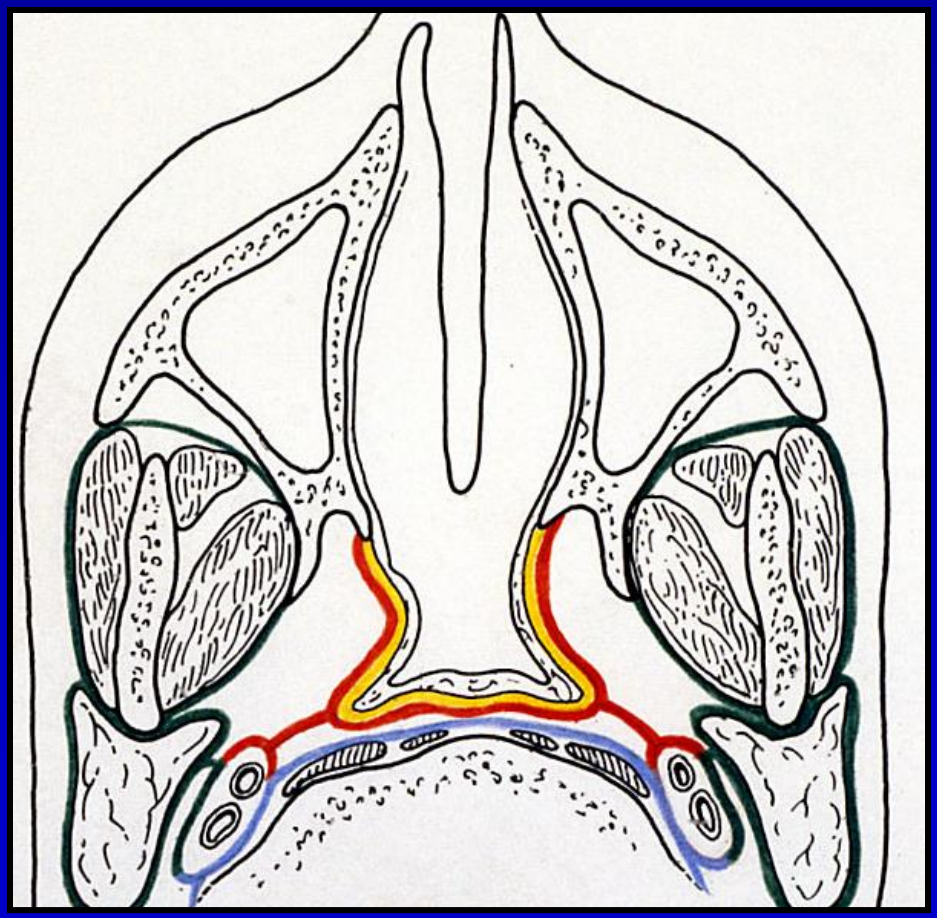


Old thinking

New approach with
x-sectional imaging

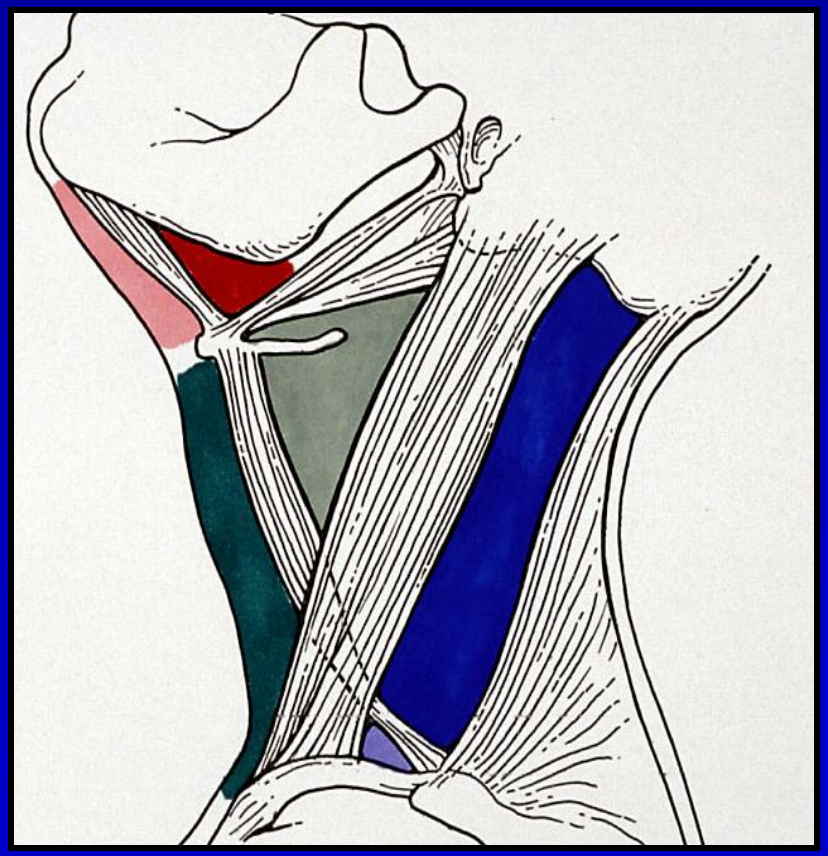
Layers of the Deep Cervical Fascia

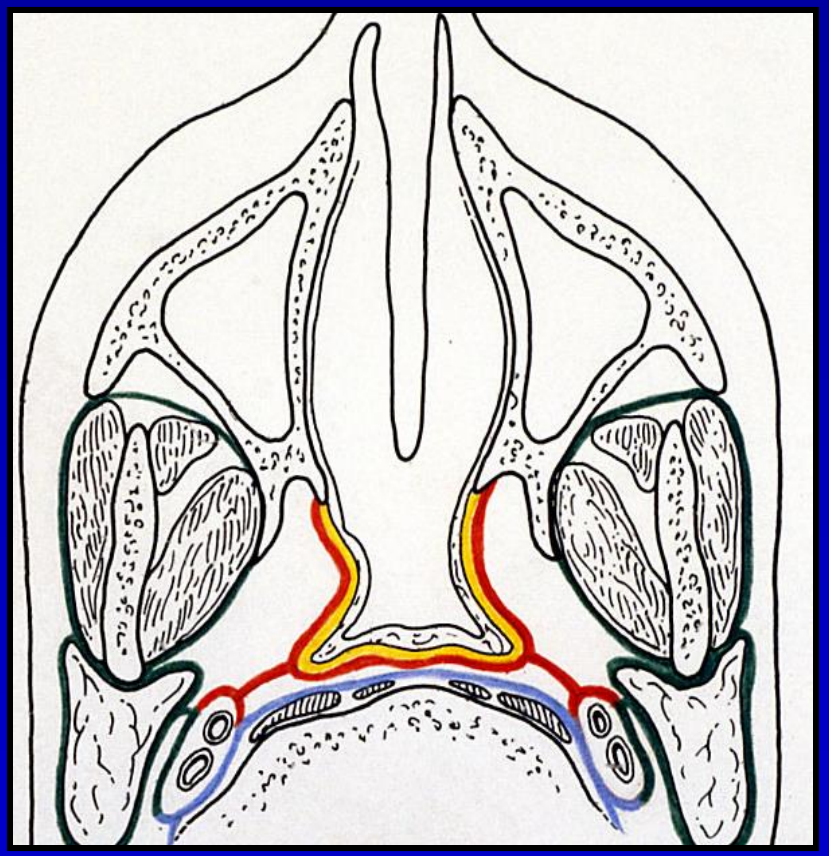
- Green – supererficial.
- Red – middle
- Blue – deep
- Yellow – pharyngobasilar fascia

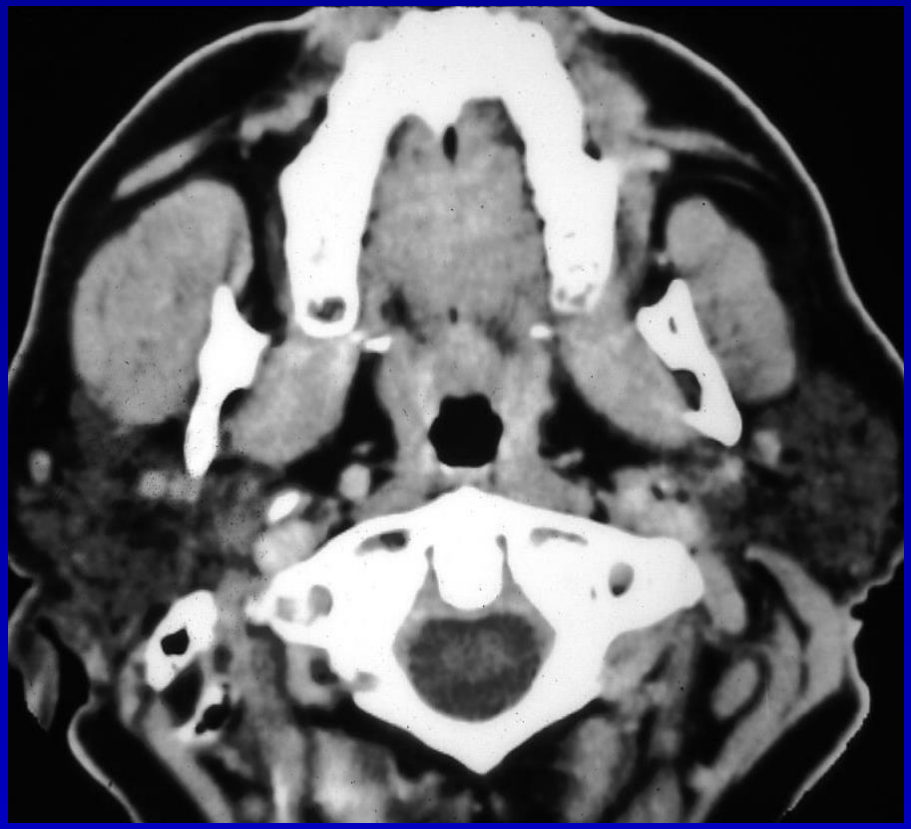


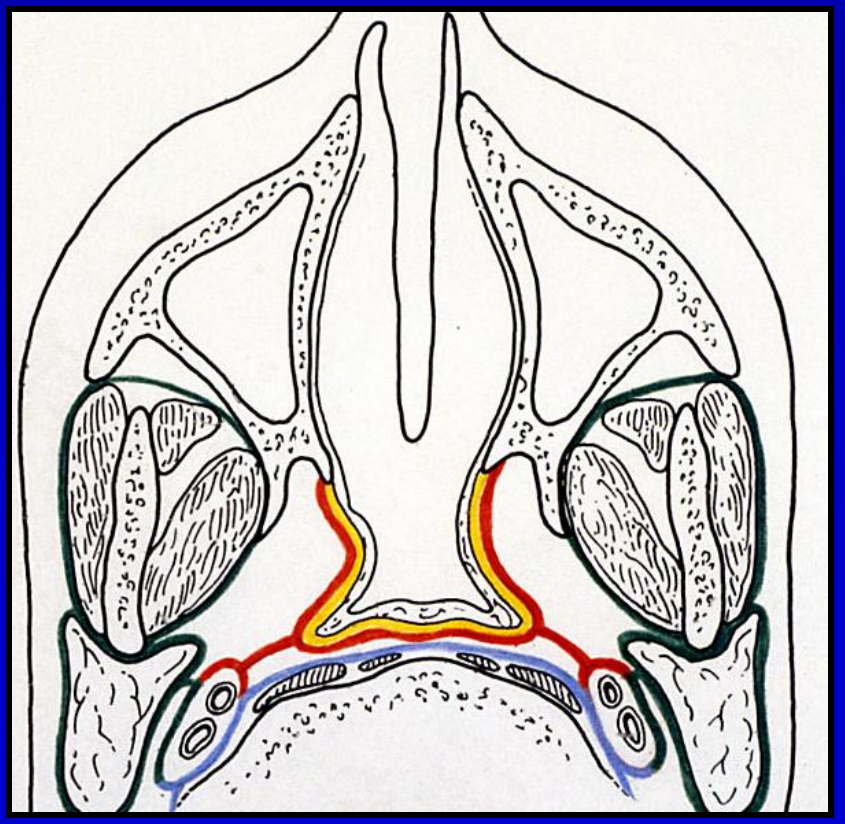
Triangle approach

Spatial approach









New Terms – “Spaces” of the SHN

- Pharyngeal Mucosal (PMS)
- Parapharyngeal (PPS)
- Masticator (MS)

- Parotid
- Carotid (post-styloid PPS)
- Retropharyngeal
- Pre-vertebral

Location

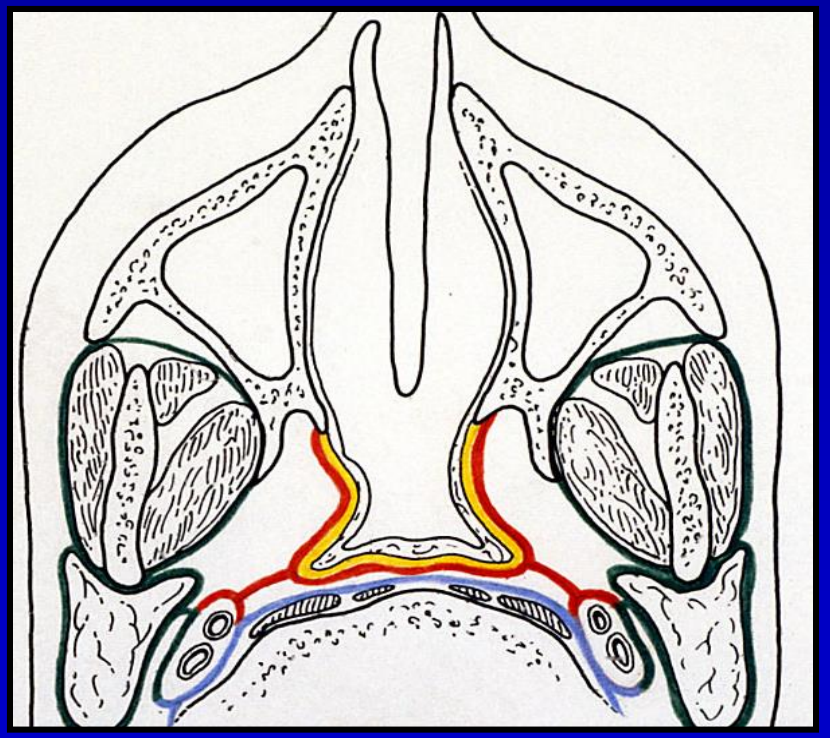
Fascia

Normal contents

Diff. Dx of lesions

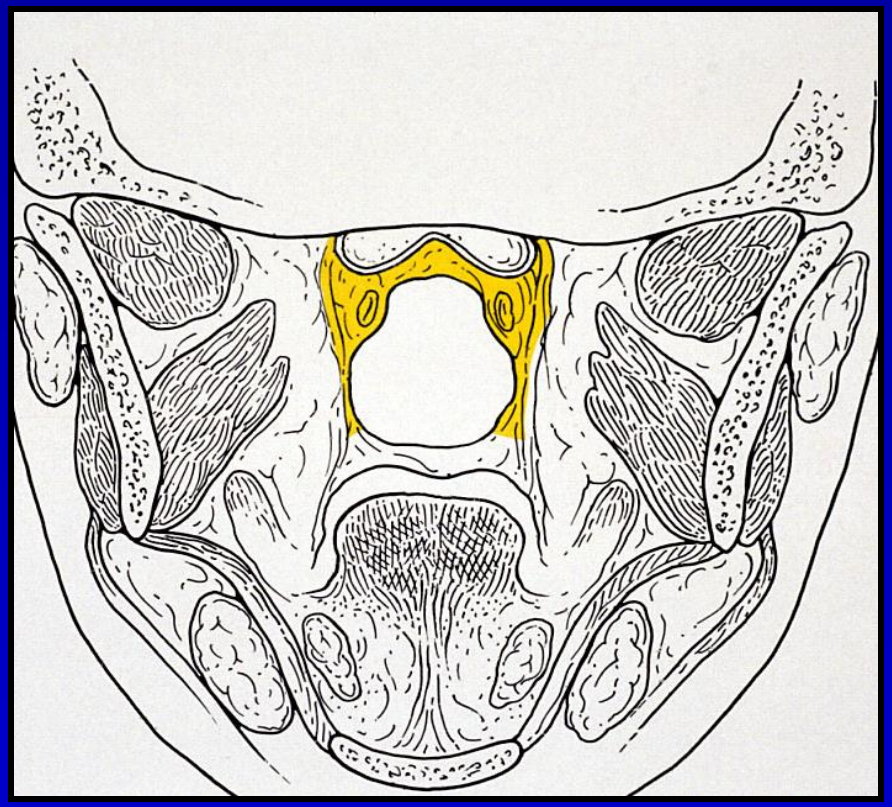
1. Pharyngeal mucosa space

- Location
  - Naso, oro & hypopharyngeal surface of aerodigestive location
- Fascia
  - ML-DCF
  - Pharyngobasilar fascia – Sup con m aponeurosis that connects to skull base
  - Below that ML-DCF
  - No fascia on airway side



