

Oropharynx-Anatomy & Target volume delineation

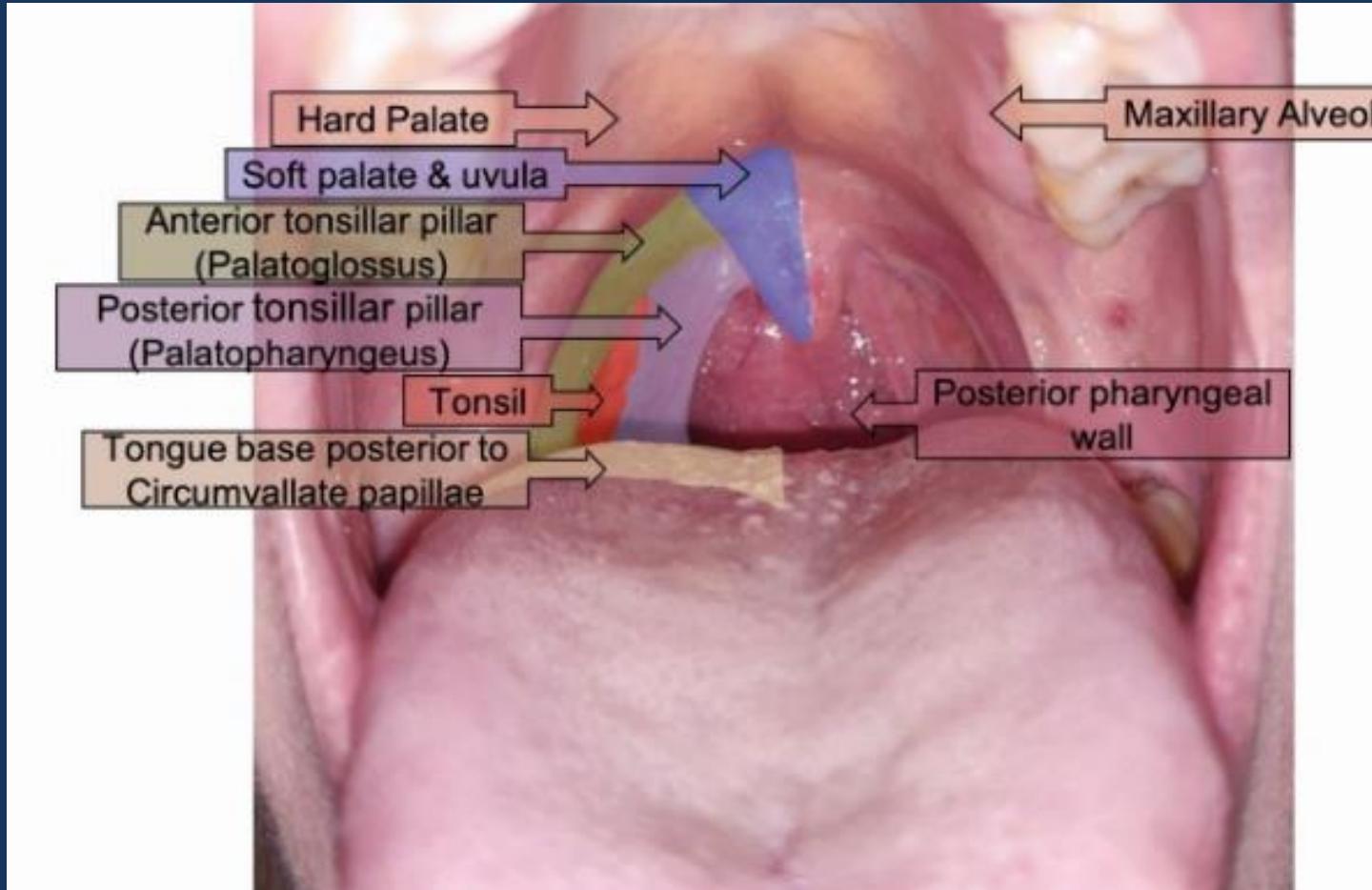
Cessal Thommachan Kainickal MD DNB MRCP(UK)(Med.Onc.)