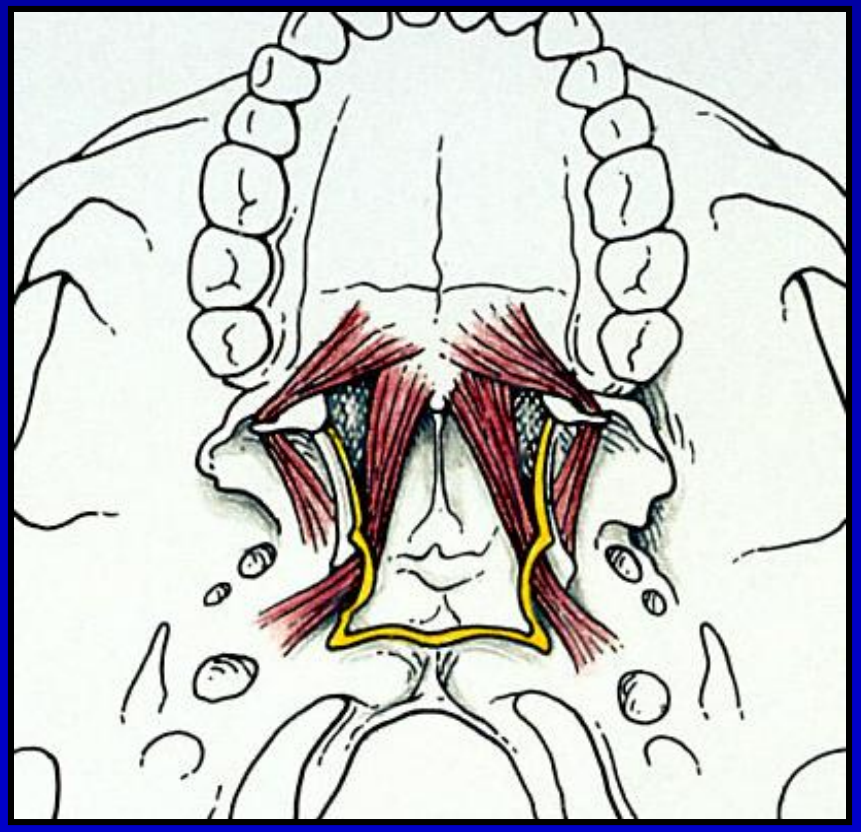
1. PMS

- Pharyngobasilar fascia or sup.constrictor m. aponeurosis inserts on pharyngeal tubercle (skull base)



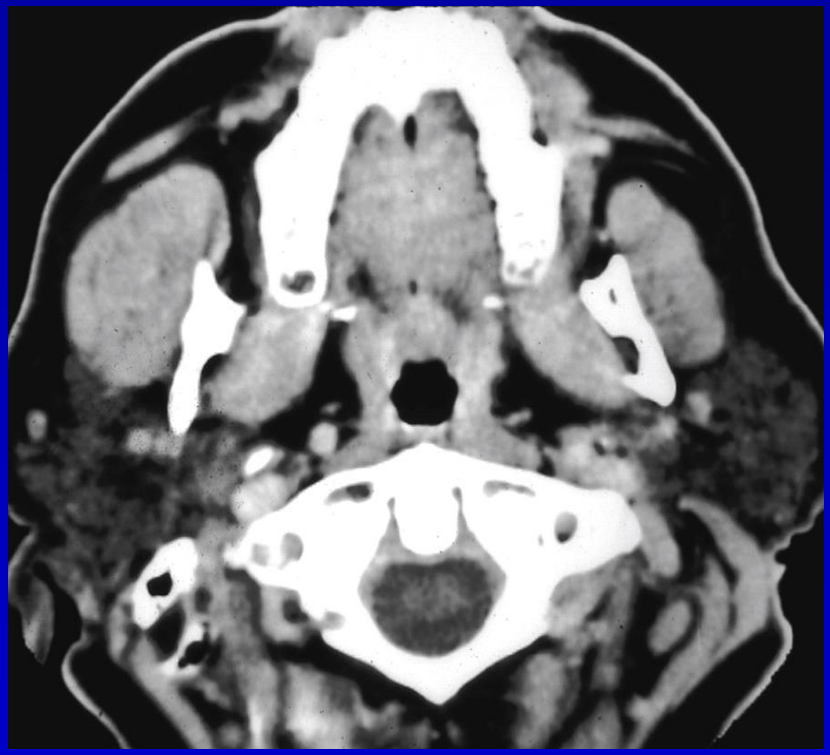
Sinus of Morgagni

- Anatomic defect in pharyngobasilar fascia/ML-DCF at skull base
- Levator palatini m & eustacian tube from skull base to PMS at level of nasopharynx



PMS

- Contents
  - Mucosa
  - Lymphatic tissue
    - Adenoids
    - Faucial tonsils
    - Lingual tonsils
  - Minor salivary glands
  - Constrictor muscles
  - Torus tubarius



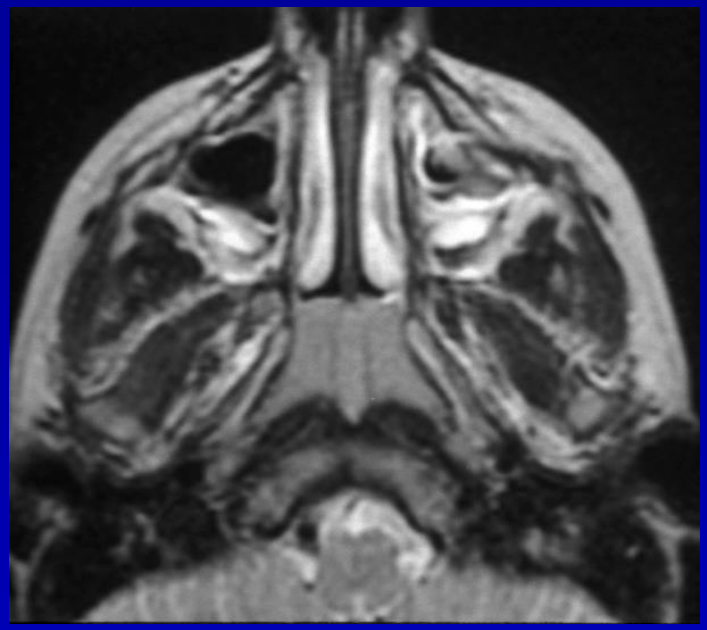
PMS Pitfalls

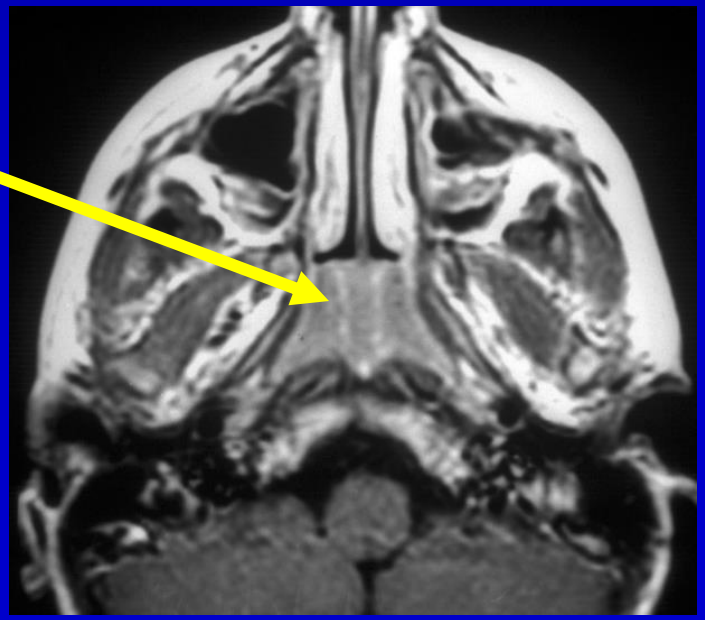
Lymphatic tissue

- Asymmetric
- Prominent, especially in children, young adults, HIV

PMS - Adenoids

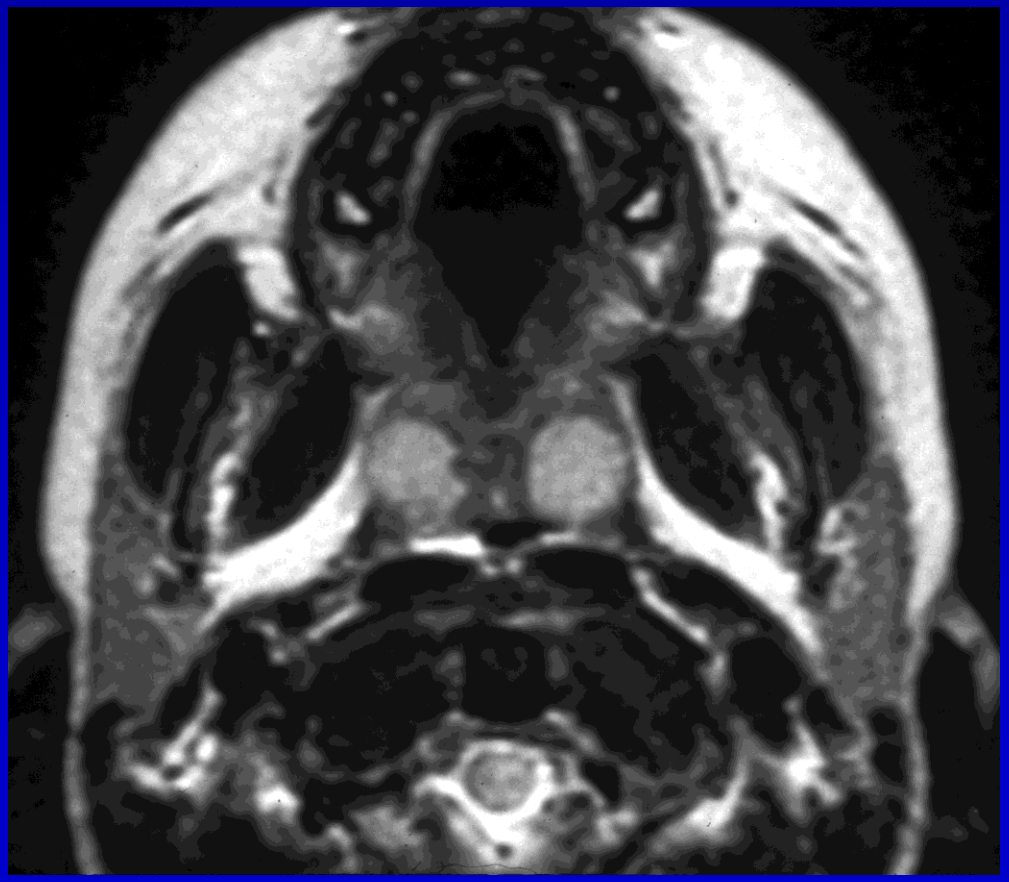
- Commonly seen in peds, young adults
- Flat anteriorly, symmetric, no deep extension





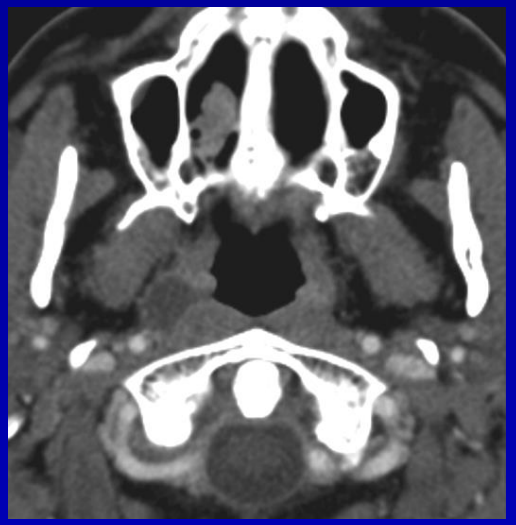
Normal to see vertical striations

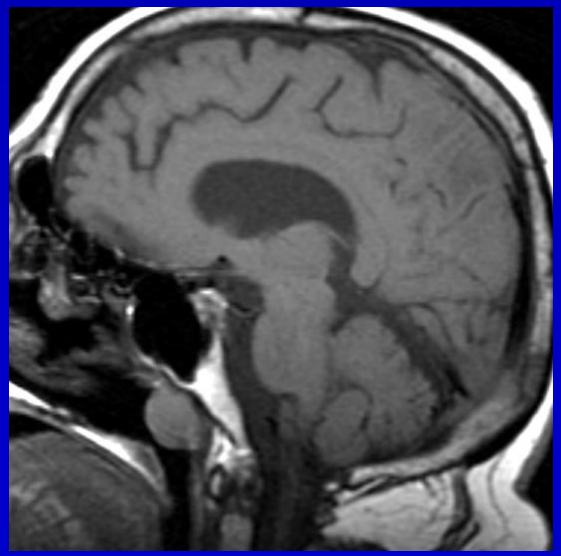
PMS – Tonsils Best seen on MRI

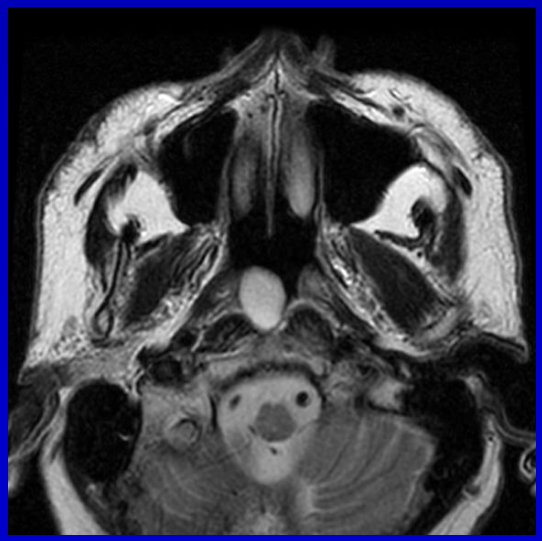


PMS - Benign cysts

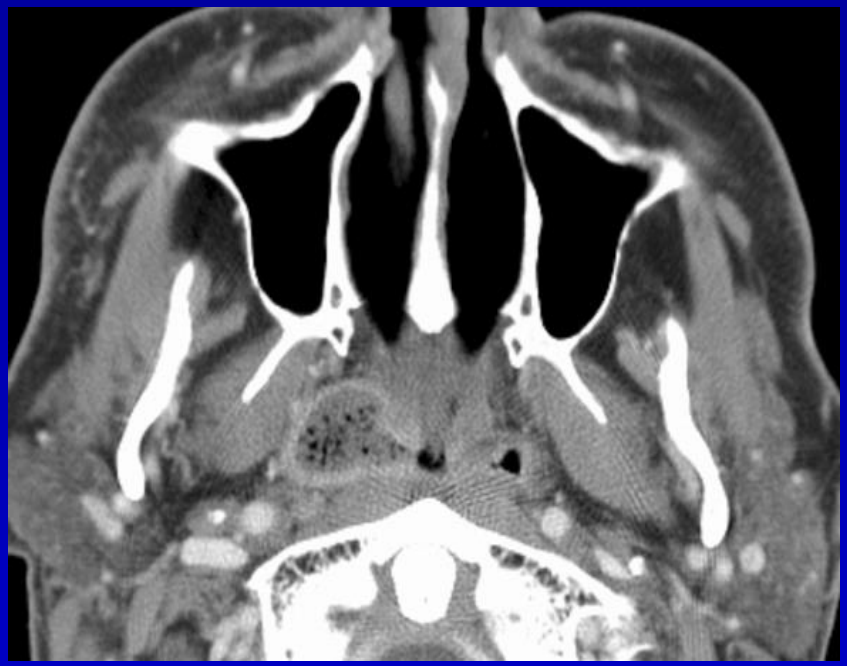
- ***Common***
- Asymmetric
- Mucoid density
- No middle ear effusion







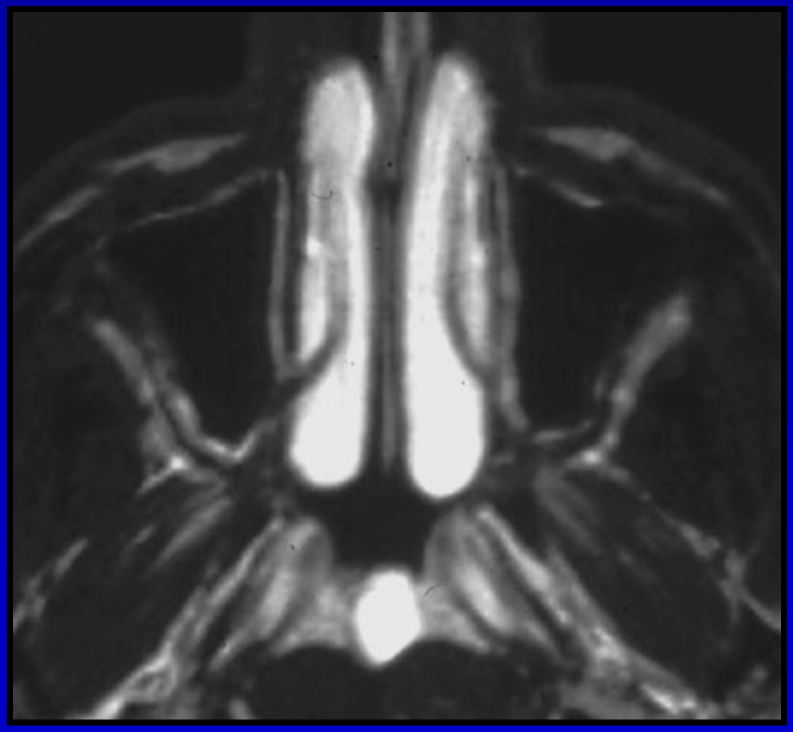
PMS - Benign cyst with secretions



Can see some peripheral enhancement

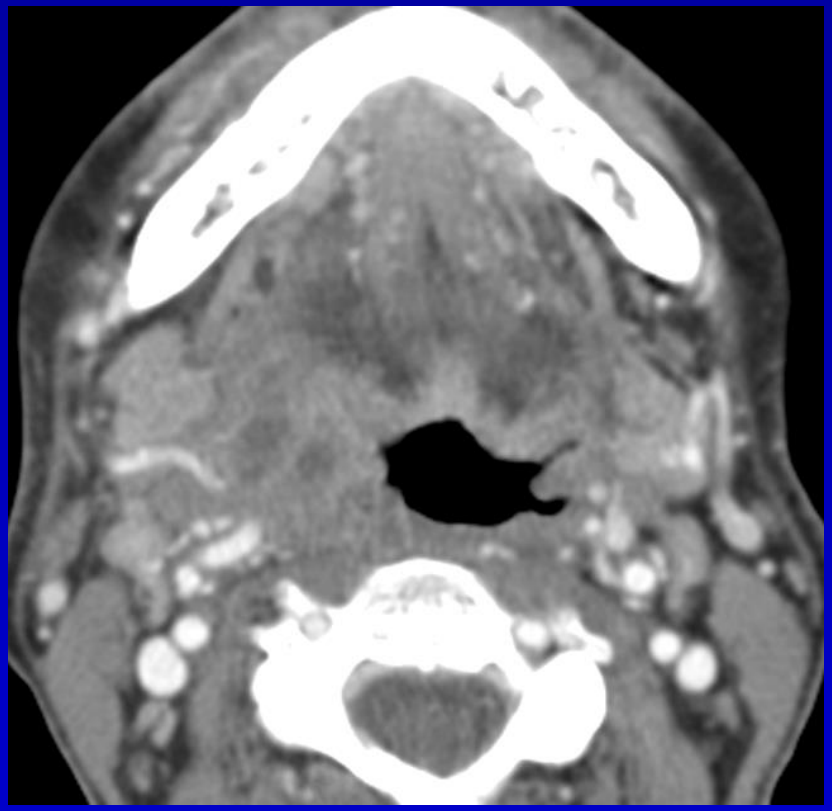
PMS – Thornwaldt cyst

- Benign well-circumscribed midline cyst
- No deep extension
- Usually of no clinical significance
- Other cysts are more common