Additional Professor, Head & Neck Oncology

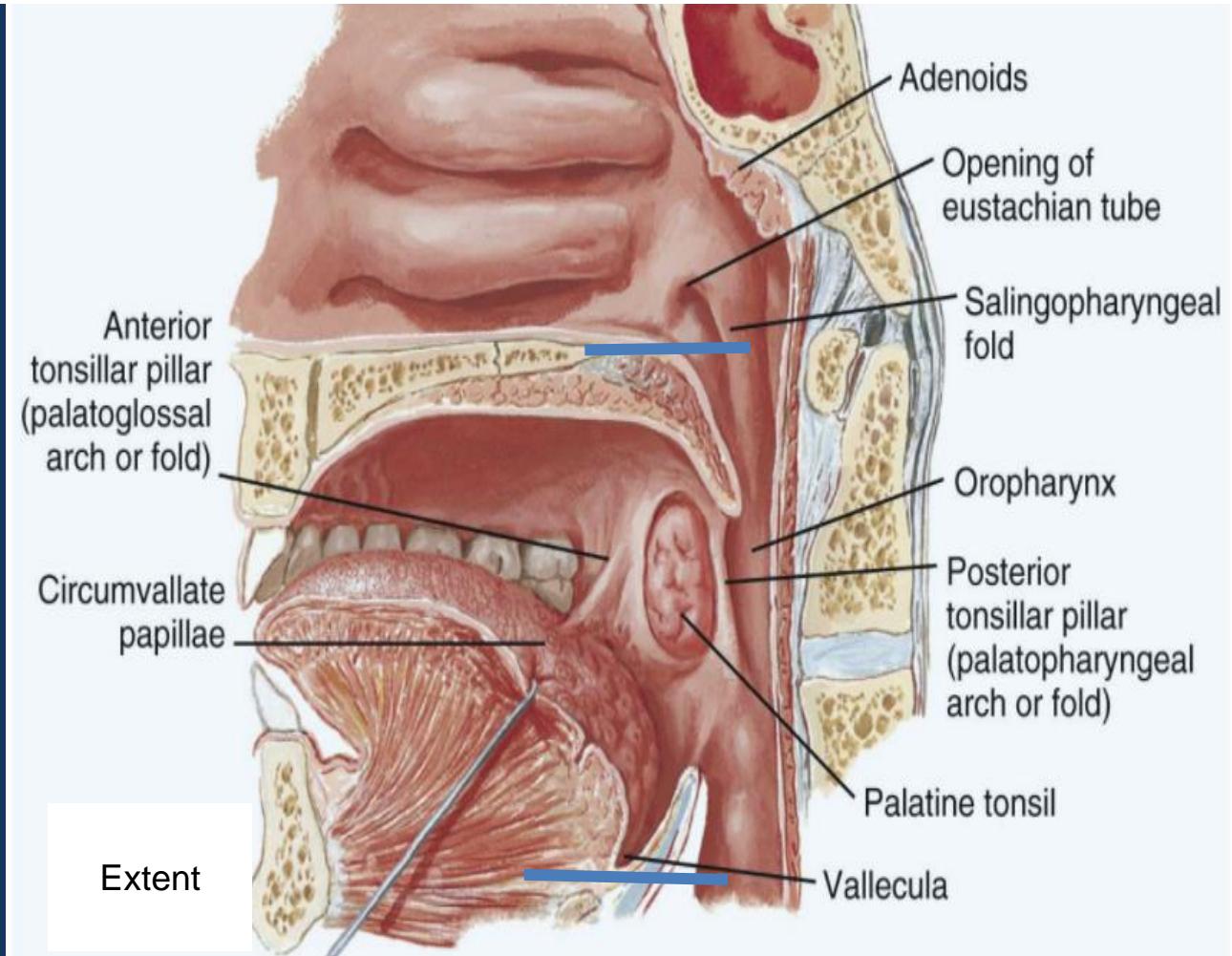
Regional Cancer Centre

Trivandrum, Kerala

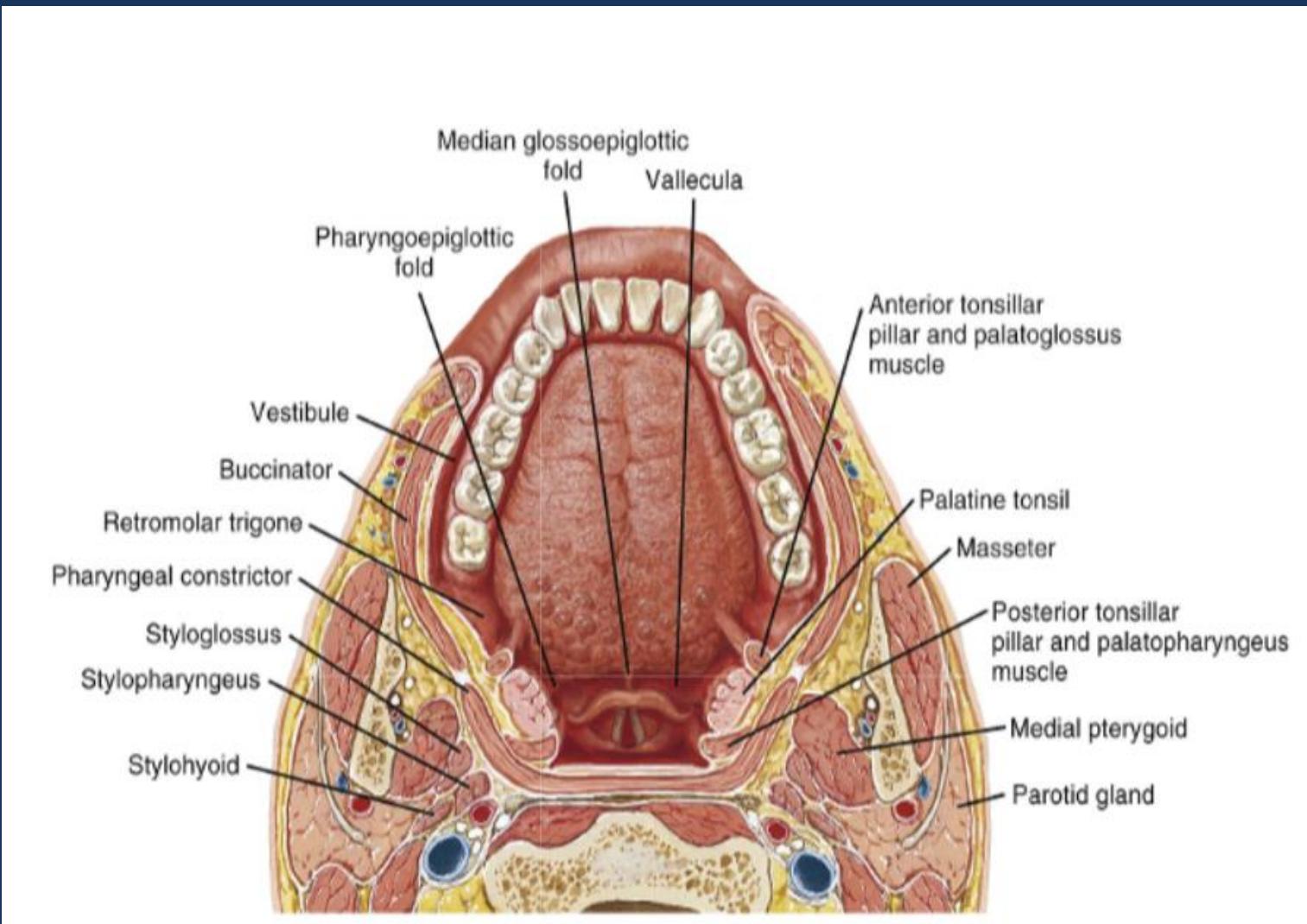
Oropharynx- Anatomy



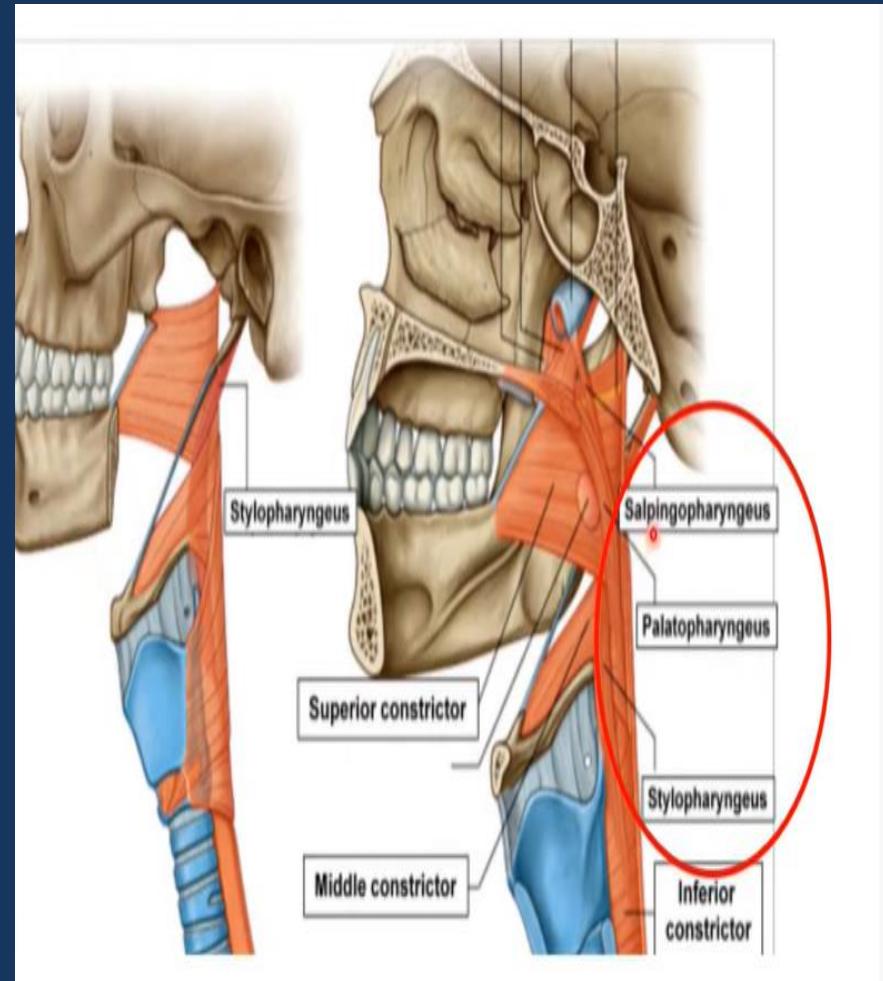
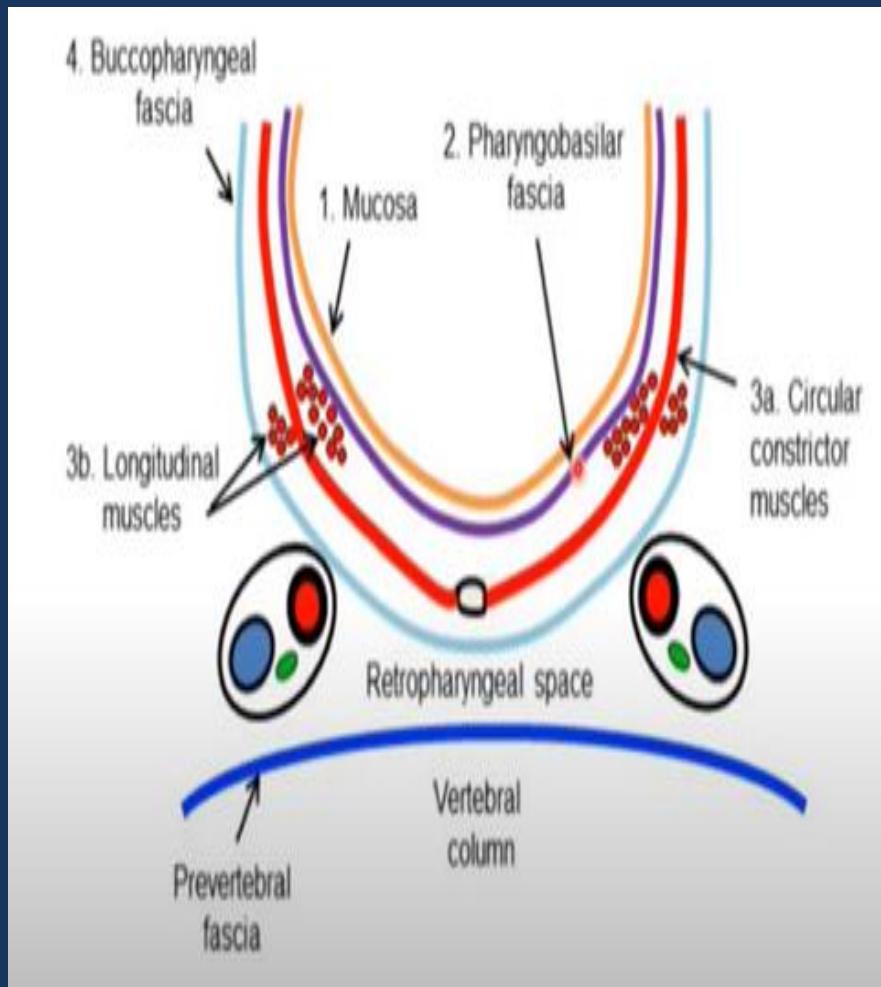
- *Anterior*: Palatoglossal arch
- *Posterior*: Palatopharyngeal arch
- *Superior*: Where the palatoglossal and palatopharyngeal arches meet.
- *Inferior*: Dorsal surface of posterior 1/3rd of the **tongue**.
- *Lateral* : lateral wall of oropharynx.