PMS - Tonsillitis

Mono can look identical

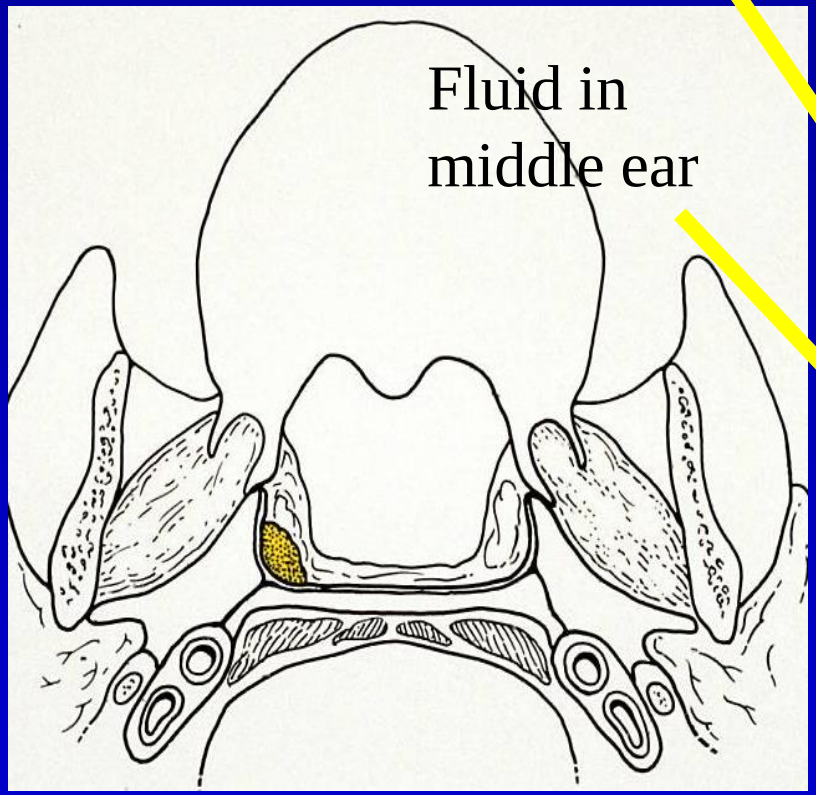


If this were an older person with a smoking history SCC could look just like this

PMS – Squamous cell ca
Naso, oro or hypopharyngeal

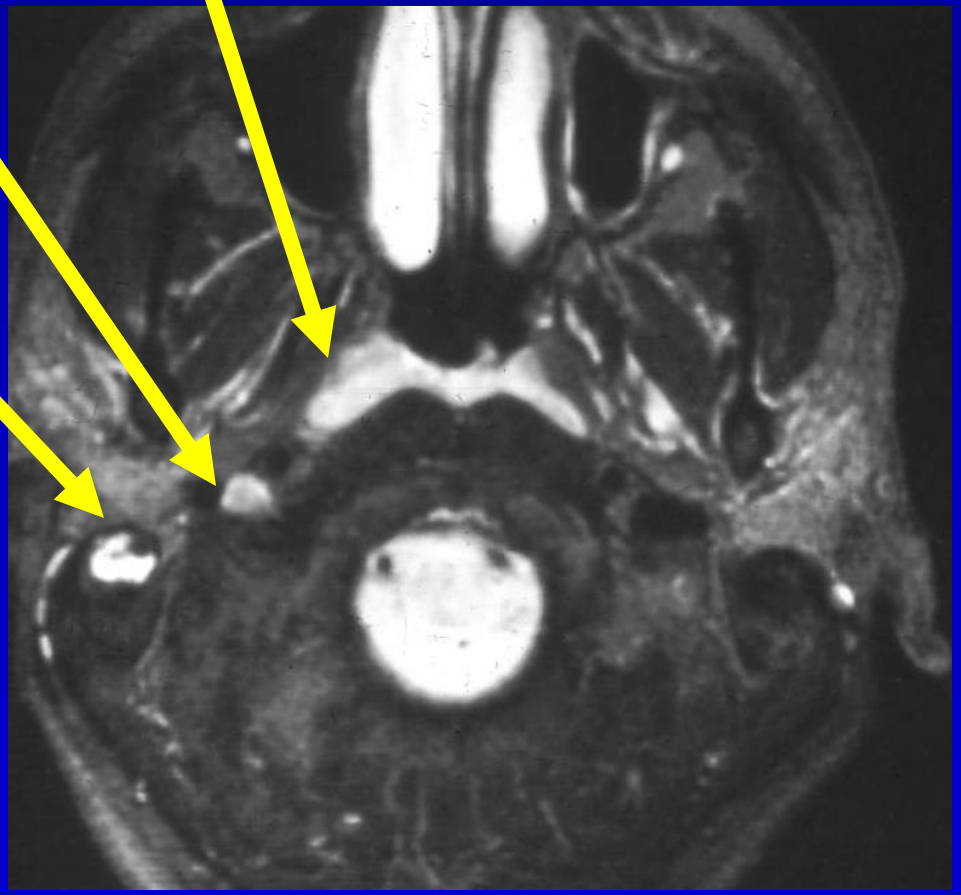
- Most common PMS in the adult
- Mucosal component easily visualized directly
- On imaging, asymmetric soft tissue on airway side
- Value of imaging
  - Deep extension
  - Nodal disease

PMS – SCCa, nasopharynx



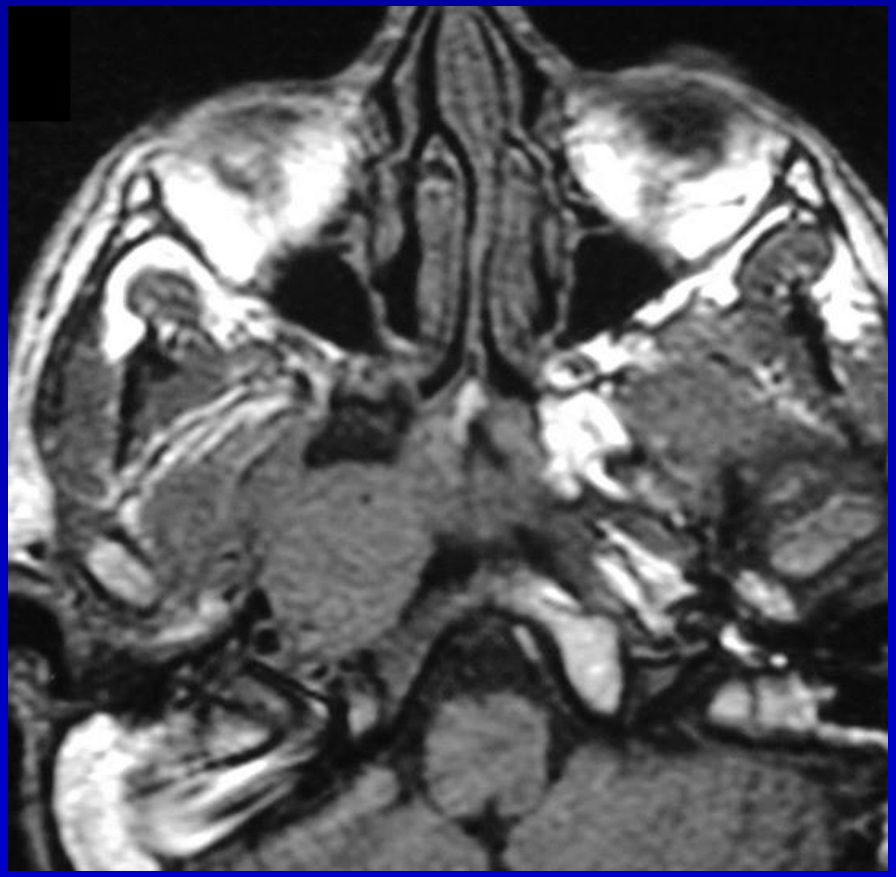
Node

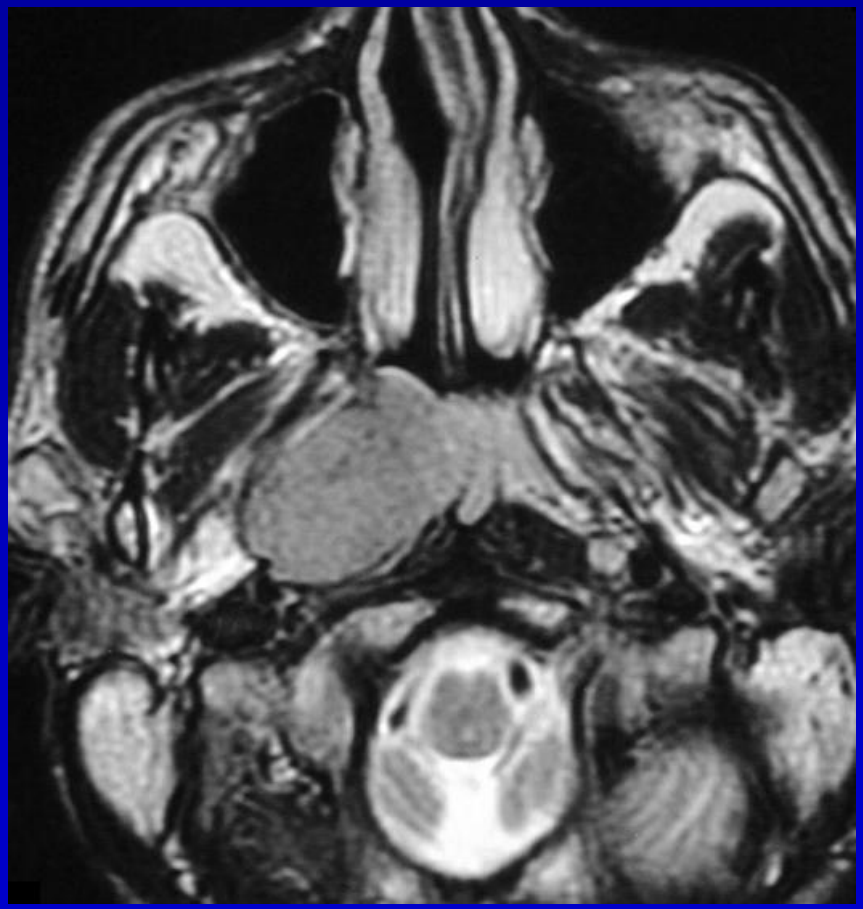
Fullness



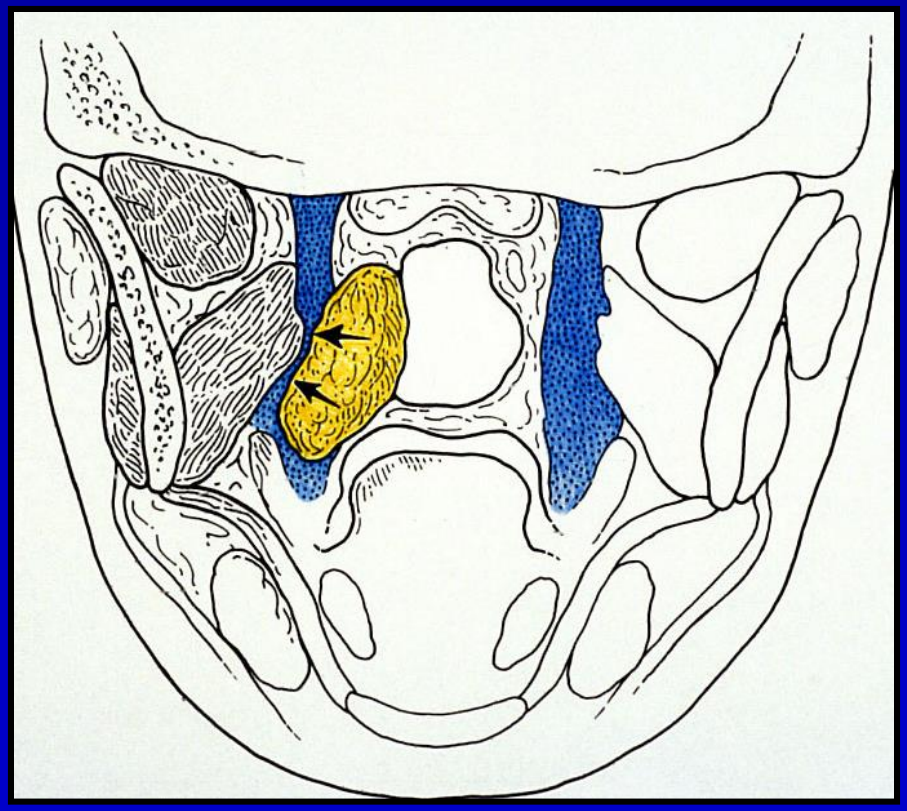
Clinicians will always see ulceration, we need to look for extension and nodes