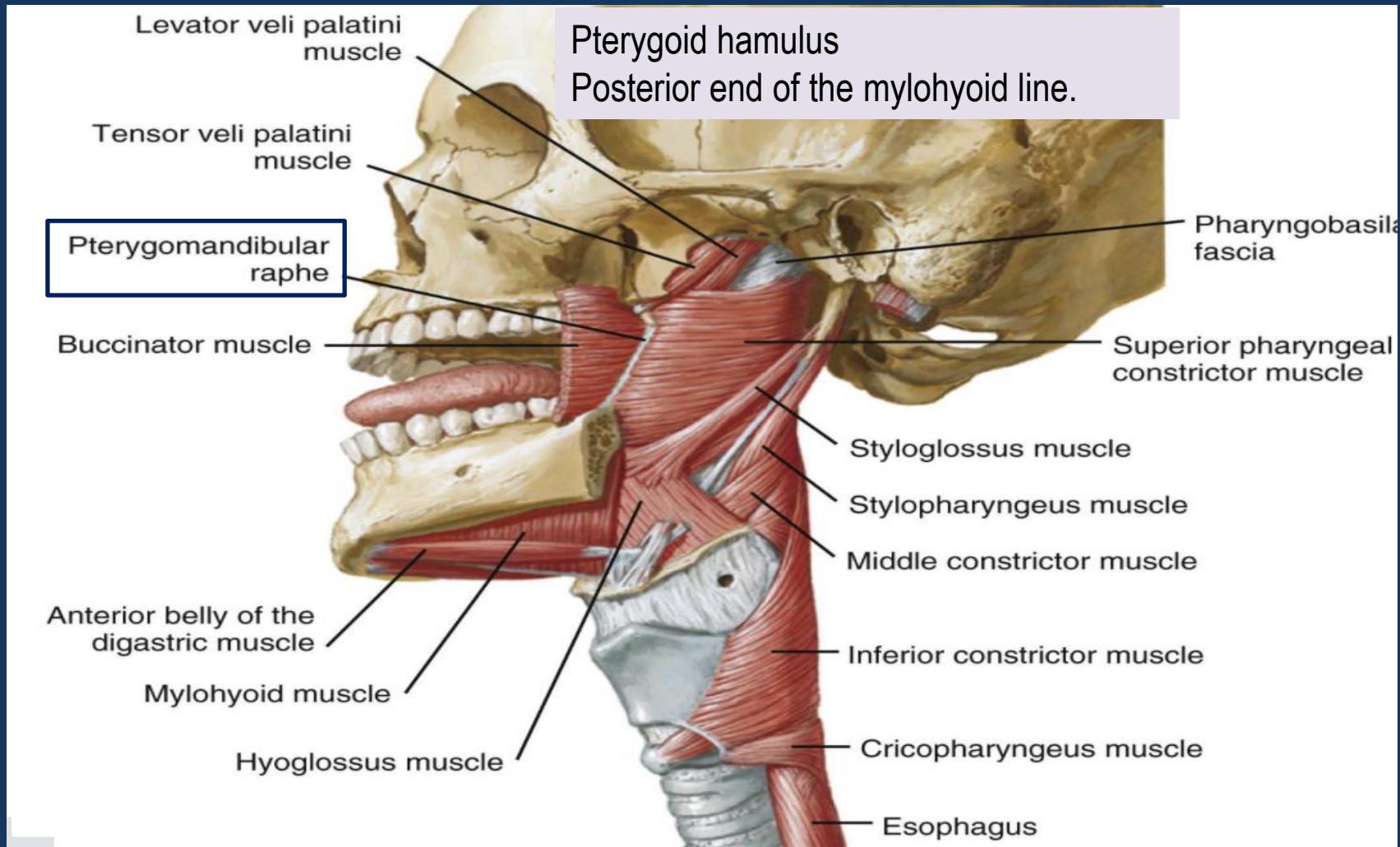
Ca tonsil -Routes of spread



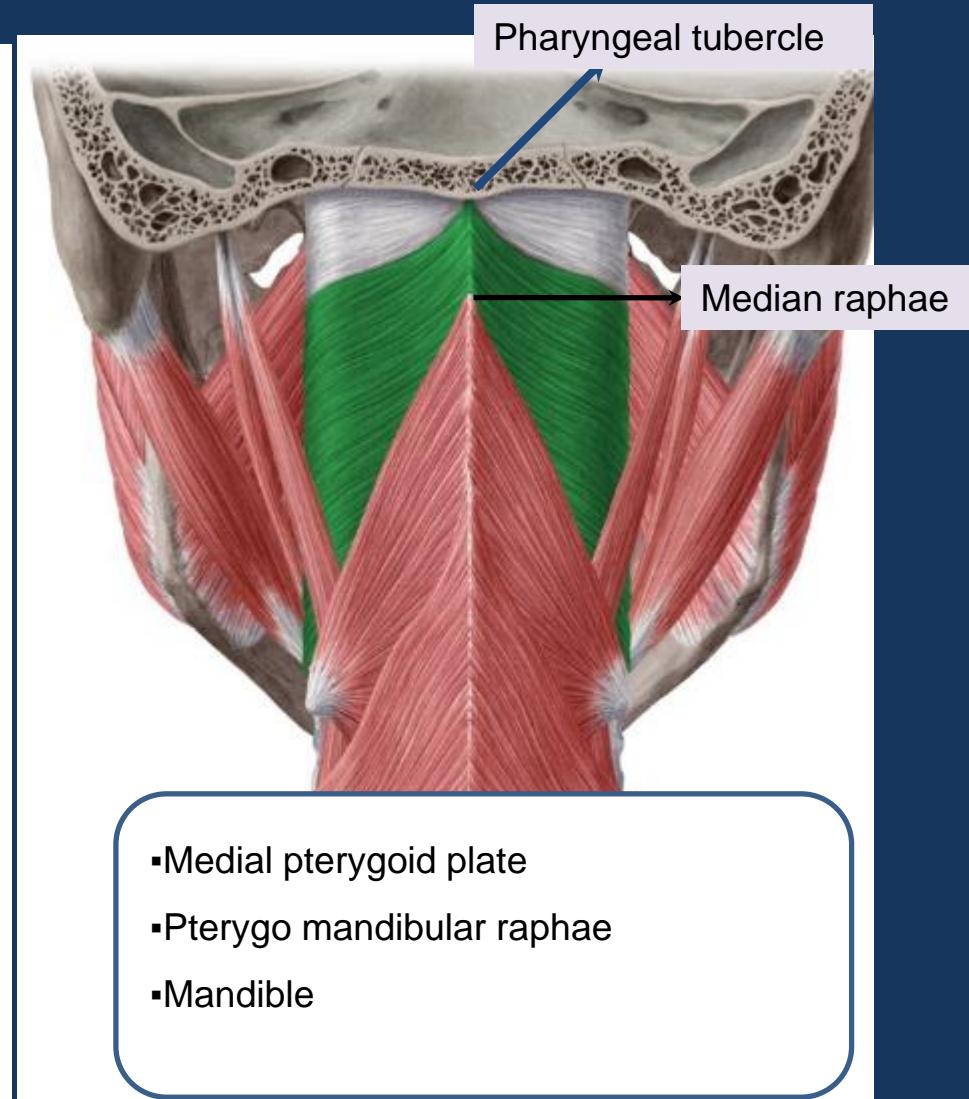
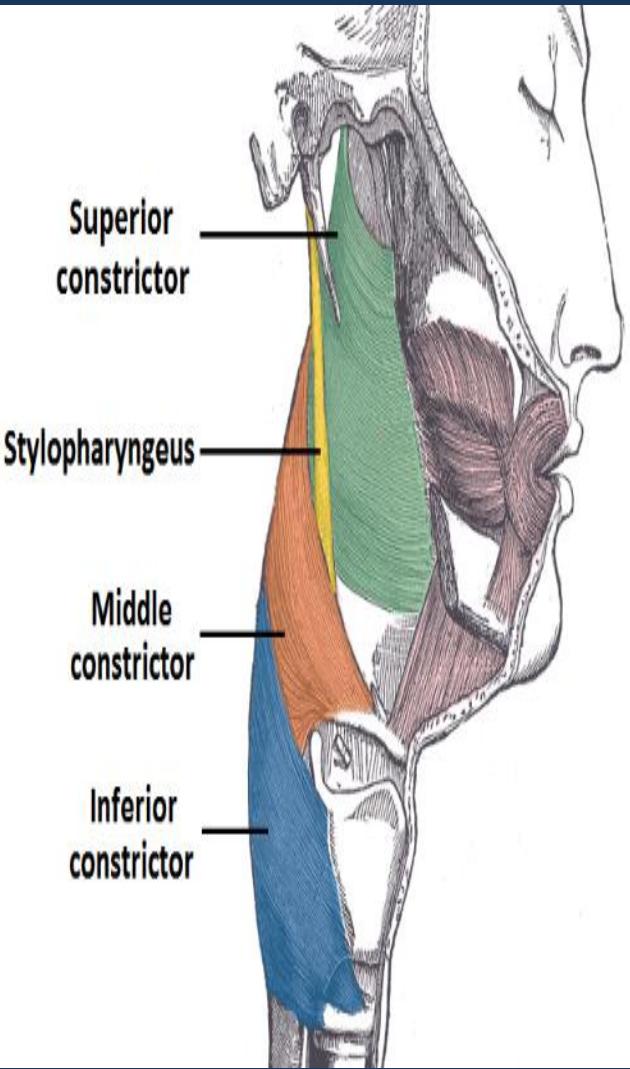
Circular & Longitudinal muscles

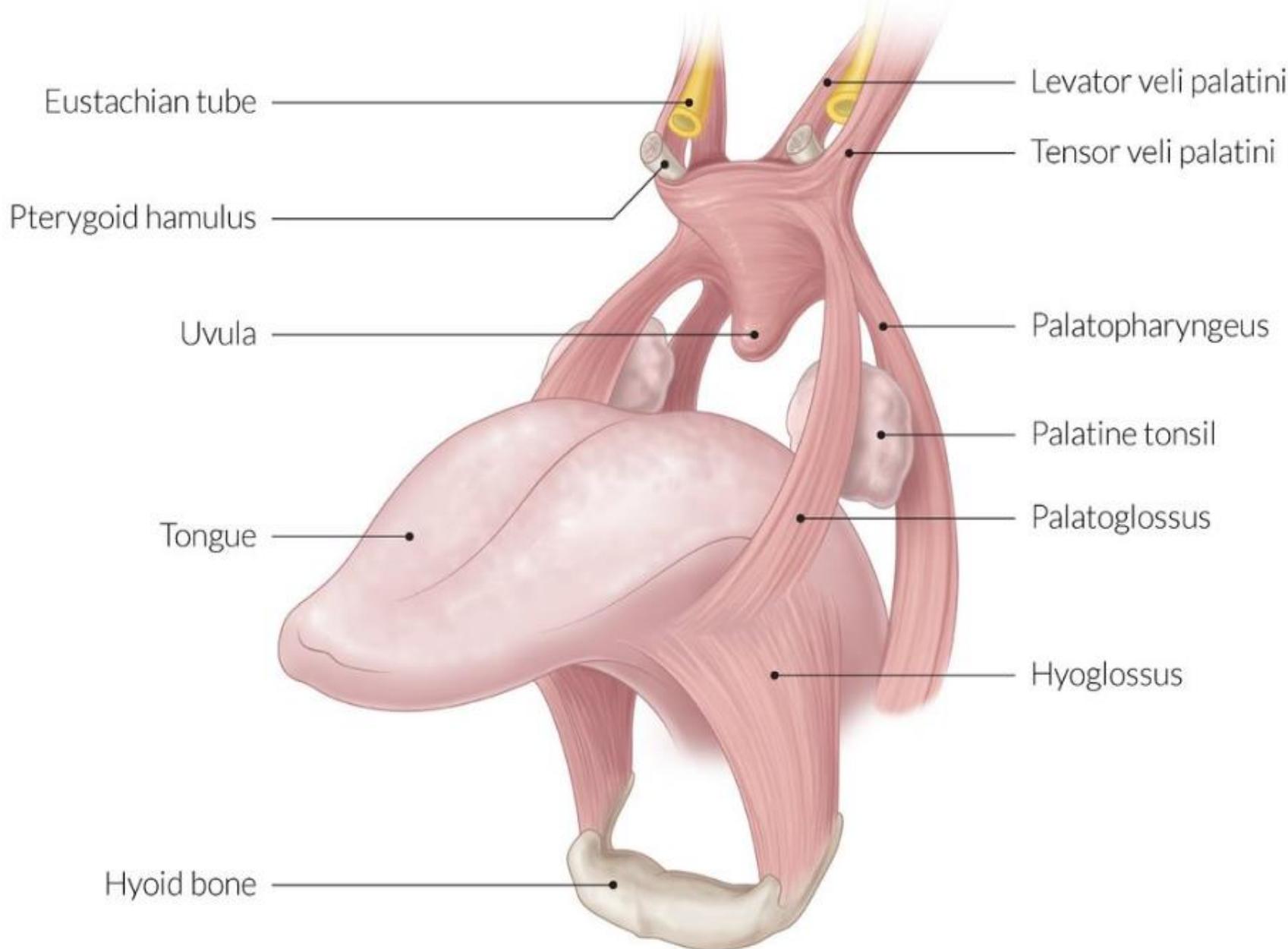


Fibrous band of the buccopharyngeal fascia

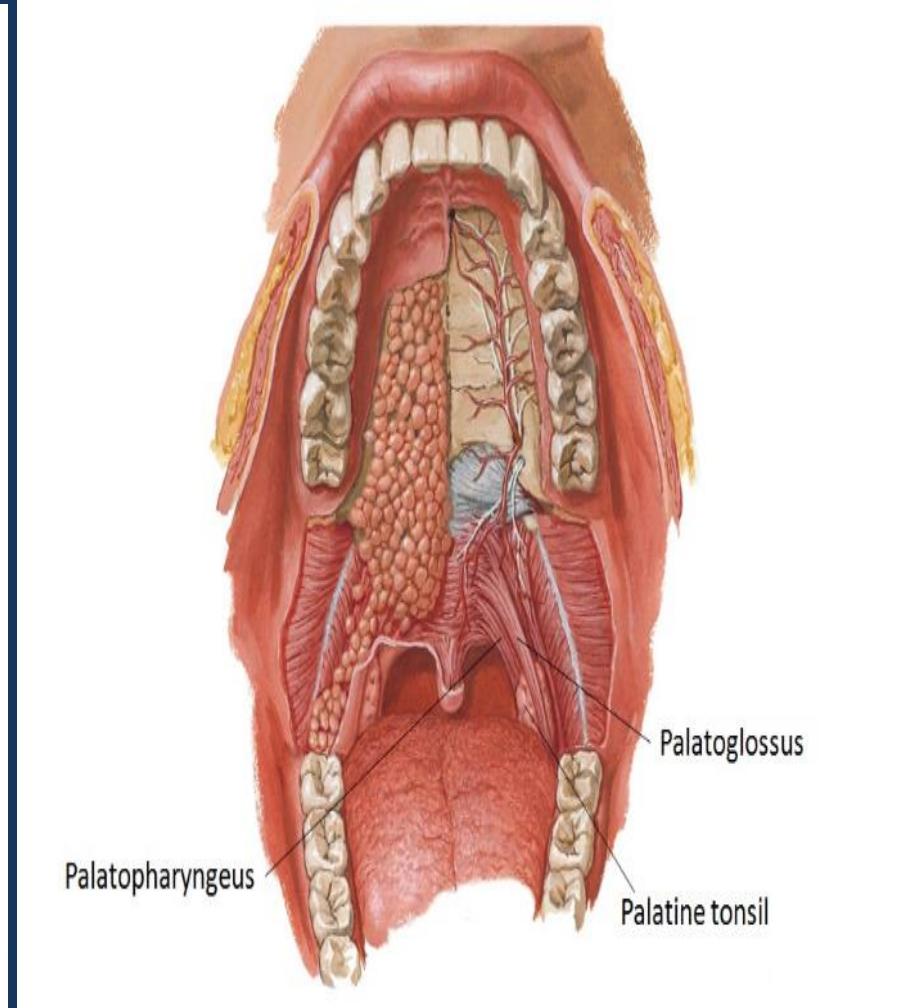
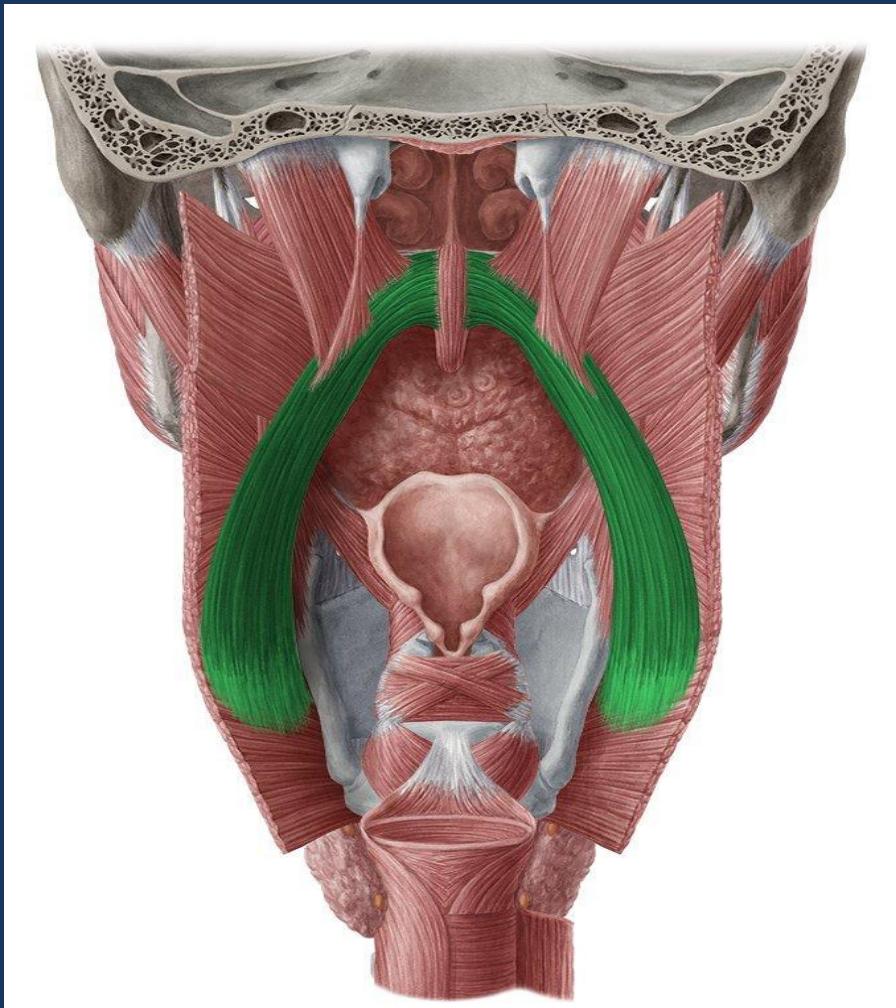