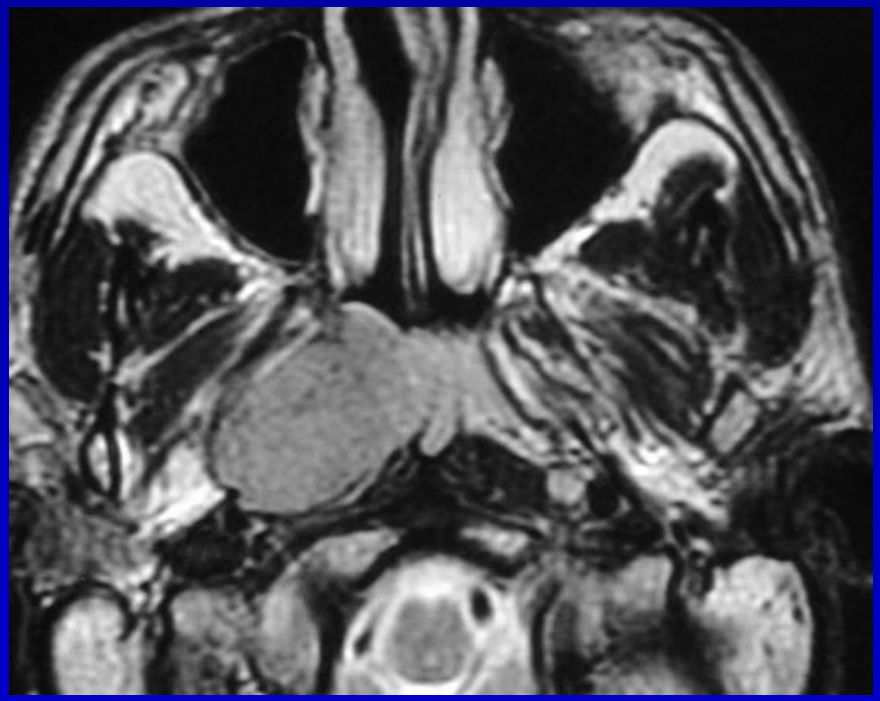
PMS – SCCa, Nasopharynx



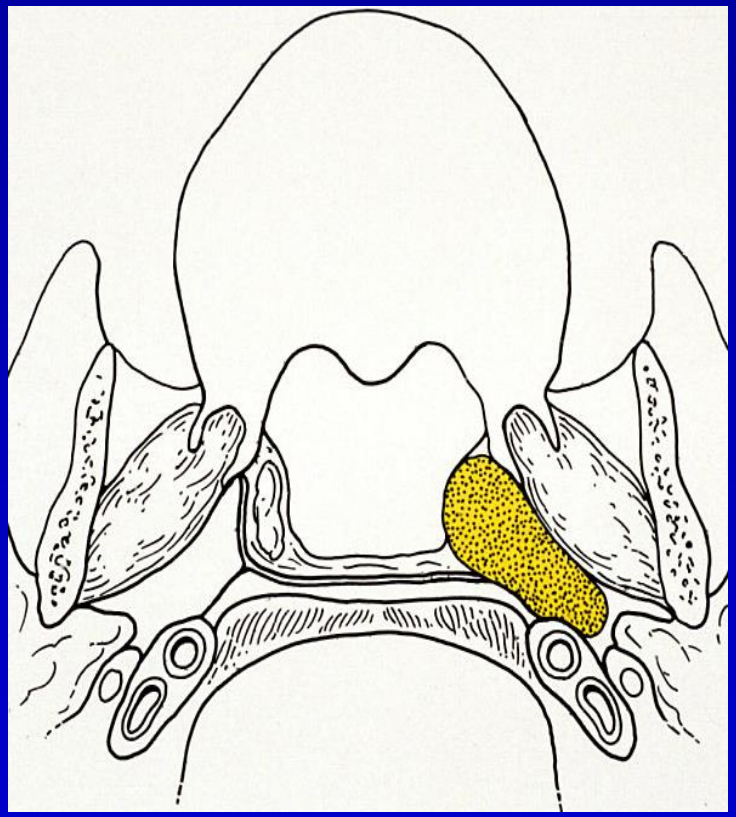


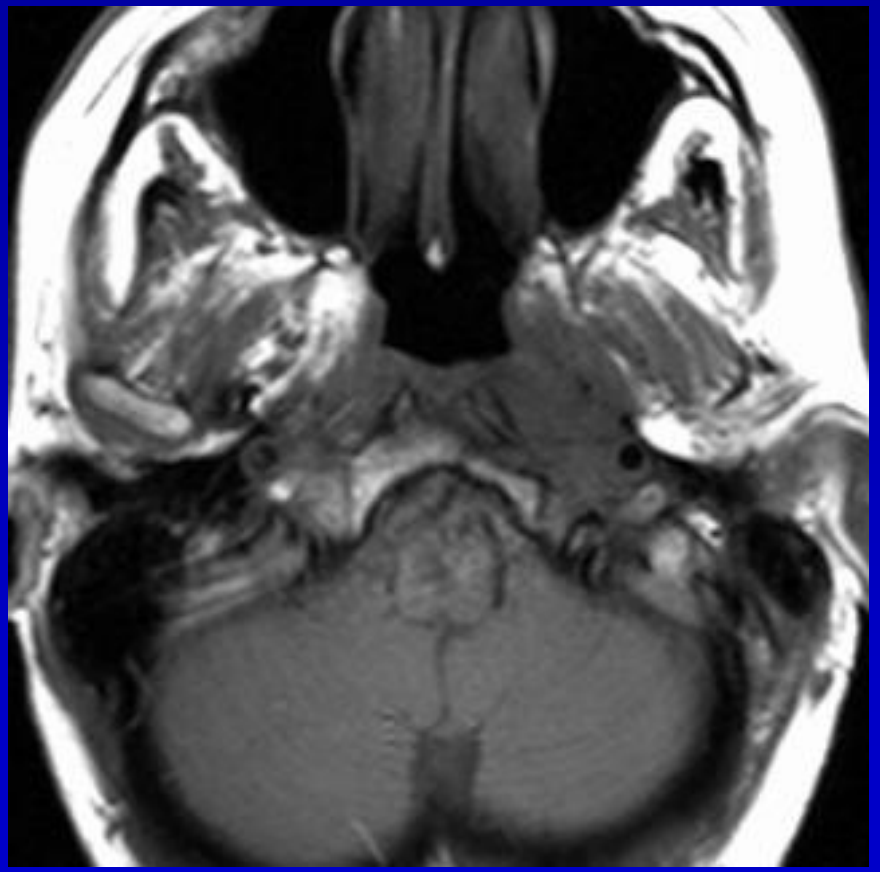
PMS, mass effect on PPS



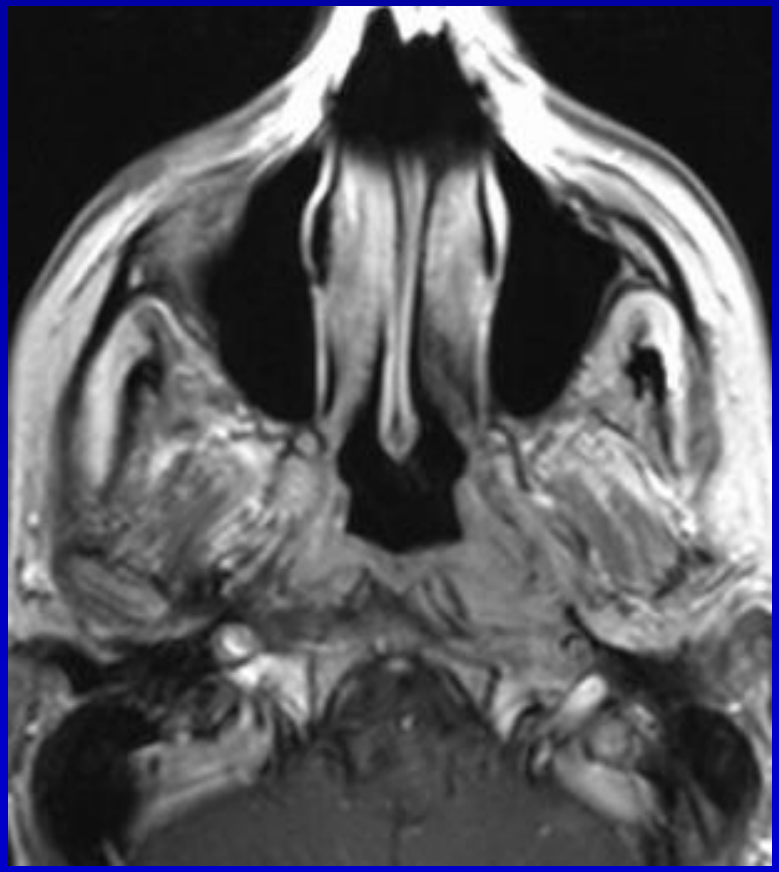


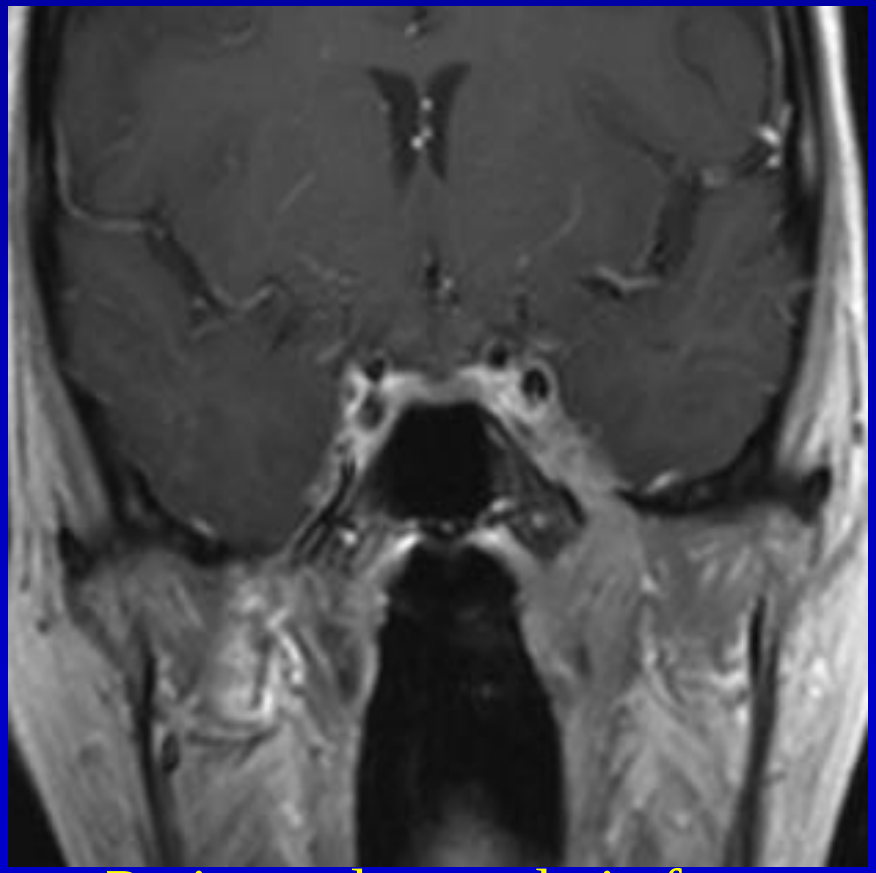
PMS - Spread through fascia/sinus





PMS - Adenoid cystic carcinoma





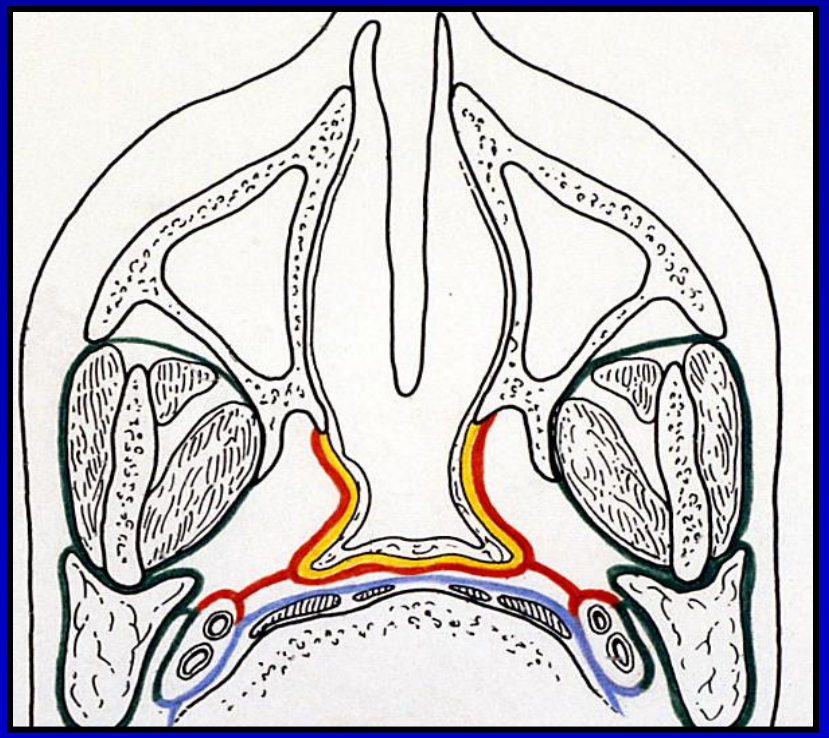
Perineural spread via foramen ovale

Perineural Spread

- Increased size of foramen
- Fat nerve
- Enhancing nerve
- Denervation to muscles
- Loss of fat plane

2. PPS (Parapharyngeal Space)

- Location
  - Lateral to PMS
  - Deep to MS
  - Anterior to CS, RTP space

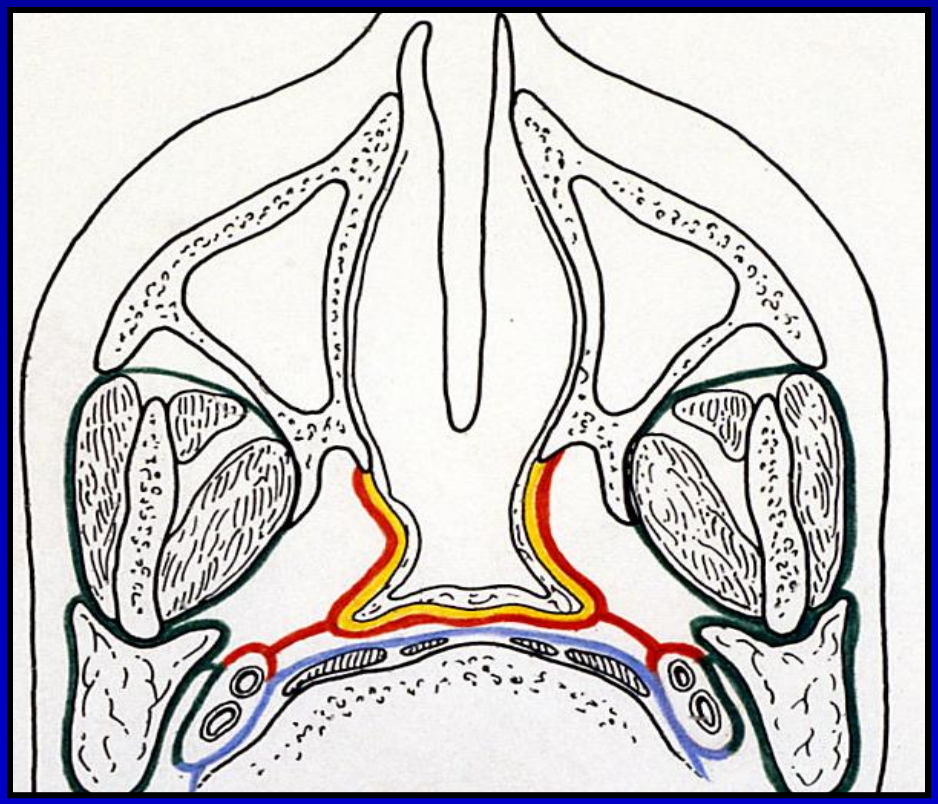


- Fascia - complex
  - Lateral – SL-DCF
  - Medial – ML-DCF
  - Posterior – ML-DCF

2. PPS (Parapharyngeal Space)

Contents

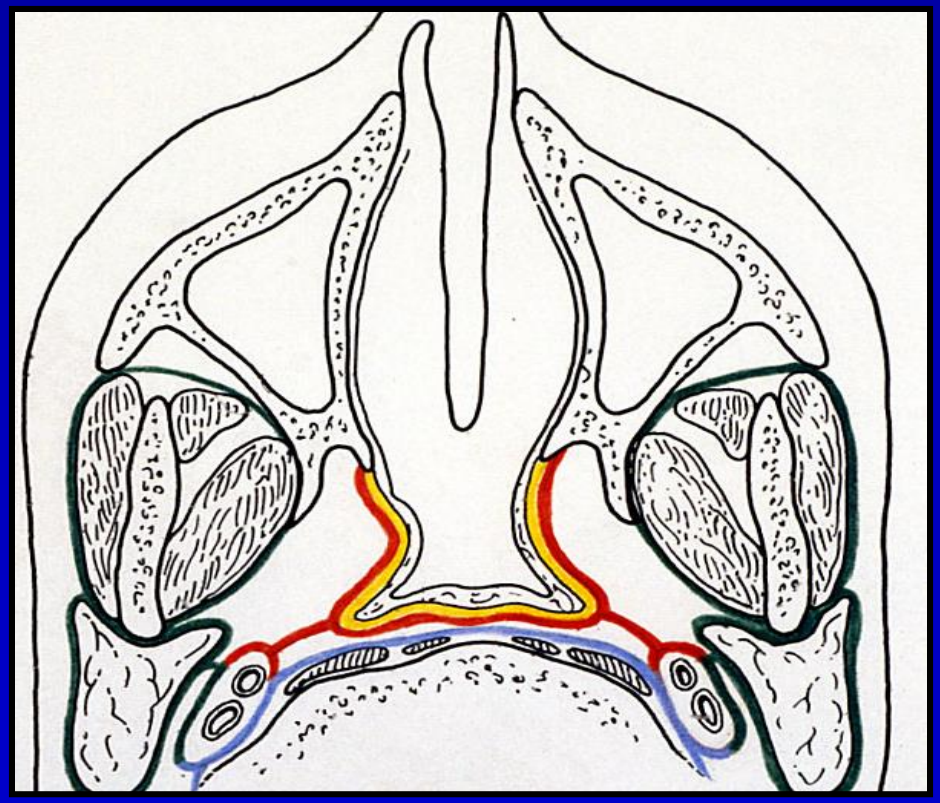
- Fat
- Occasional Lymphatics
- Branches of ECA
- Minor salivary gland rests



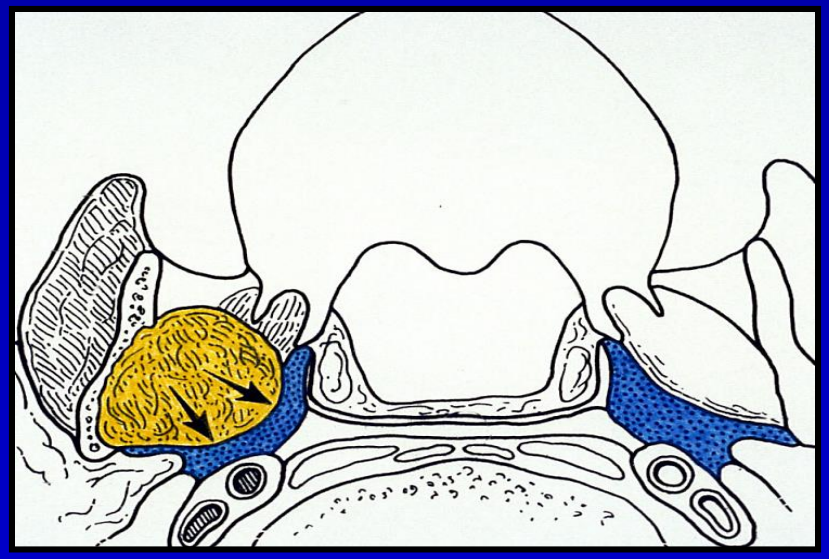
2. PPS (Parapharyngeal Space)

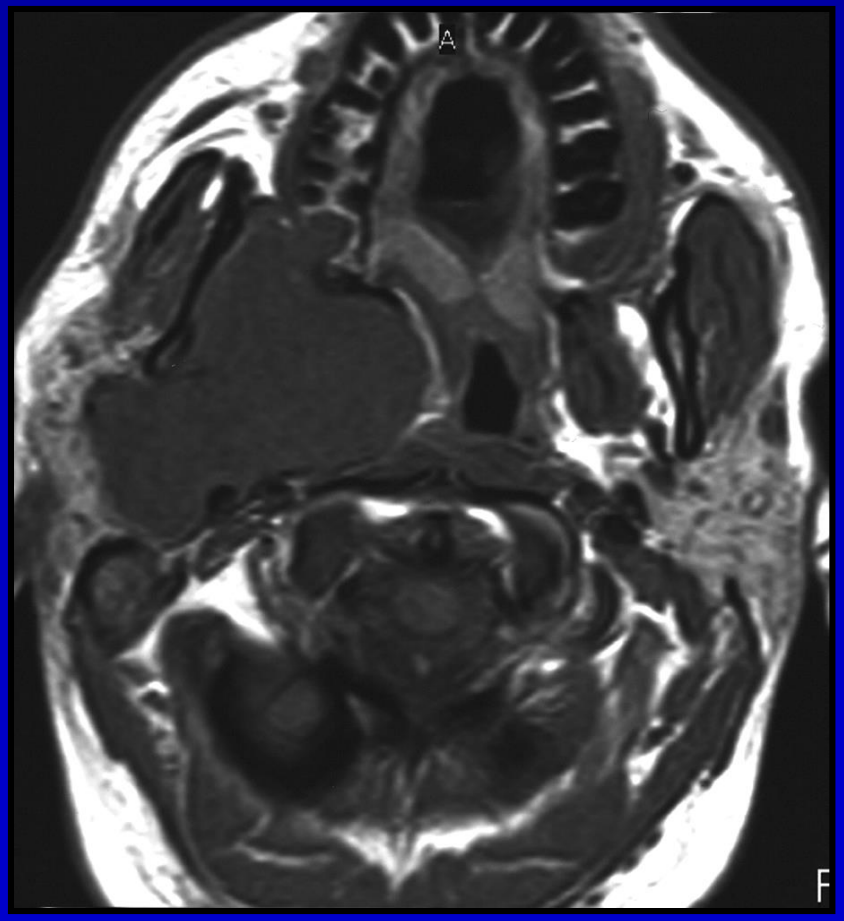
Specifics

- Complex fascial boundaries
- The “elevator” of the SHN
- Direction of mass effect helps predict space of lesion
- Primary lesions are rare