Superior constrictor muscle

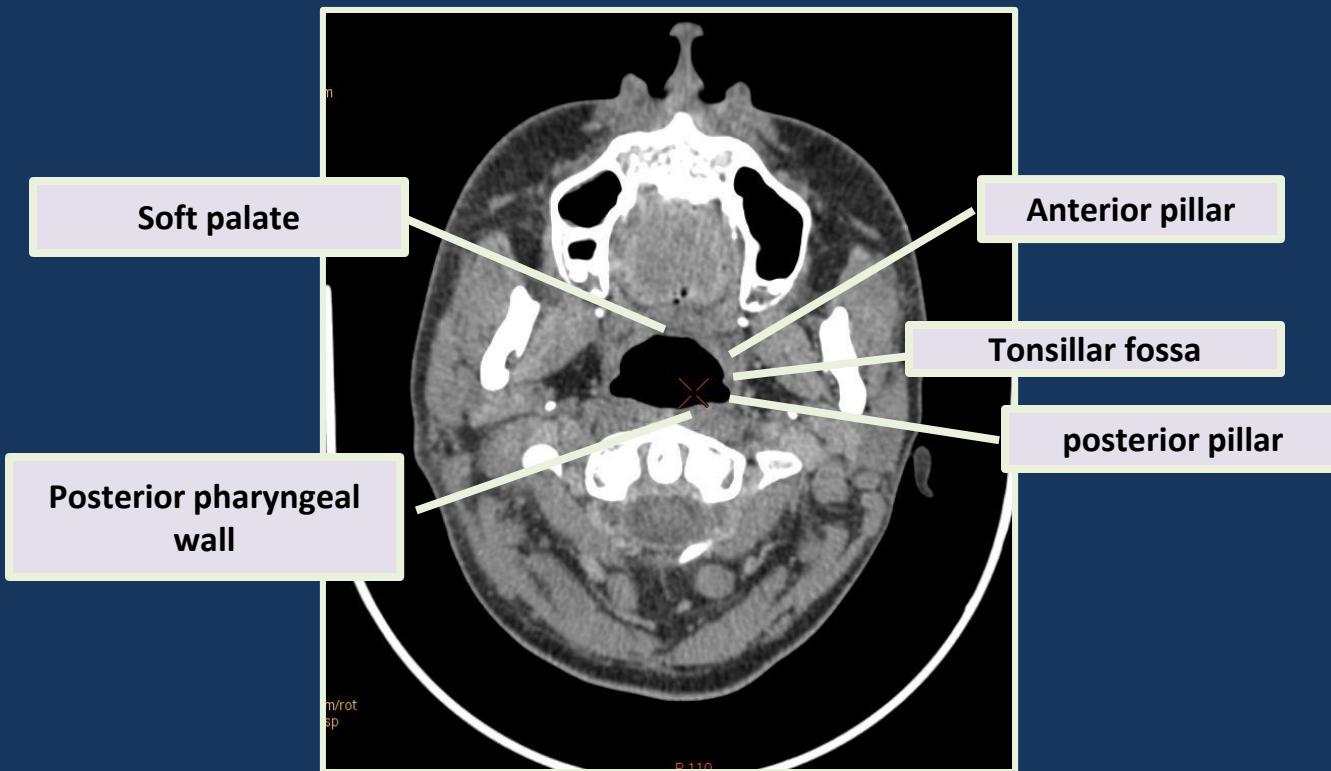




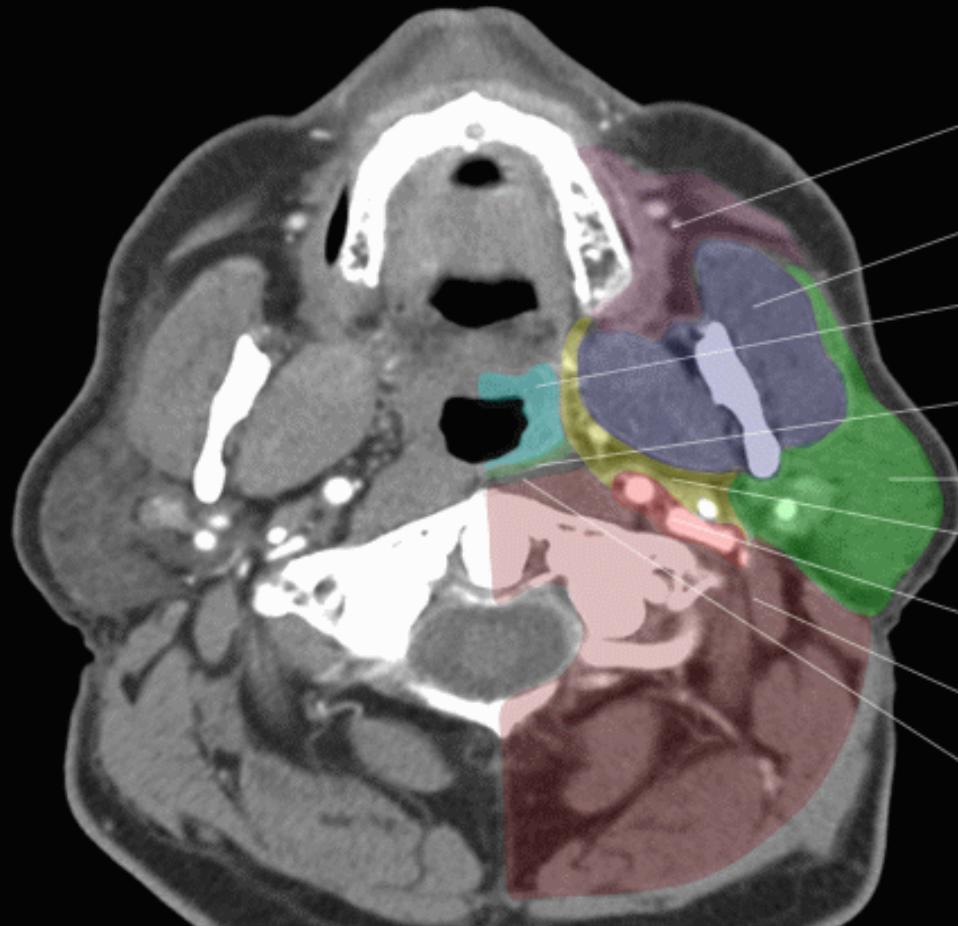
Palatoglossus & Palatopharyngeus



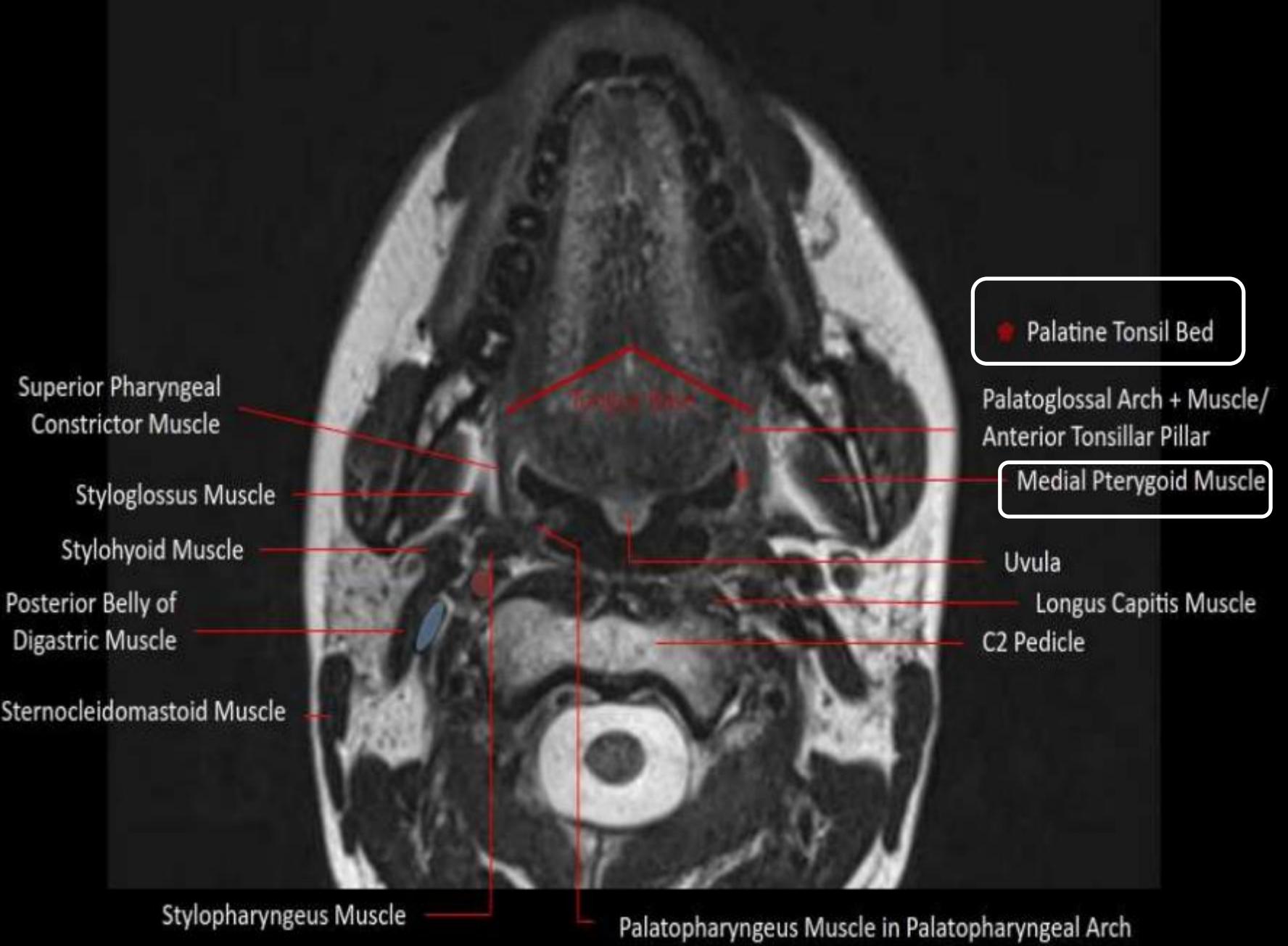
Oropharynx



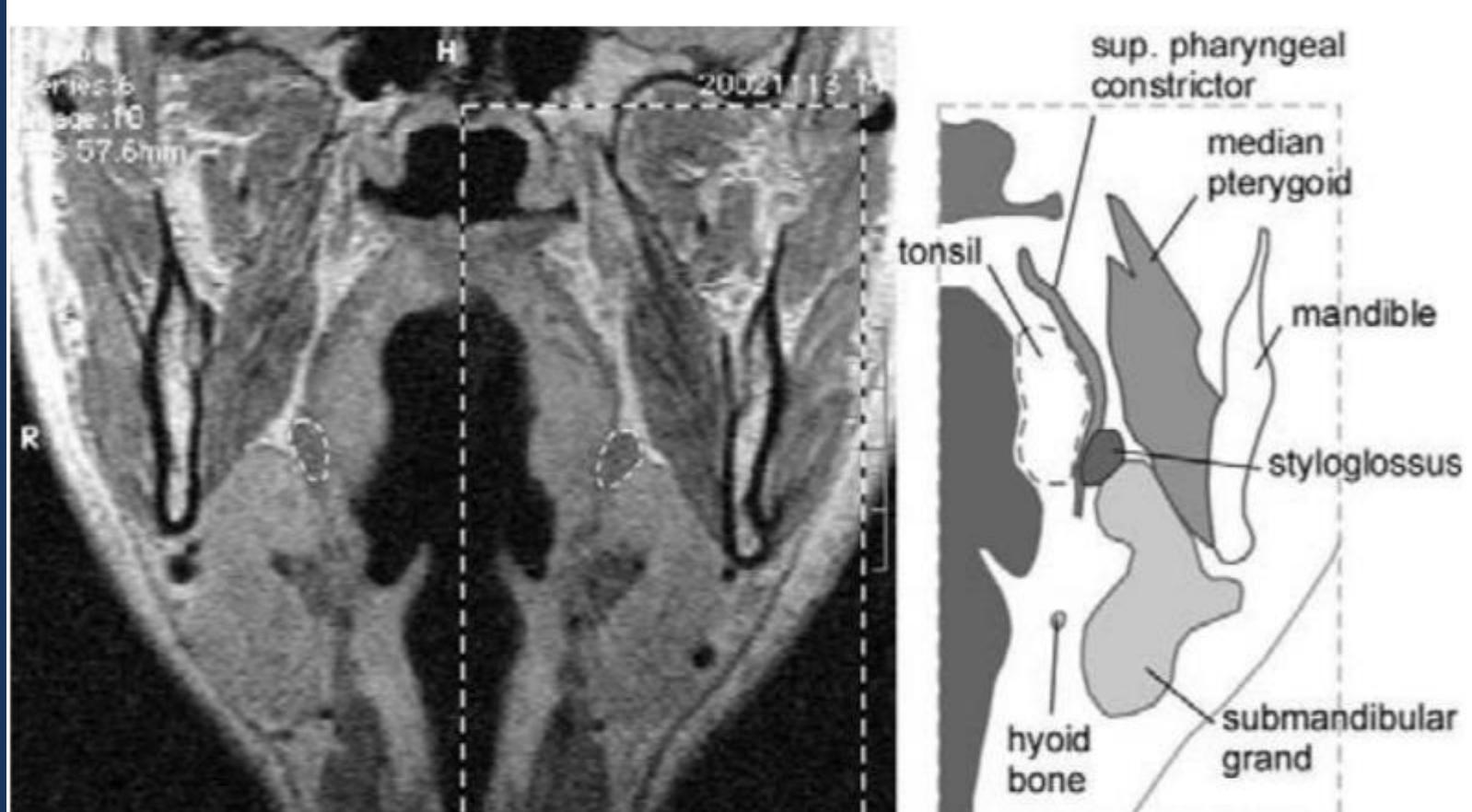
Axial view



- Buccal space
- Masticator space
- Pharyngeal space
- Retropharyngeal space
- Parotid space
- Parapharyngeal space
- Carotid space
- Perivertebral space
- Danger space