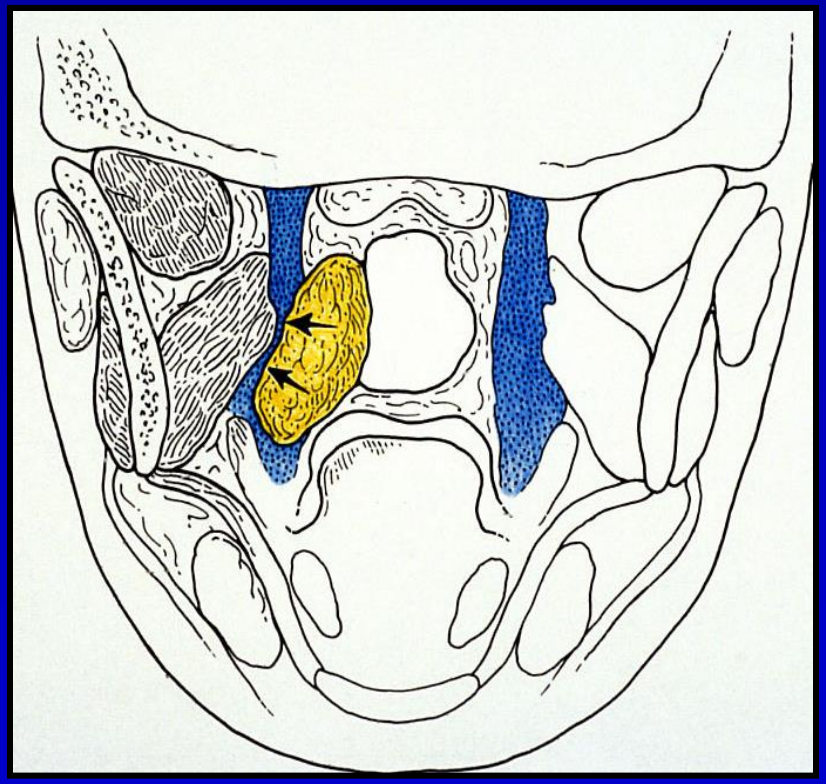


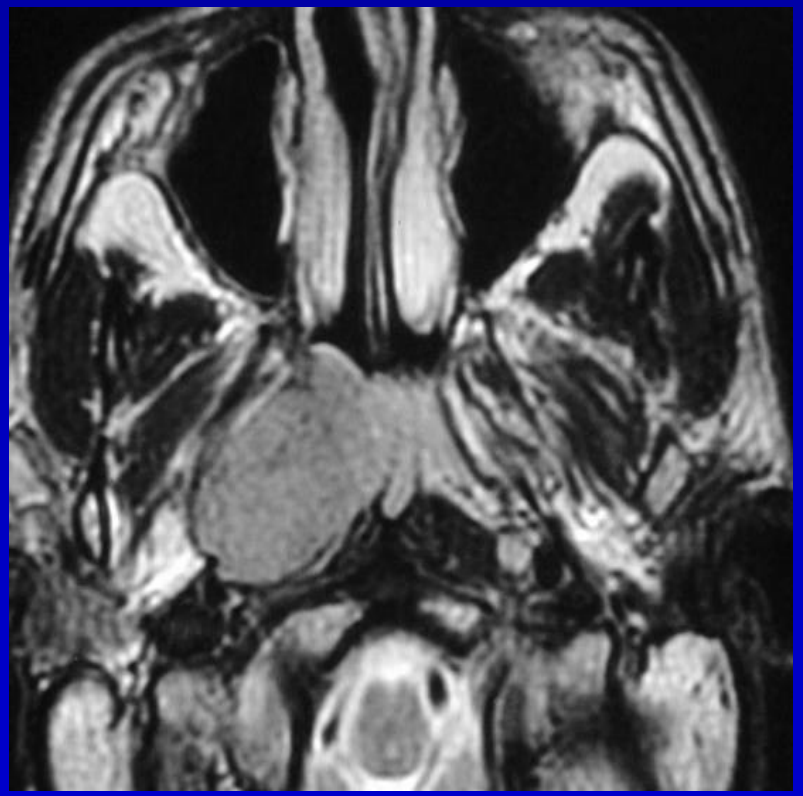
PPS – Direction of mass effect predicts location of lesion outside PPS



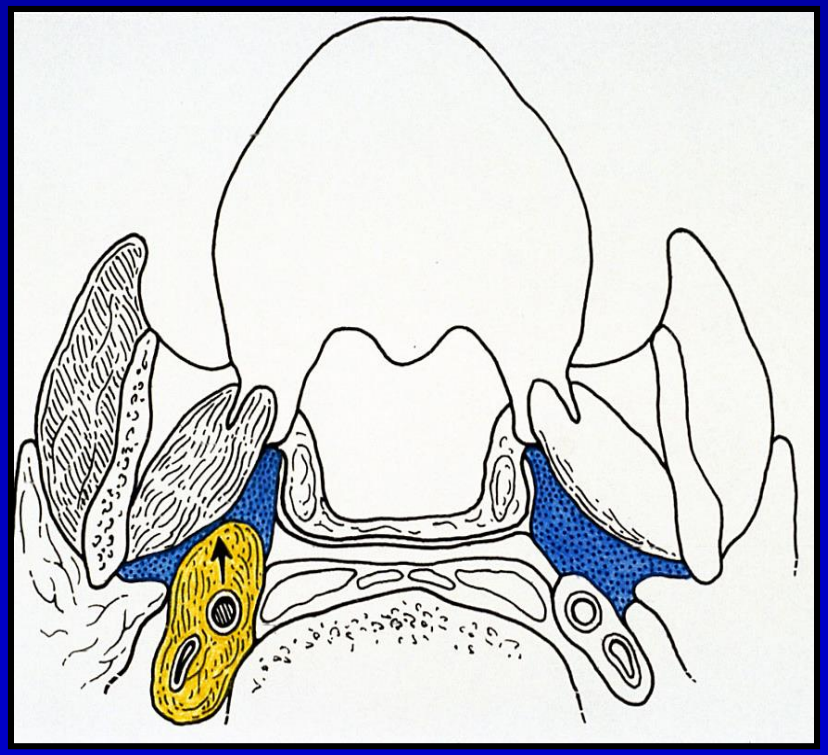


PPS – Direction of mass effect predicts location of lesion outside PPS





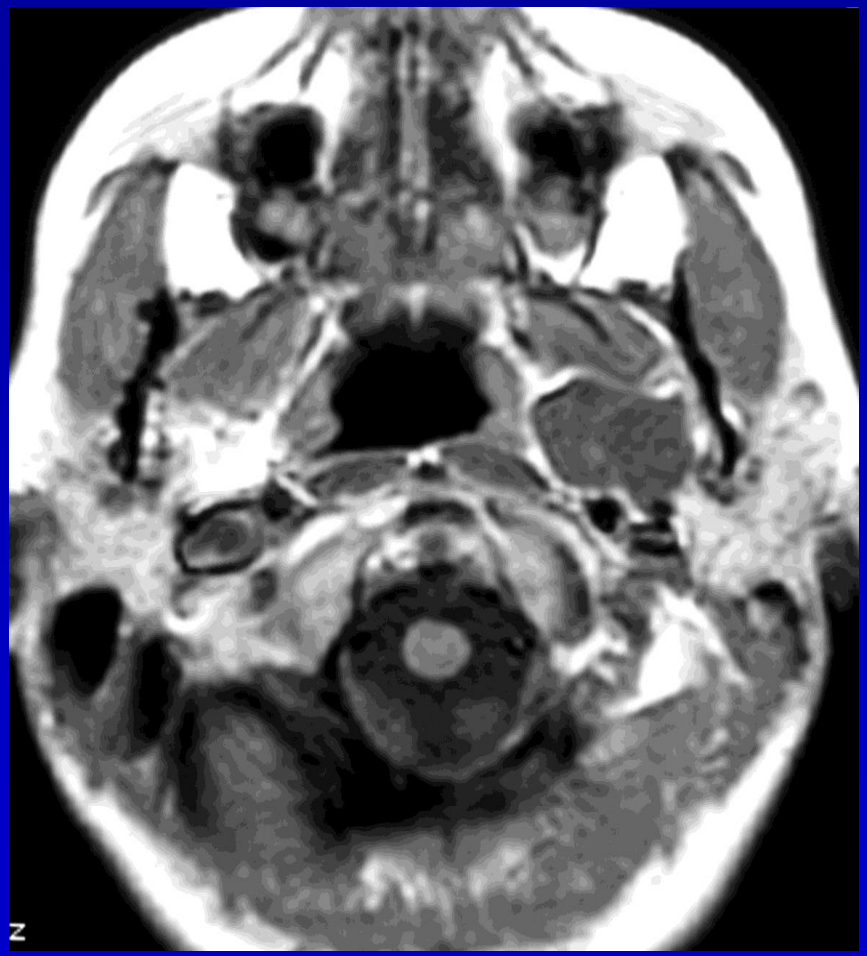
PPS – Direction of mass effect predicts location of lesion outside PPS



PPS – Pleomorphic adenoma or BMT
(Typically T2 Bright mixed on other sequences)

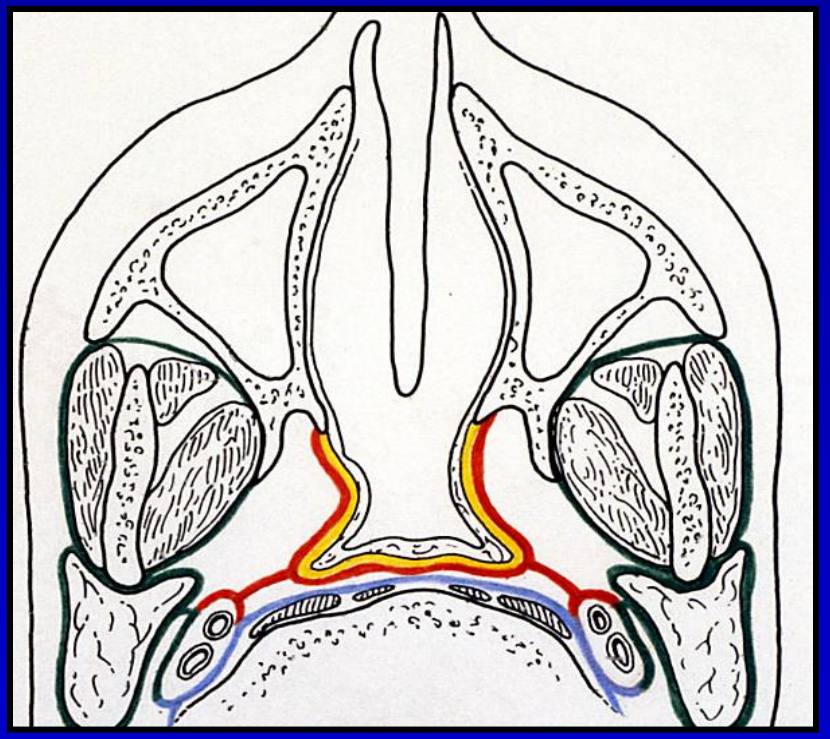
- **Most common primary PPS lesion**
- Discrete from deep lobe of parotid gland
- Presents as bulging tonsil or lateral pharyngeal wall
- Mucosa intact
- May not be able to differentiate from large deep lobe parotid lesion

PPS – Pleomorphic adenoma or BMT



3. Masticator Space (MS)

- Location
  - Lateral to PPS
  - Anterior to parotid gland



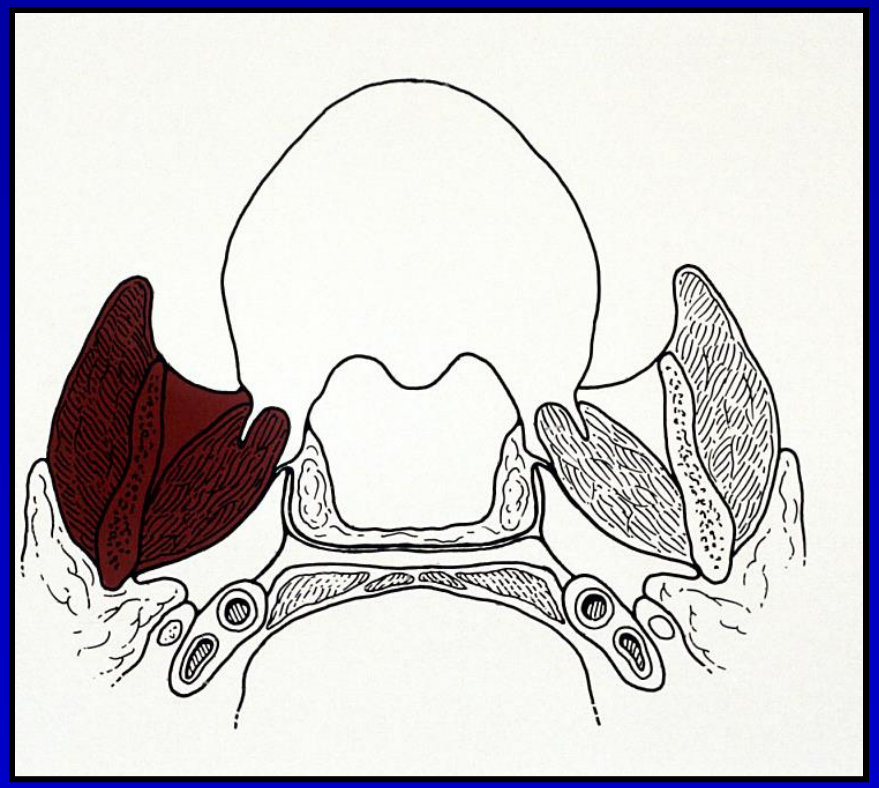
- Fascia
  - SL-DCF

    Attaches to skull base medial to foramen ovale

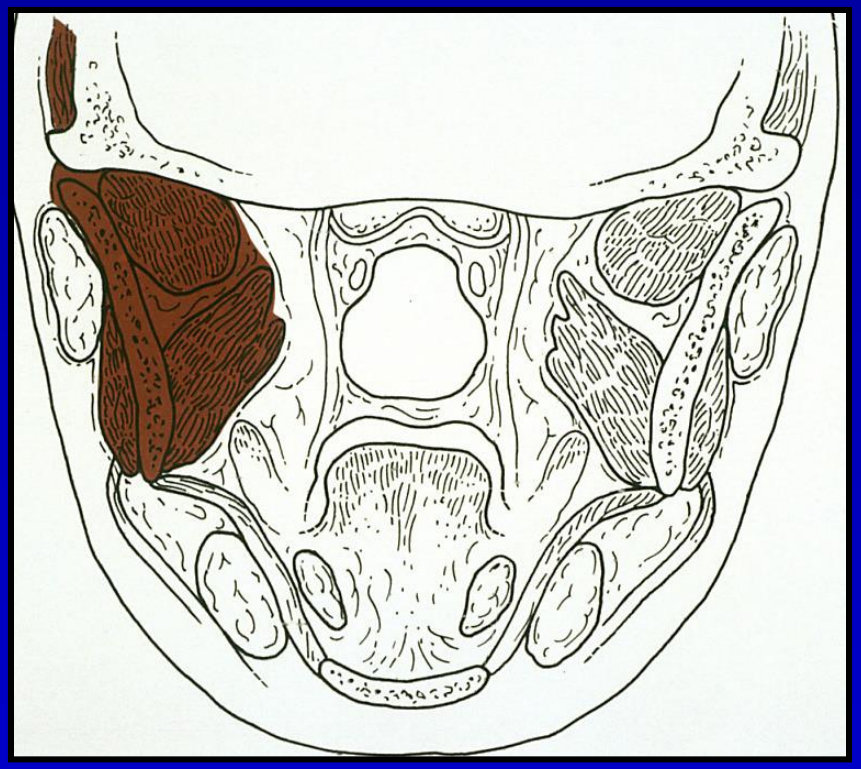
    Zygomatic arch

    Calvarium

3. MS



Infrazygomatic portion of MS
(infratemporal fossa)

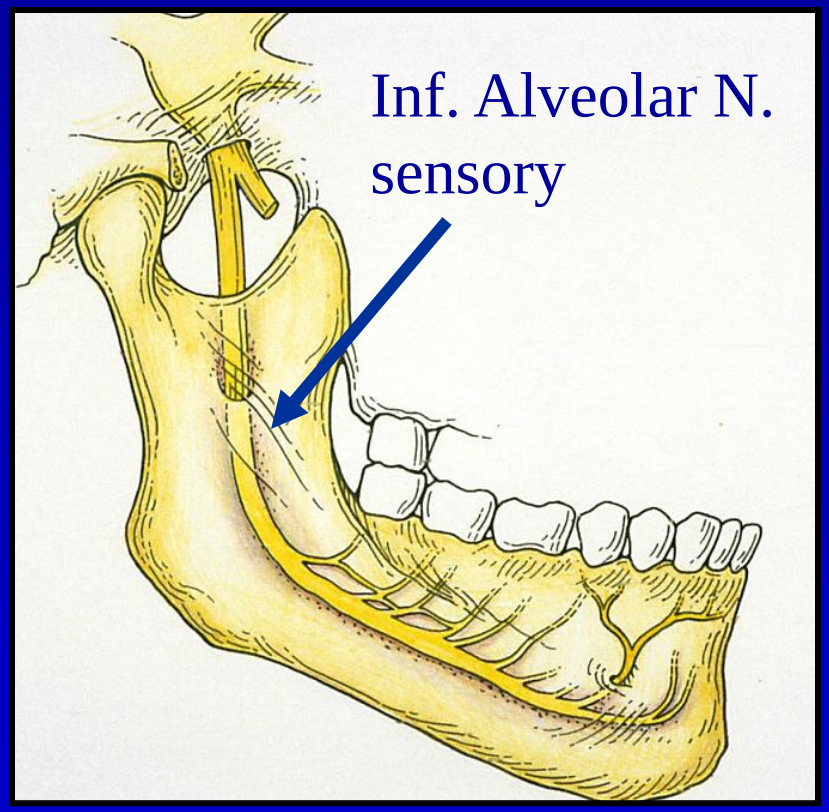


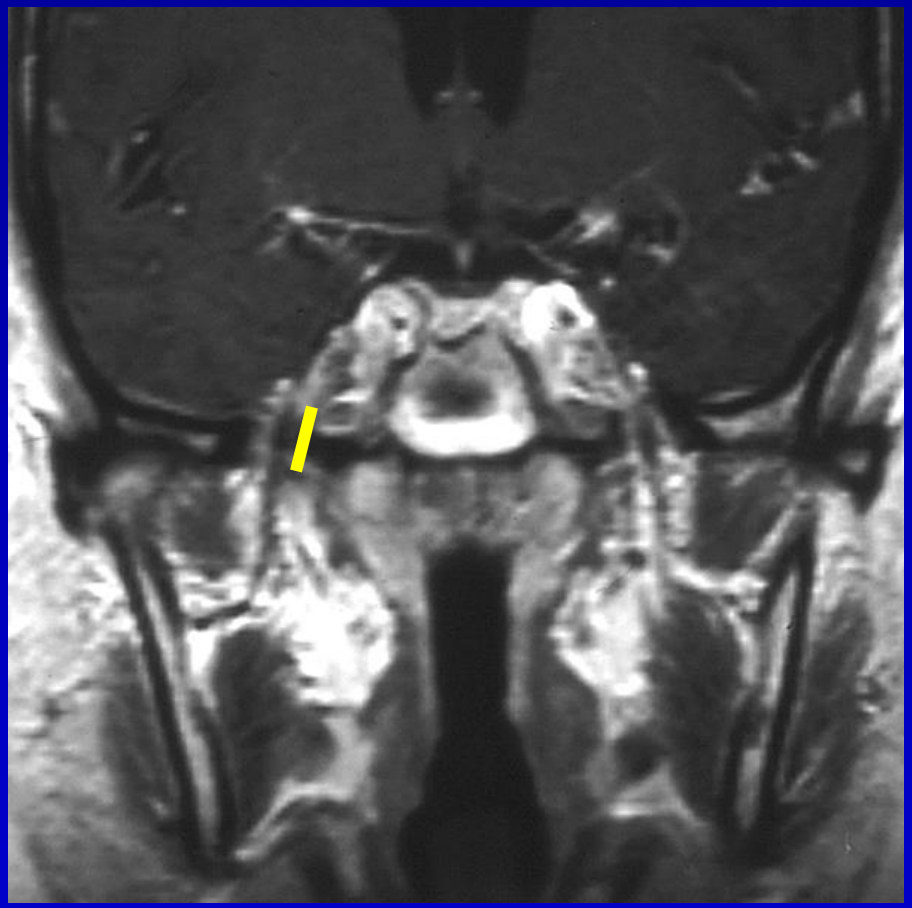
Suprazygomatic portion of MS
(temporal fossa)

3. MS Contents

- Mandible – ramus & posterior margin
- CN V 3 – motor & sensory
- Inferior alveolar vein and artery
- V3 muscles
  - Masseter, med and lat pterygoids, temporalis
- Foramen ovale
  - V3 most common rout of perineural spread also V2 and 7 but less common

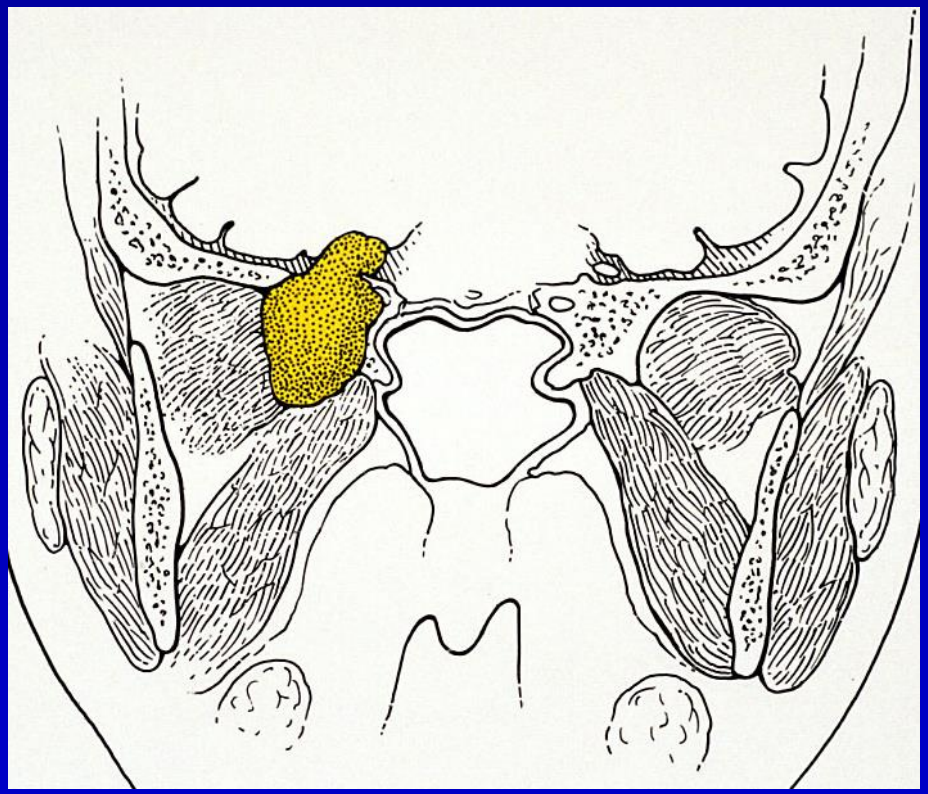
MS - V 3

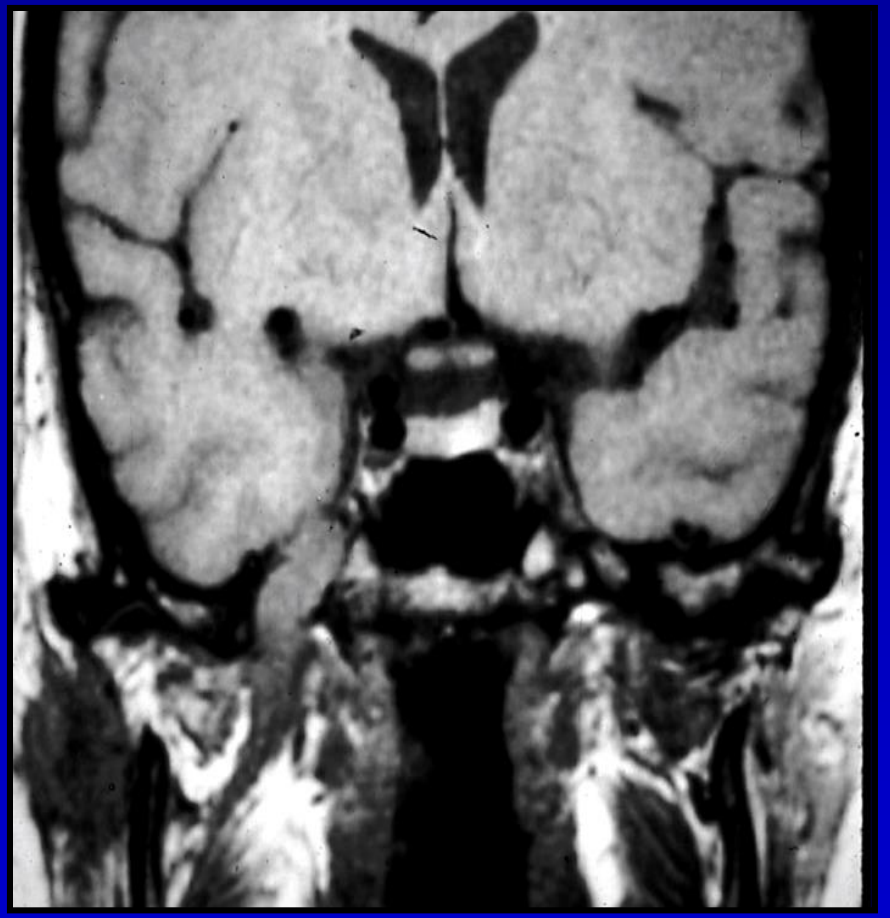




V3 gives off muscle branches and then Inf. Alveolar N. sensory

MS - Perineural V3 Spread



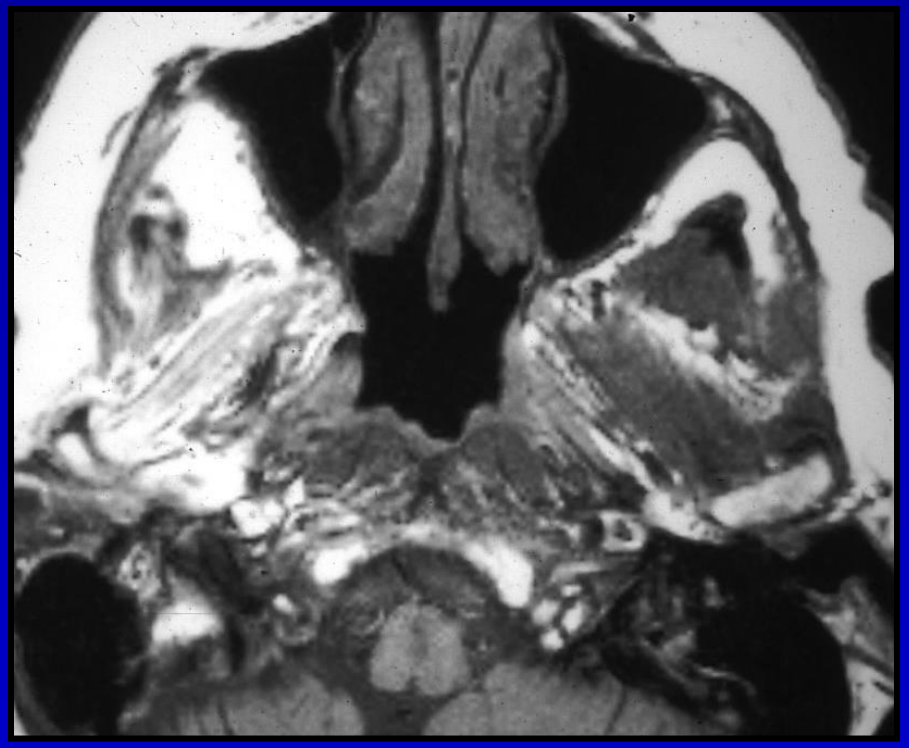


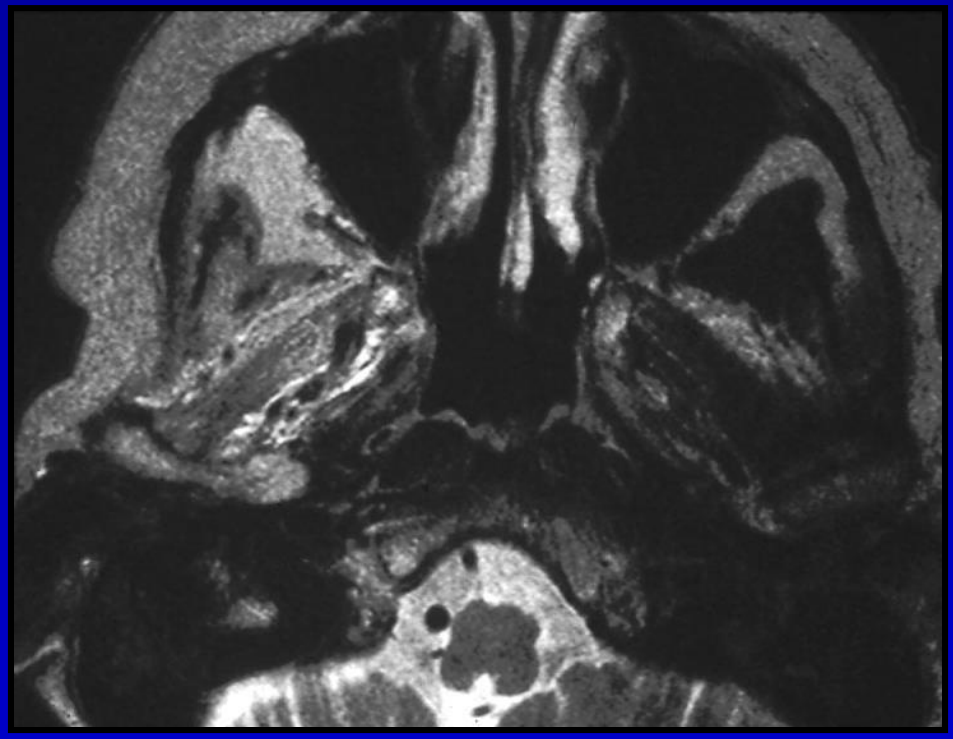
IF large V3, likely spread from neck, not from brain down

Denervation atrophy, CN V3 right

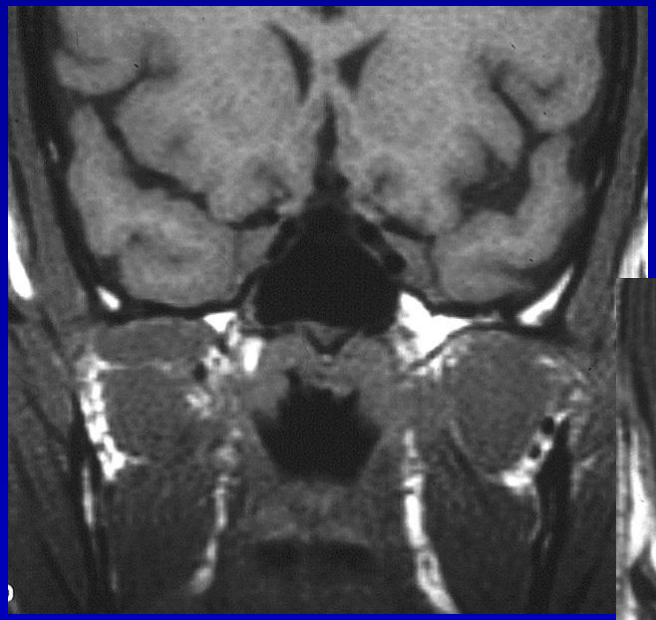
- Muscles of mastication
  - Masseter
  - Med pterygoid
  - Lat pterygoid
  - Temporalis
- Ant. digastric, mylohyoid
- Tensor palatini, tensor tympani