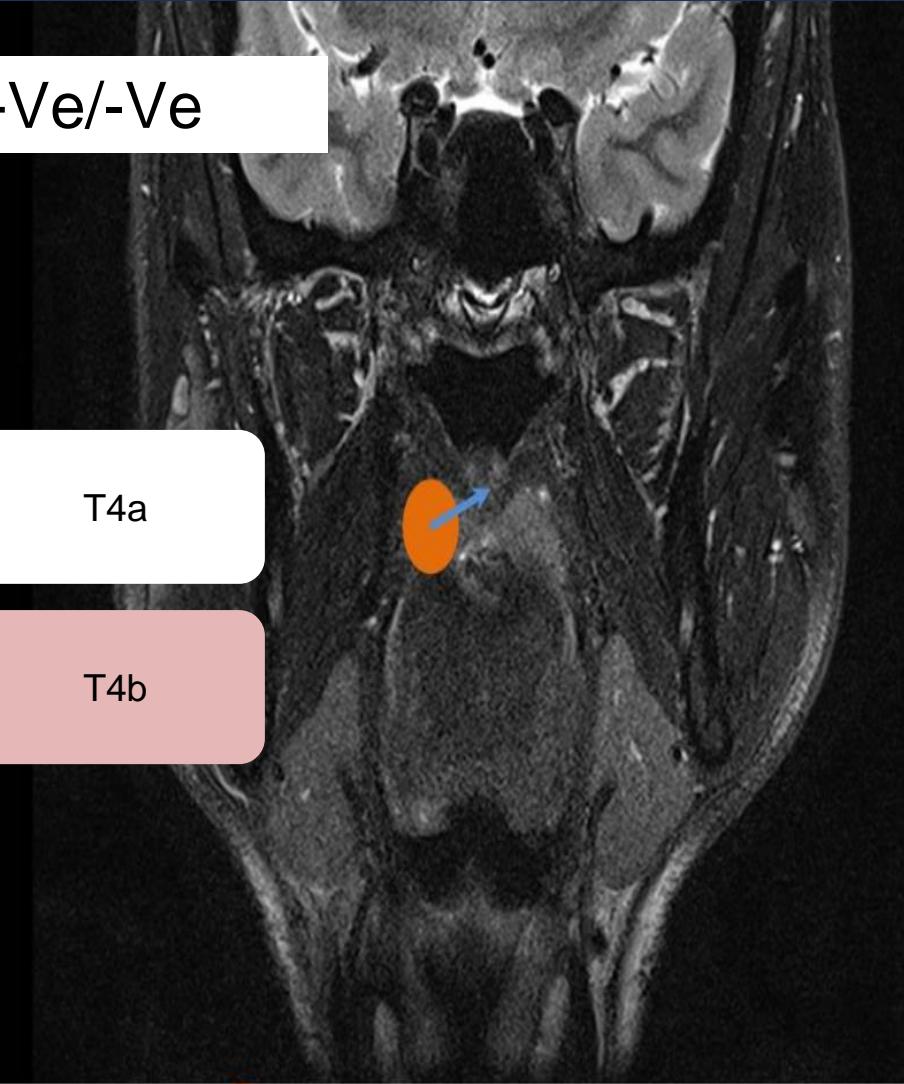
Coronal view



Up T3 - Size criteria- HPV +Ve/-Ve



T4a
T4b



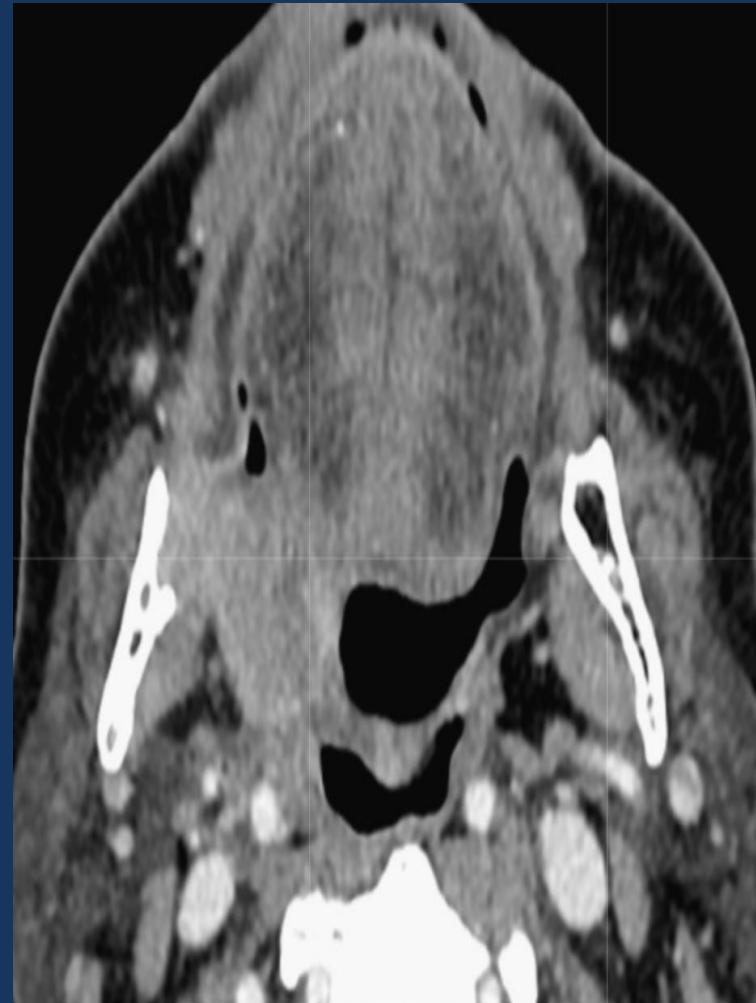
- Retromolar trigone
- Base of the tongue
- Beyond oropharyngeal mucosa



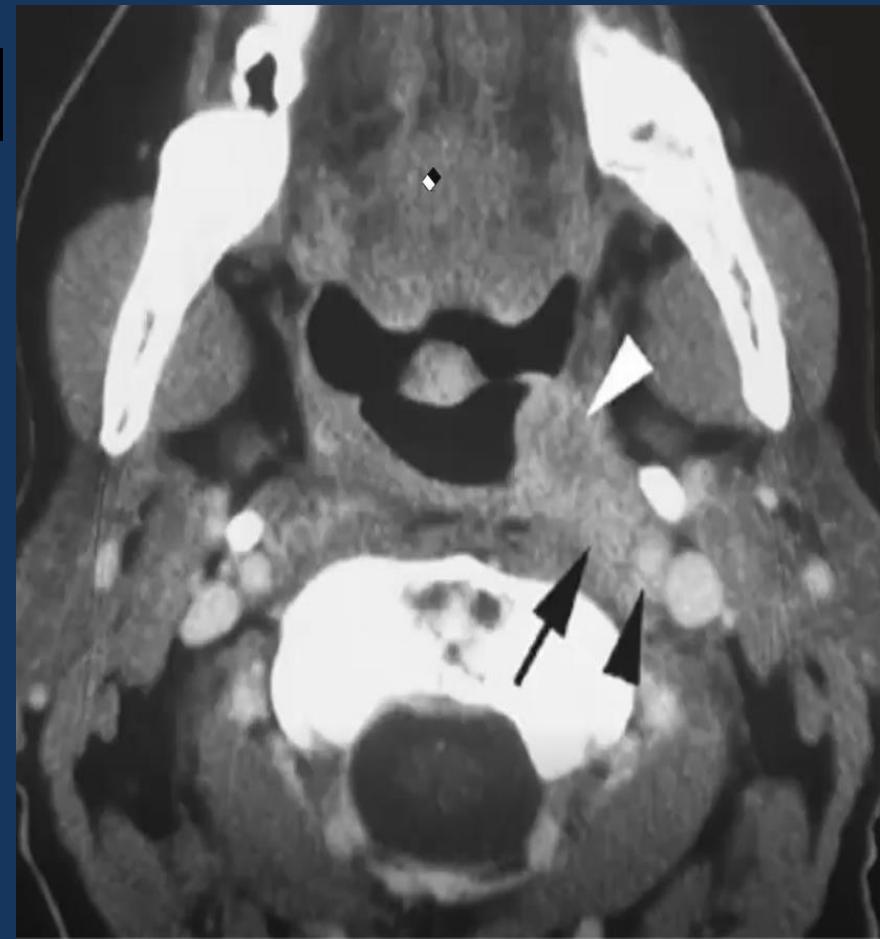
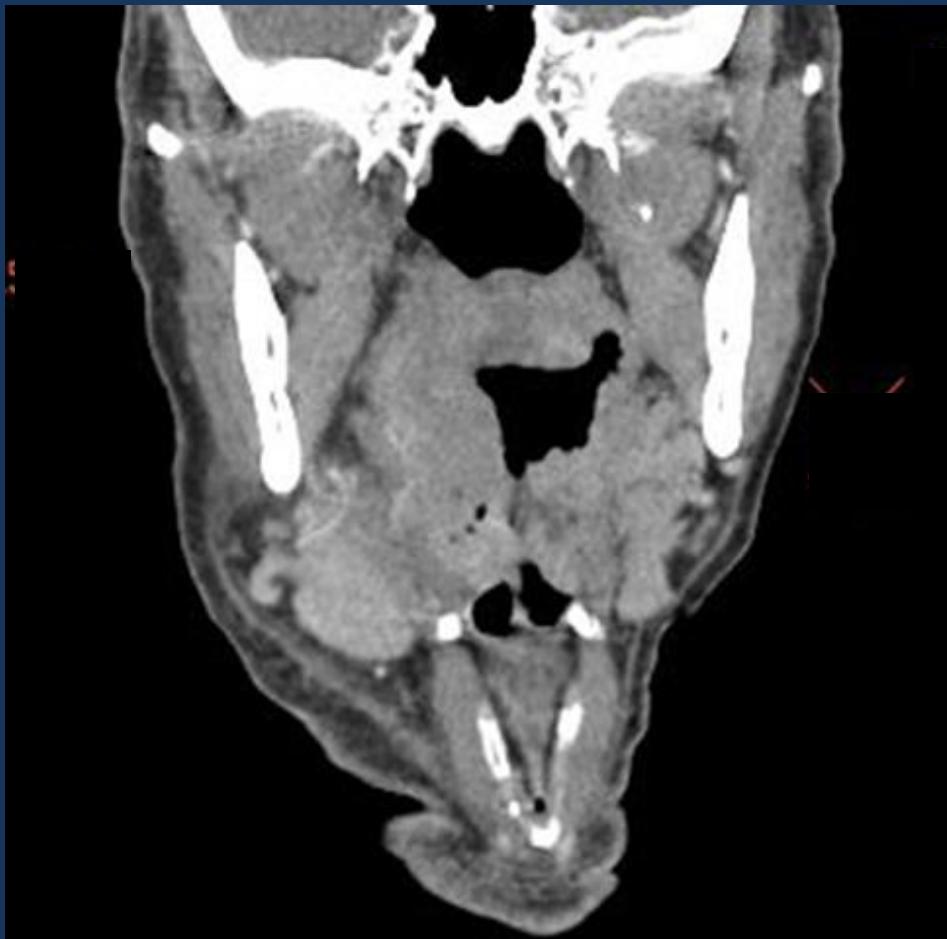
Primary tumor