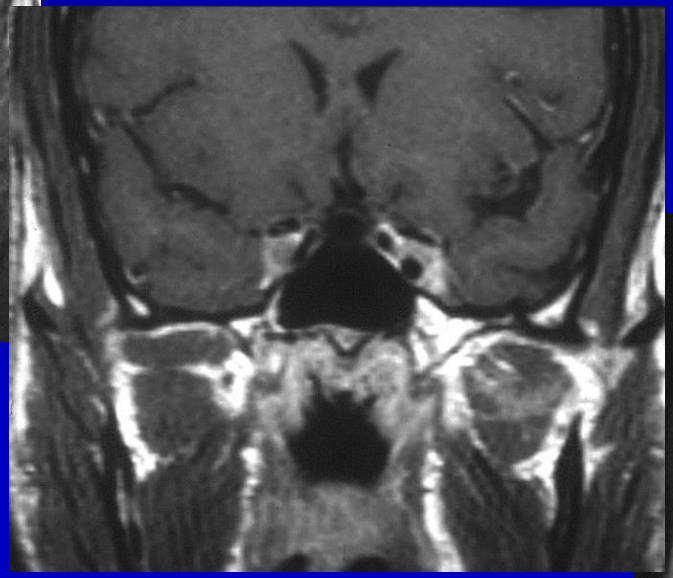
Denervation atrophy, CN V3, chronic

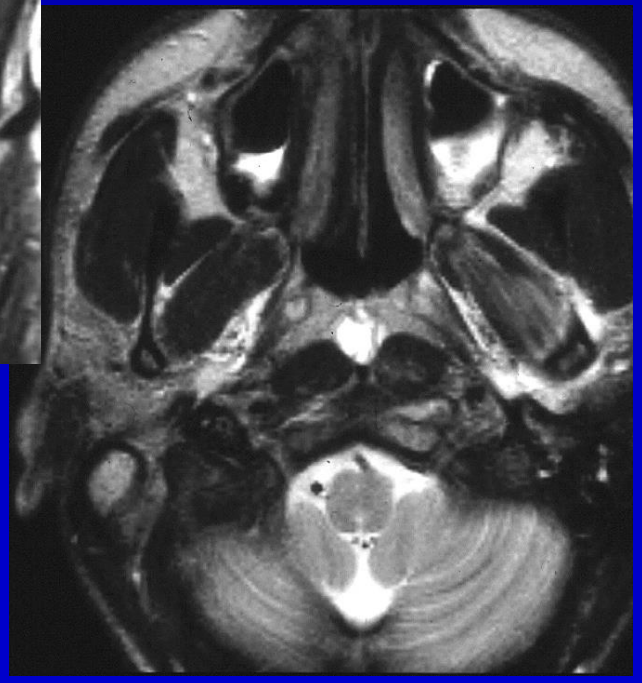




V3 denervation, acute. Lat pterygoid



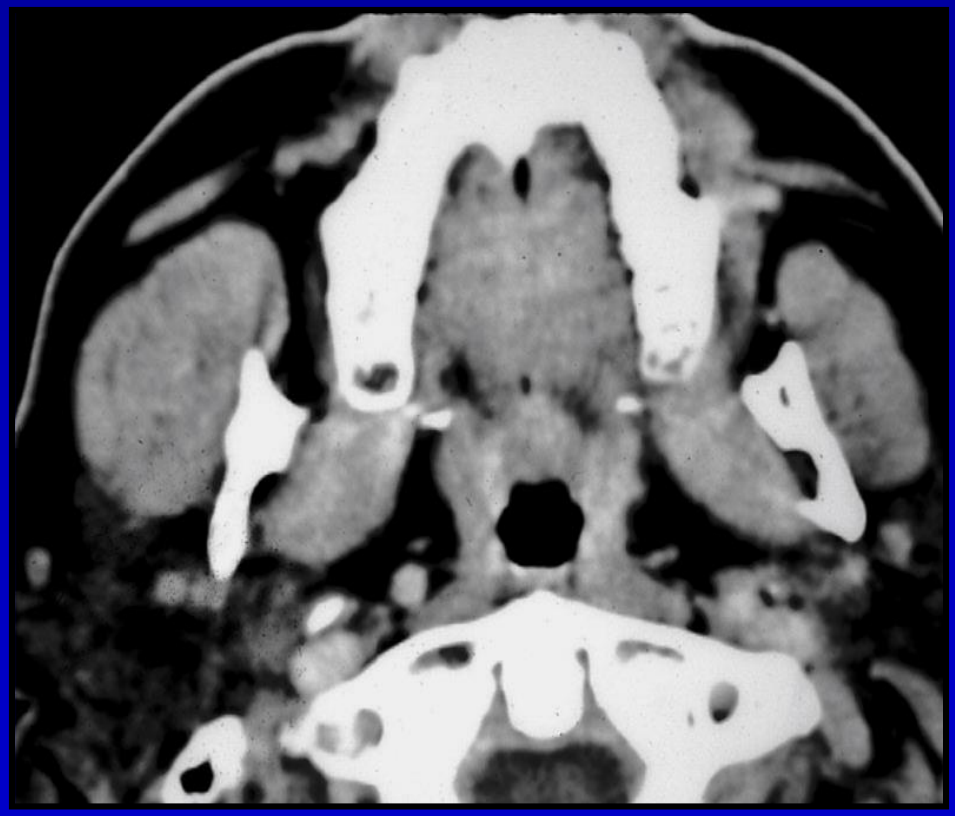




Acutely muscle will be thick and edematous

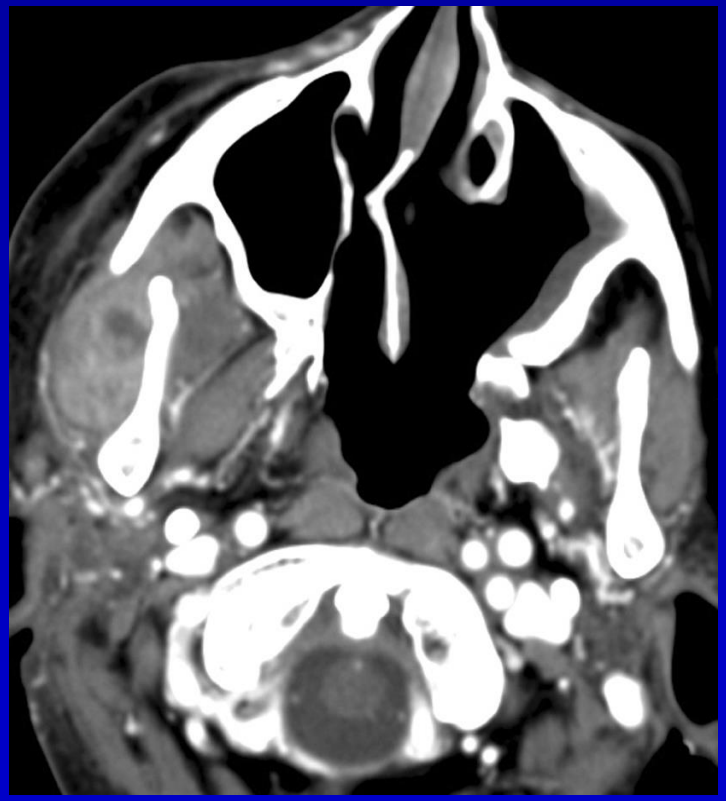
MS - Benign masseteric hypertrophy

- Uni or bilateral masseter m hypertrophy
- May present with cheek or facial lump, gets bigger with jaw clenching
- Secondary to bruxism

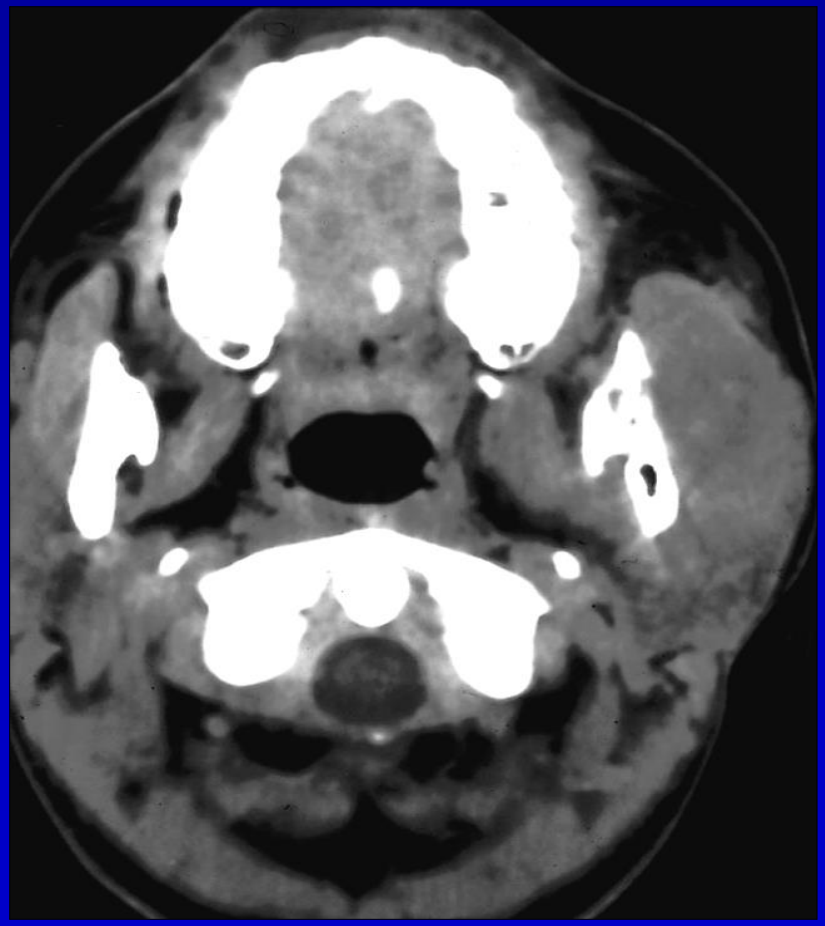


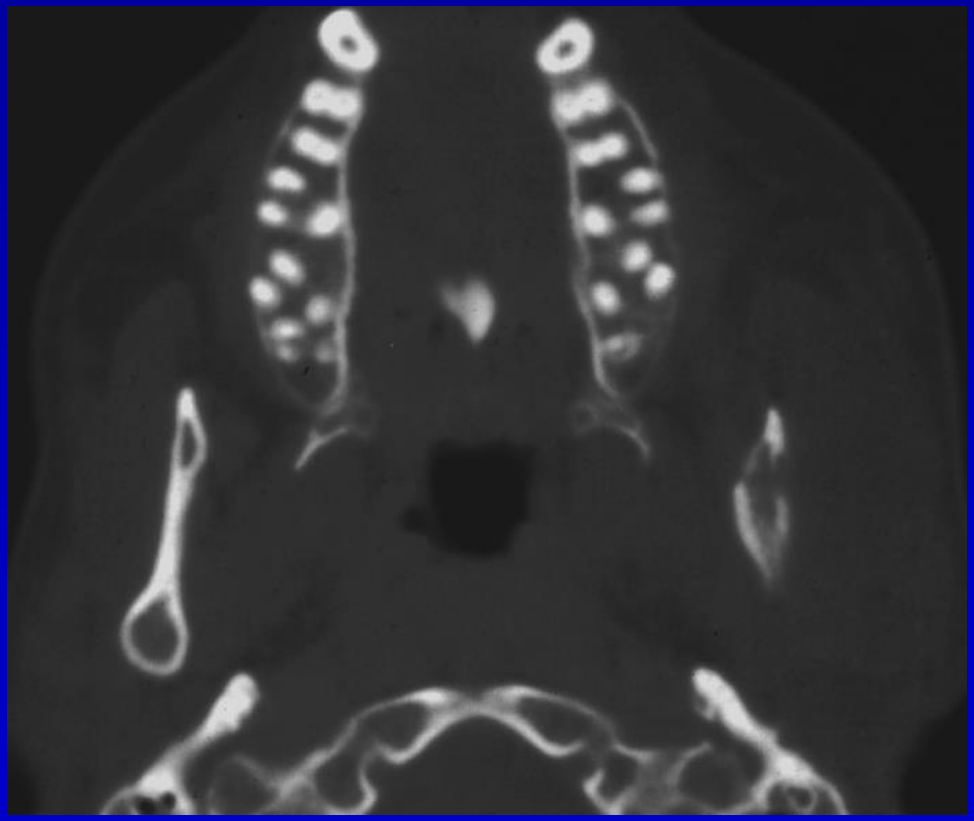
MS - Odontogenic infection

- Most common MS lesion in adults
- History of tooth infection or dental work
- Soft tissue induration
- Enlarged, enhancing muscles
- Bony destruction



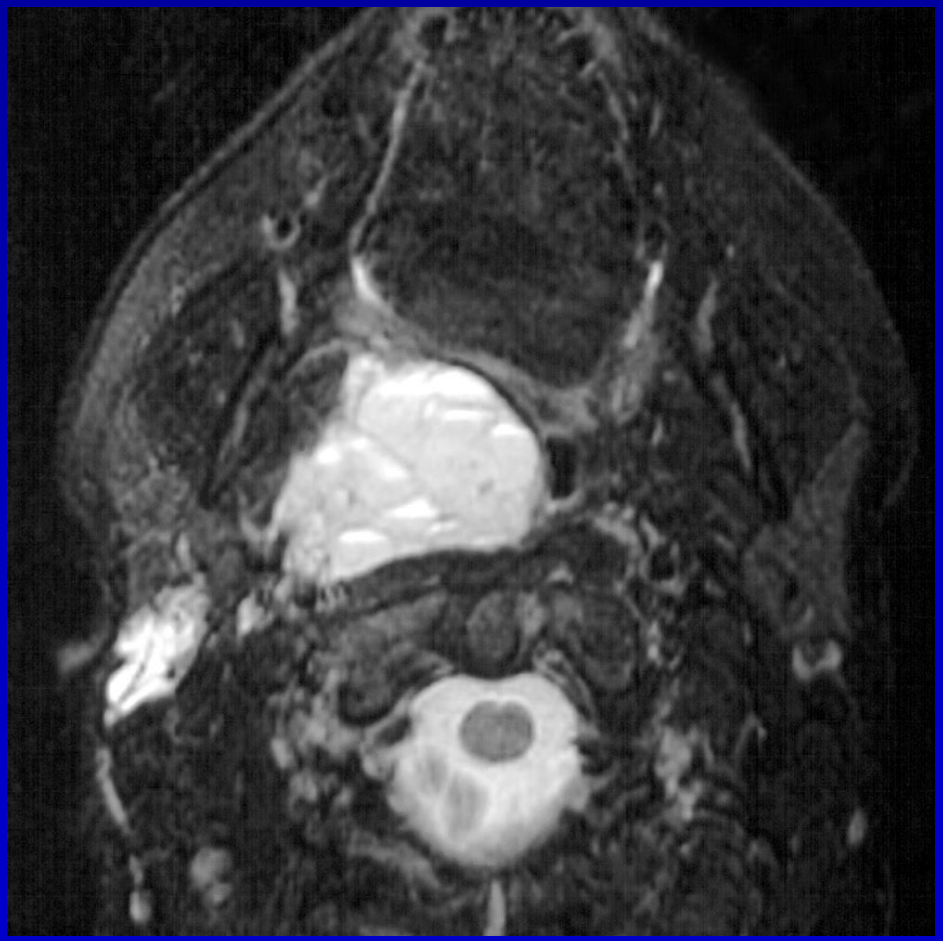
MS - Abscess



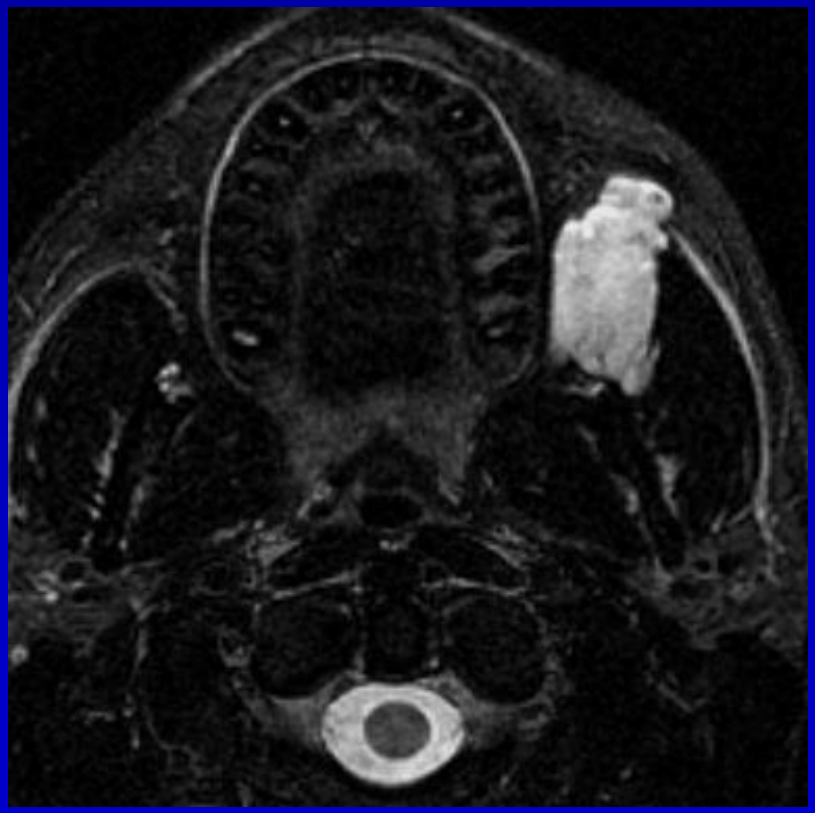


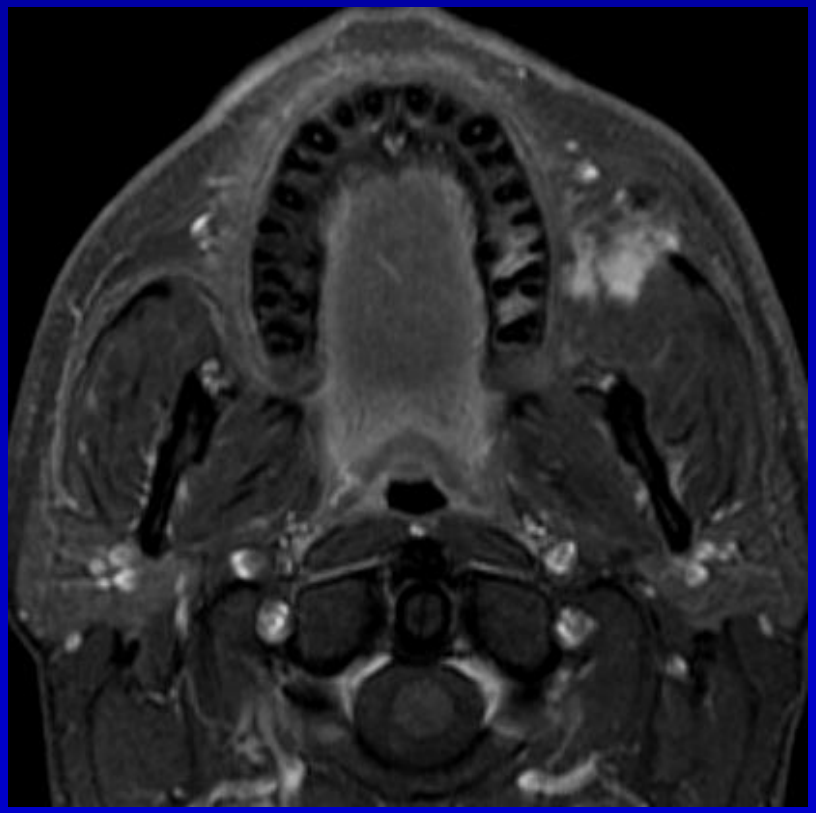
MS - Lymphangioma/hemangioma

- Most common MS lesion in children
- Congenital
- Best seen on T2WI
- Often trans-spatial