Soft palate

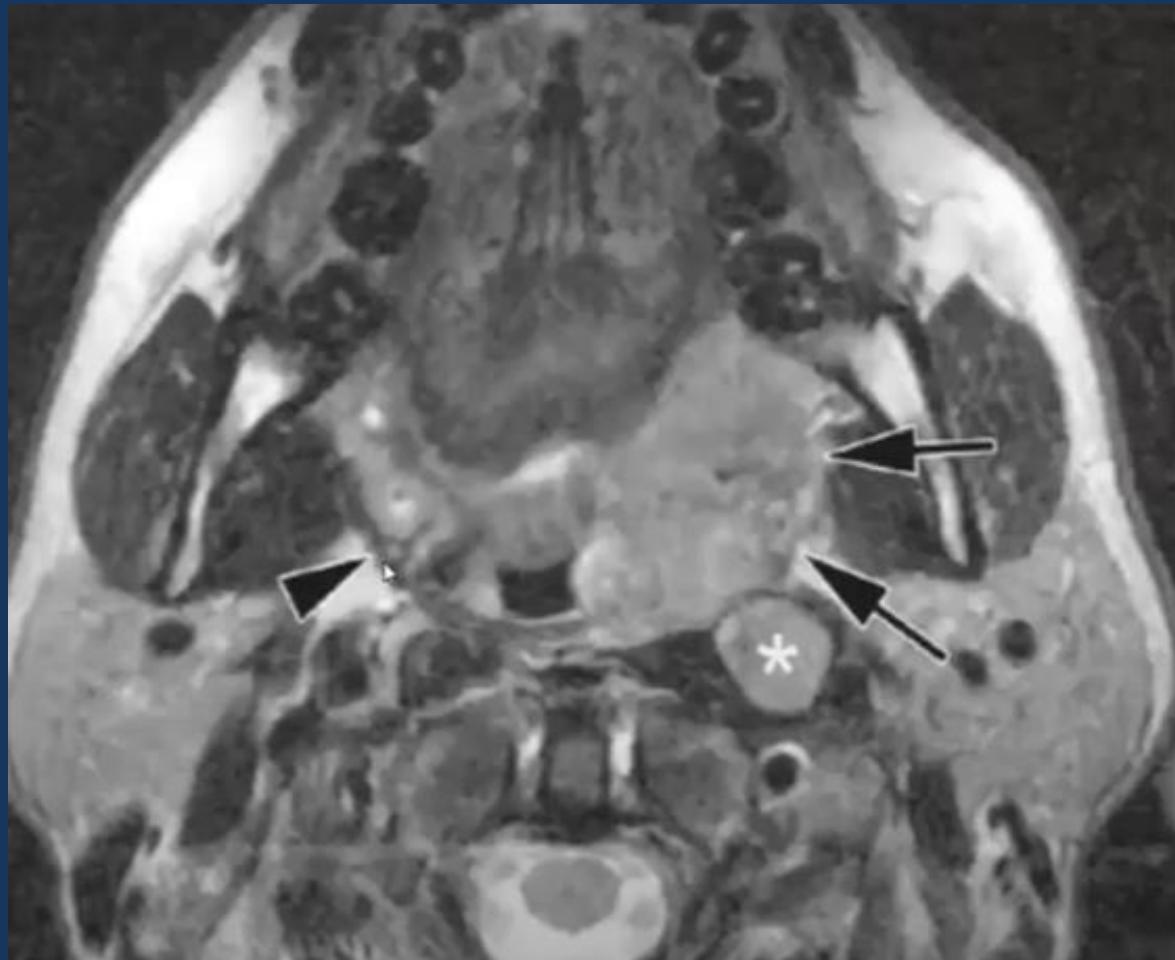
Anterior tonsillar pillar



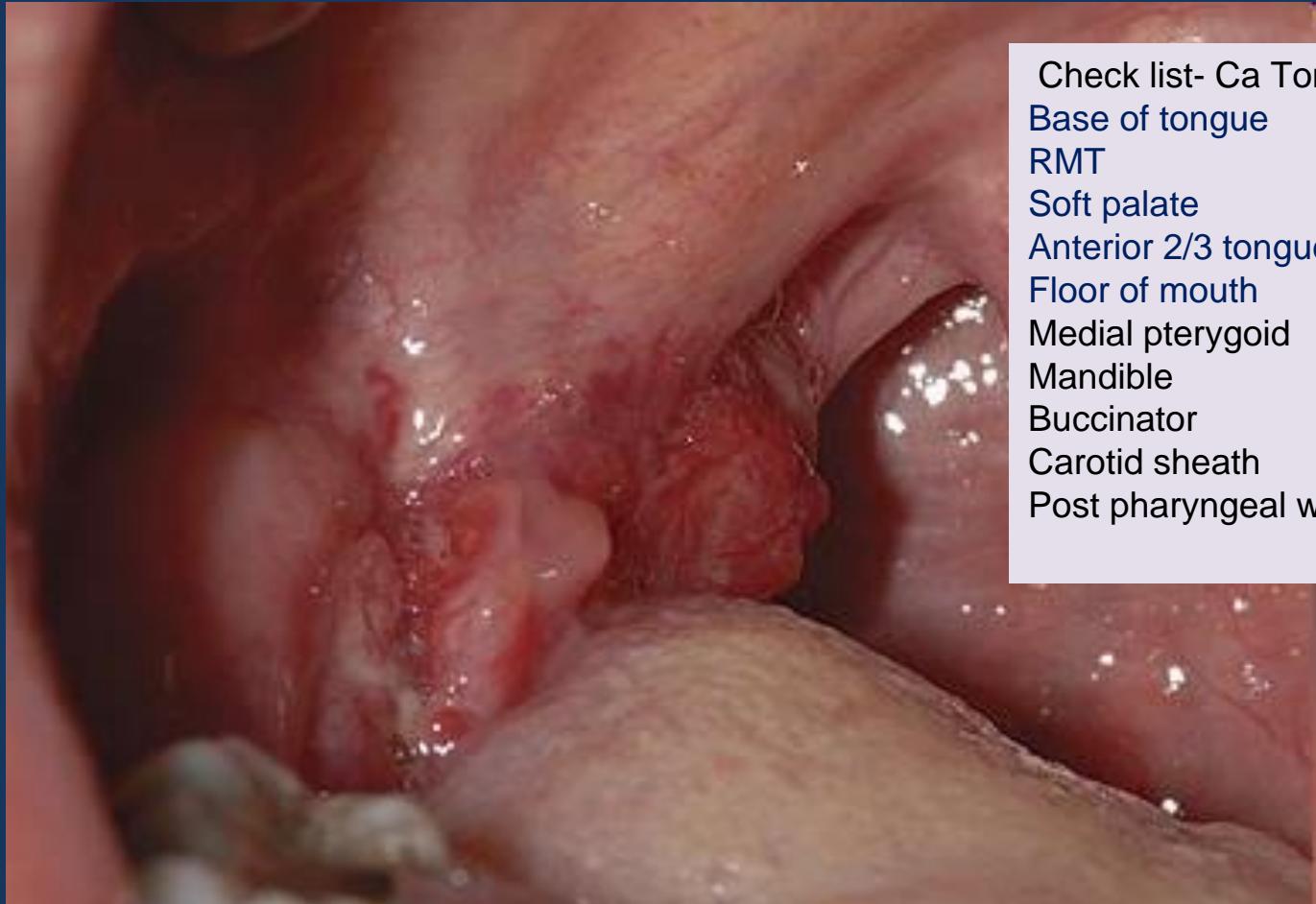
Ca Tonsil



T4a disease

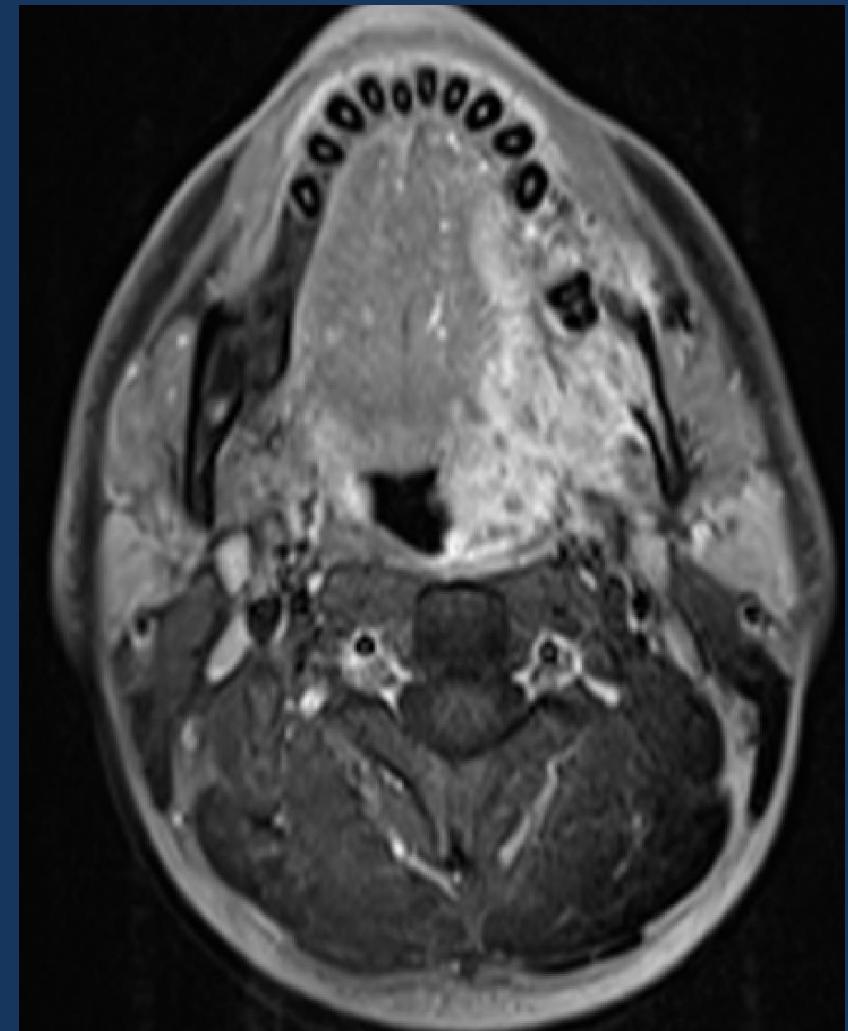
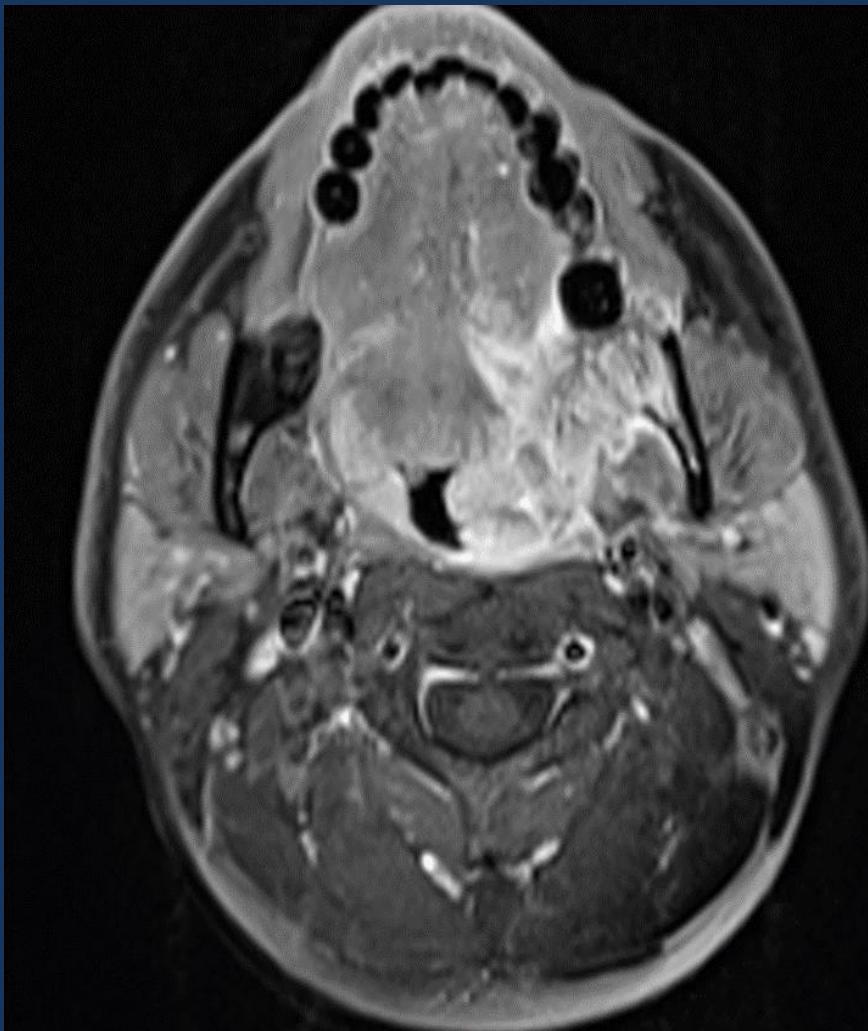


Clinical examination

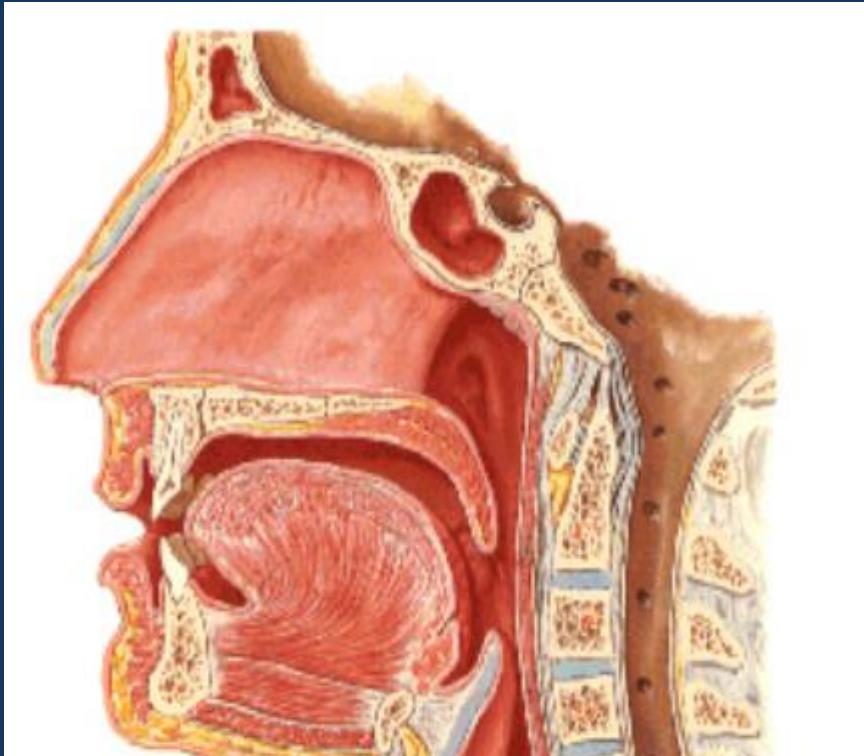


Check list- Ca Tonsil
Base of tongue
RMT
Soft palate
Anterior 2/3 tongue
Floor of mouth
Medial pterygoid
Mandible
Buccinator
Carotid sheath
Post pharyngeal wall