MS – Lymphangioma/hemangioma



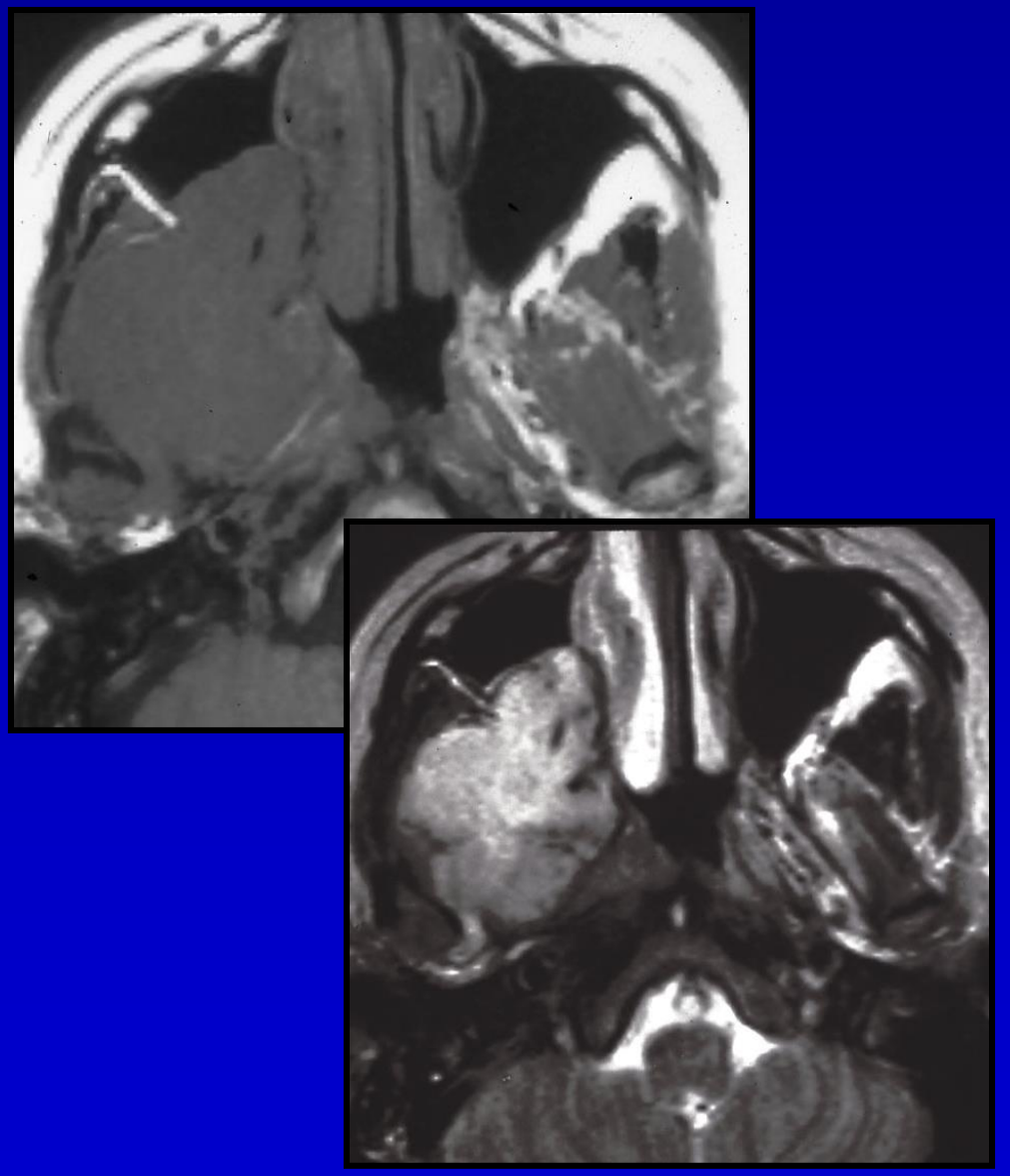


MS – Malignant lesions

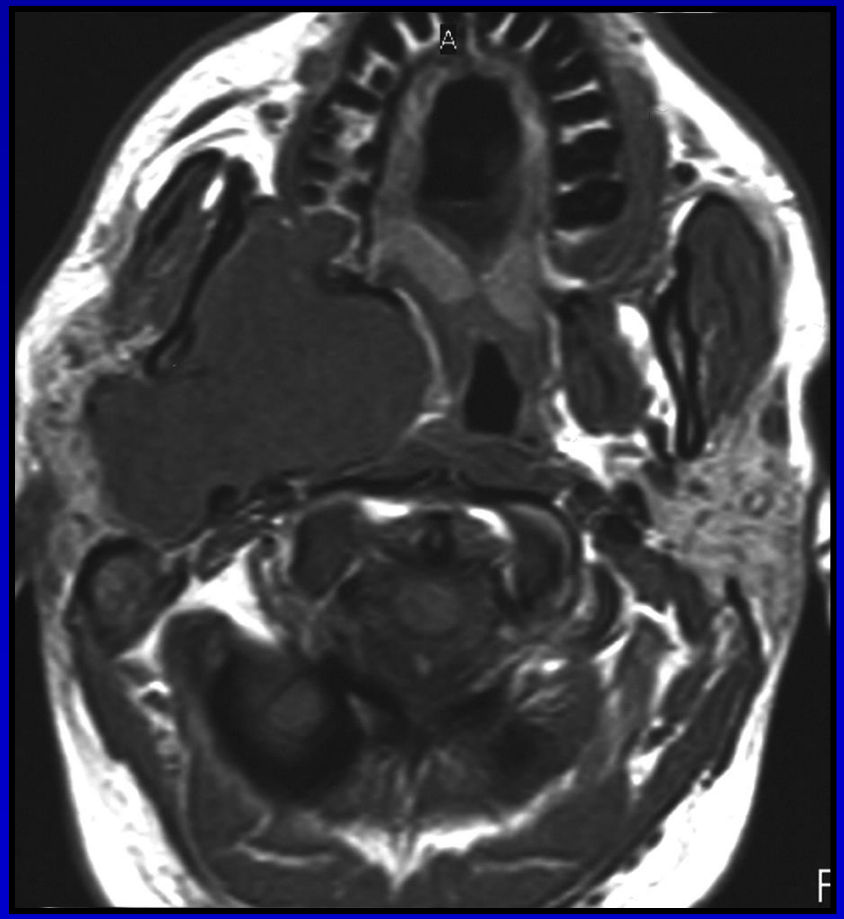
- Rhabdomyosarcoma
- Lymphoma
- Metastases
- Direct invasion from Retromolar trigone SCCa

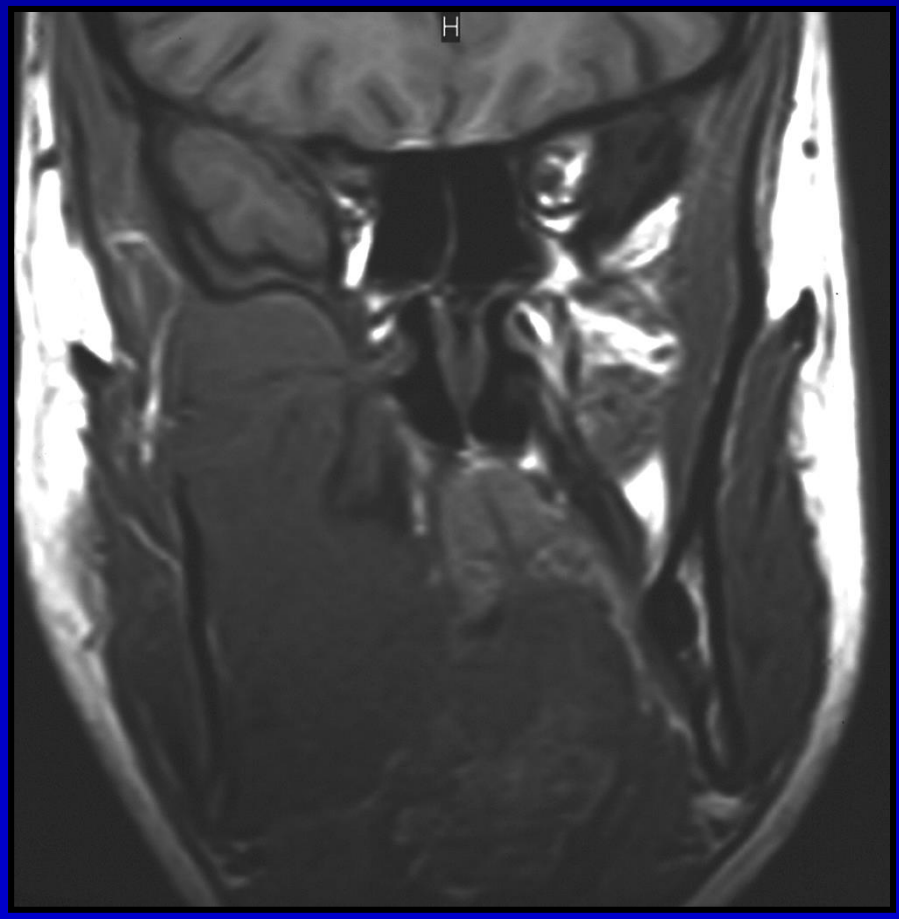
Extent of Tumor

- Perineural tumor to foramen ovale
- Intracranial extension



MS - Embryonal Rhabdomyosarcoma



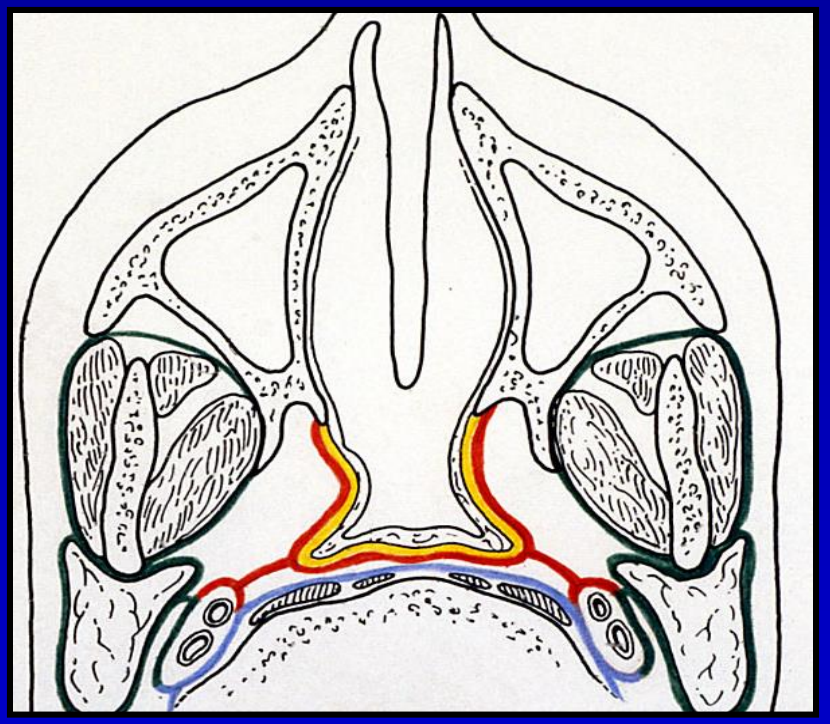


Summary – PMS, PPS, MS

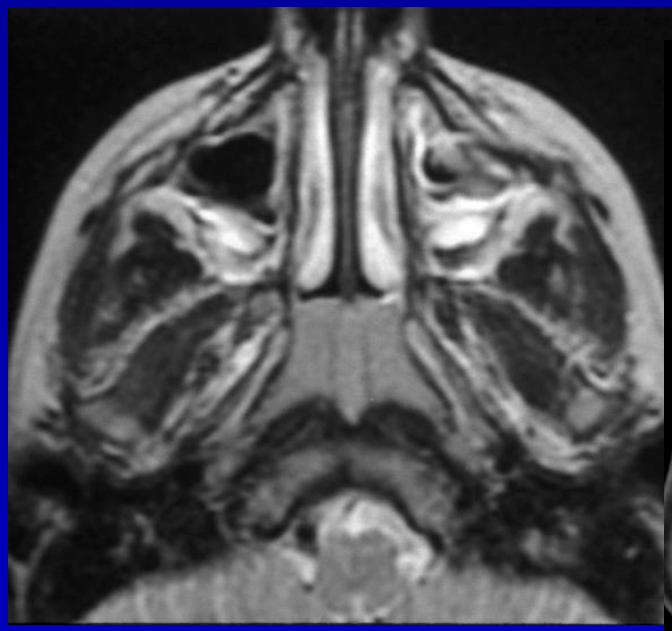
Locations & fascia each space

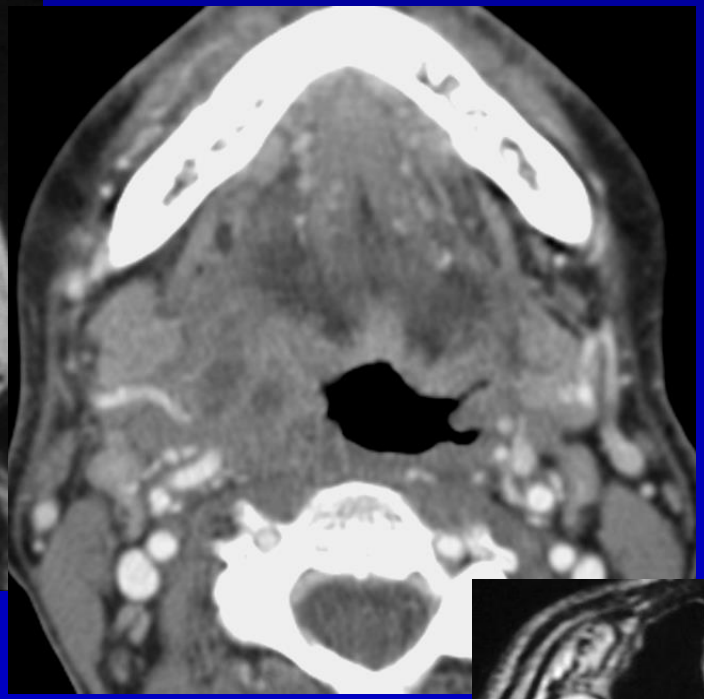
Normal contents

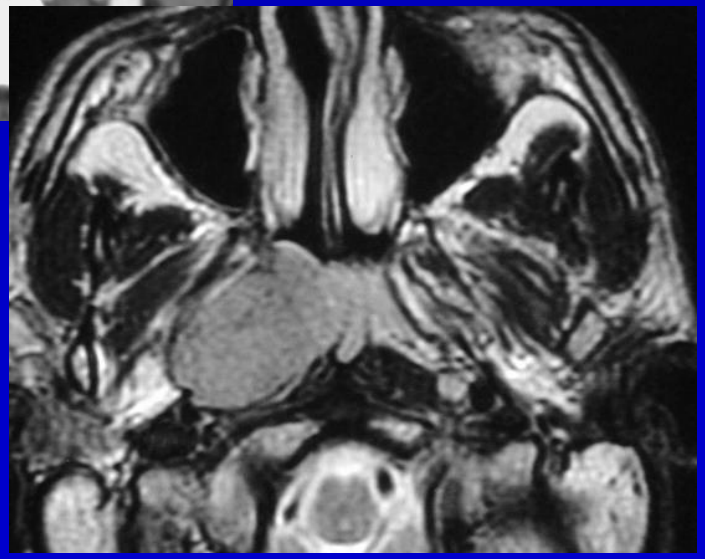
Common lesions in each space



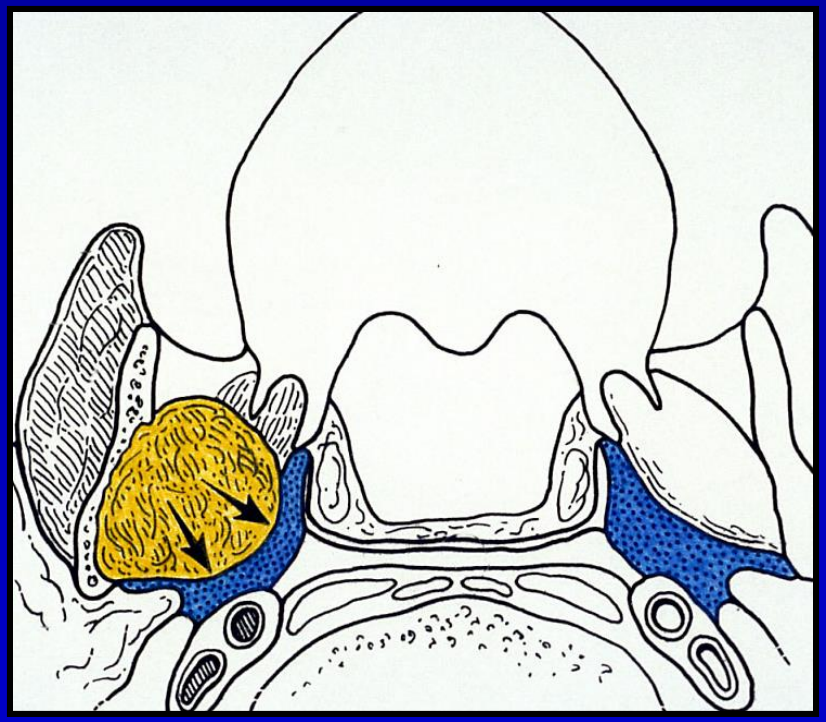
Summary - Pharyngeal mucosal space

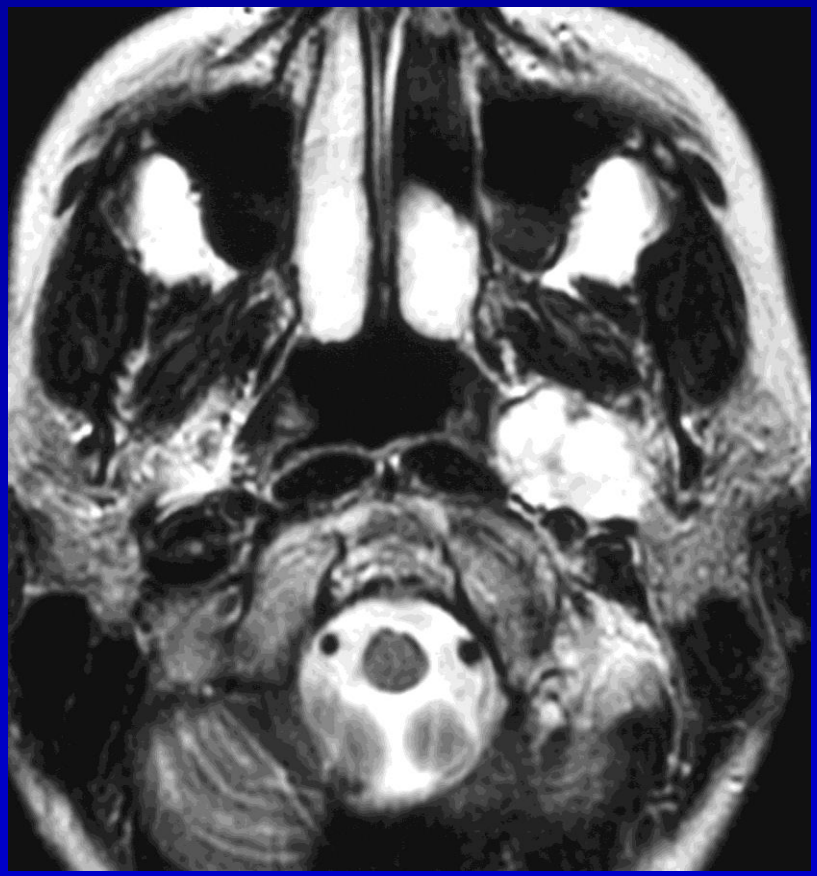






Summary - Parapharyngeal space





Summary – Masticator space