Advanced disease



Soft palate

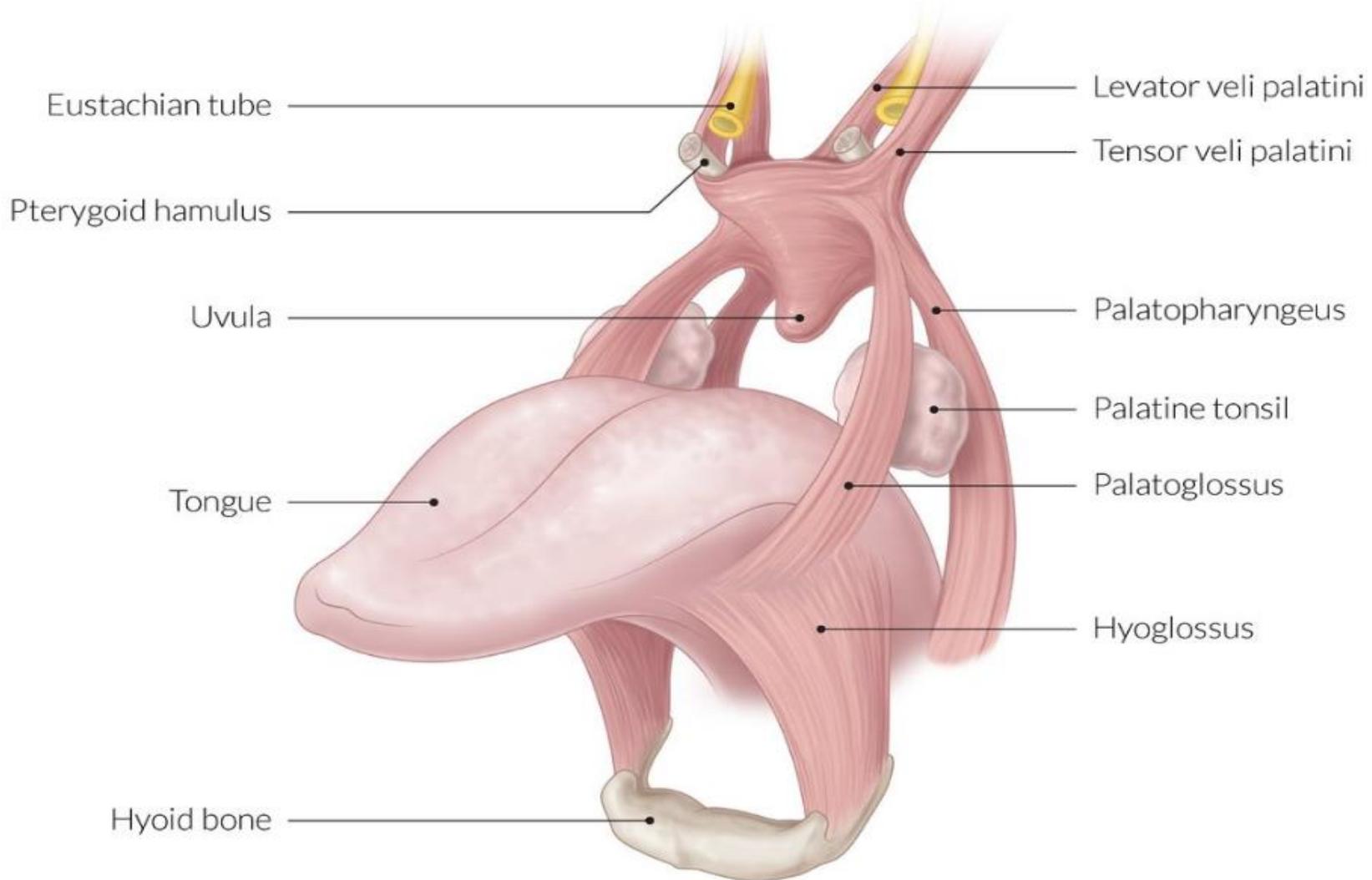


- Ant. 1/3rd is fibrous
- Middle 1/3rd is muscular
- Post. 1/3rd is glandular

Upper border :Attached to post. Margins of the hard palate
Lower border: Free & presents a conical projection in midline

Palatine Aponeurosis fibrous framework of soft palate where all palatal muscles are attached . In front – to post. Margin and under surface of hard palate

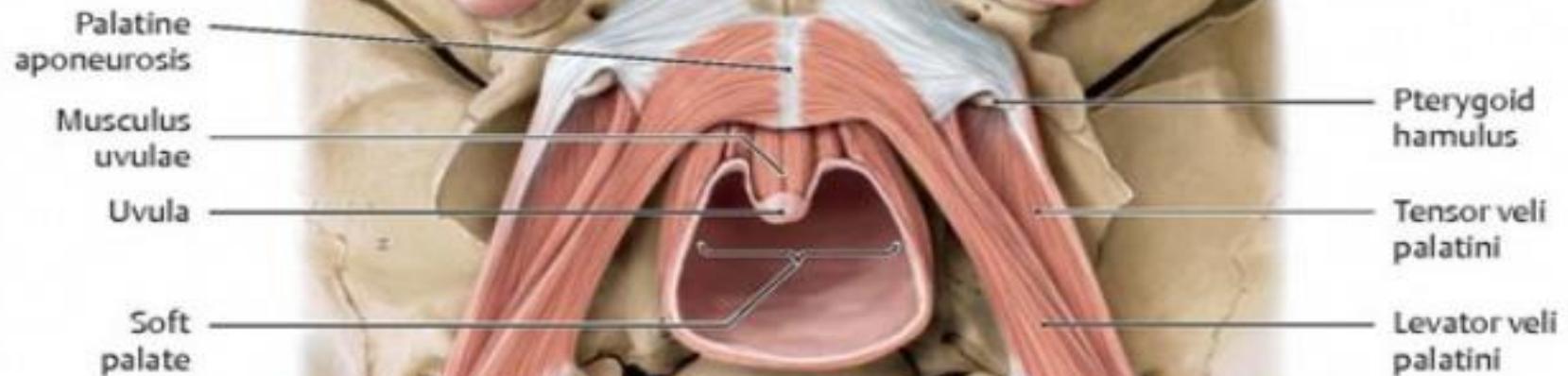
Spread of Ca Soft palate



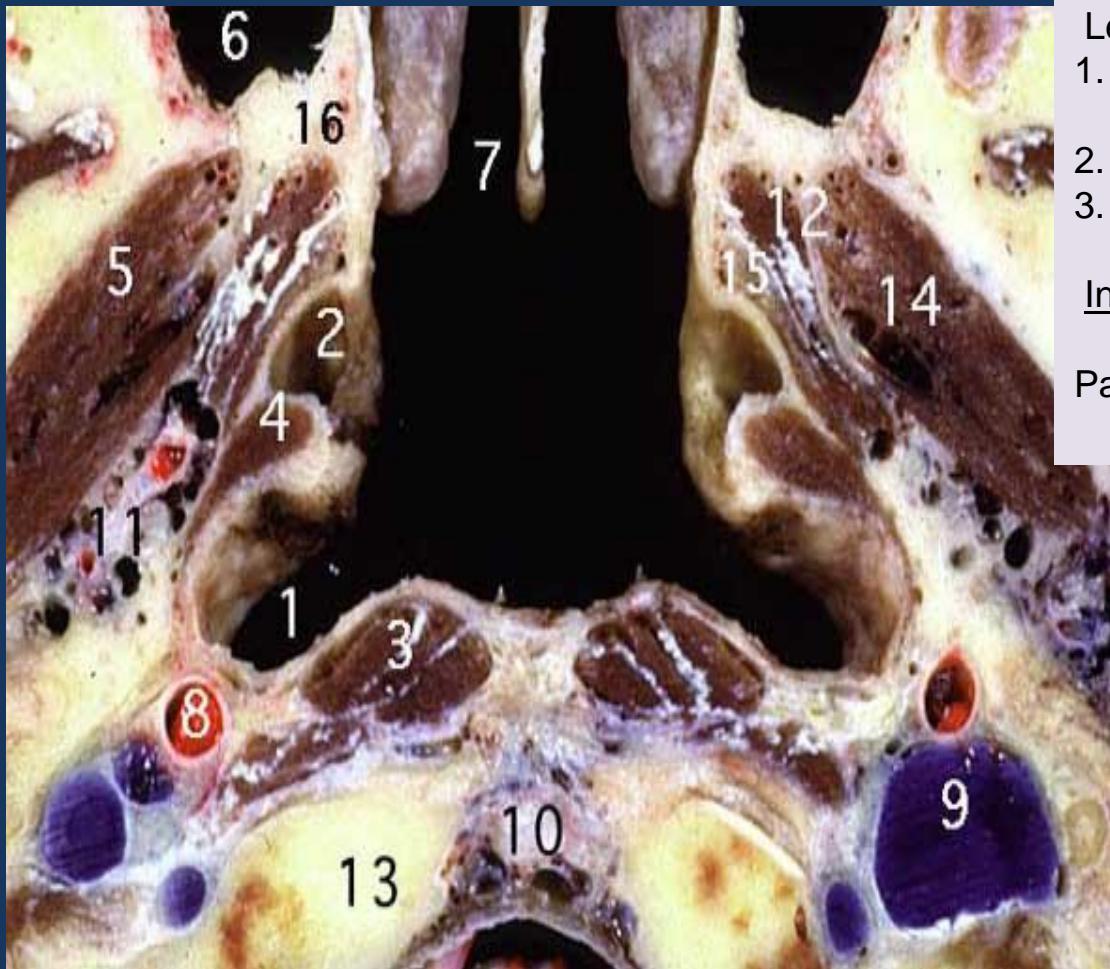
Palatine aponeurosis

Tensor veli palatini –

1. Spine of sphenoid
2. Scaphoid fossa of medial pterygoid plate
3. Lateral fibrous lamina of Auditory tube



Soft palate muscles

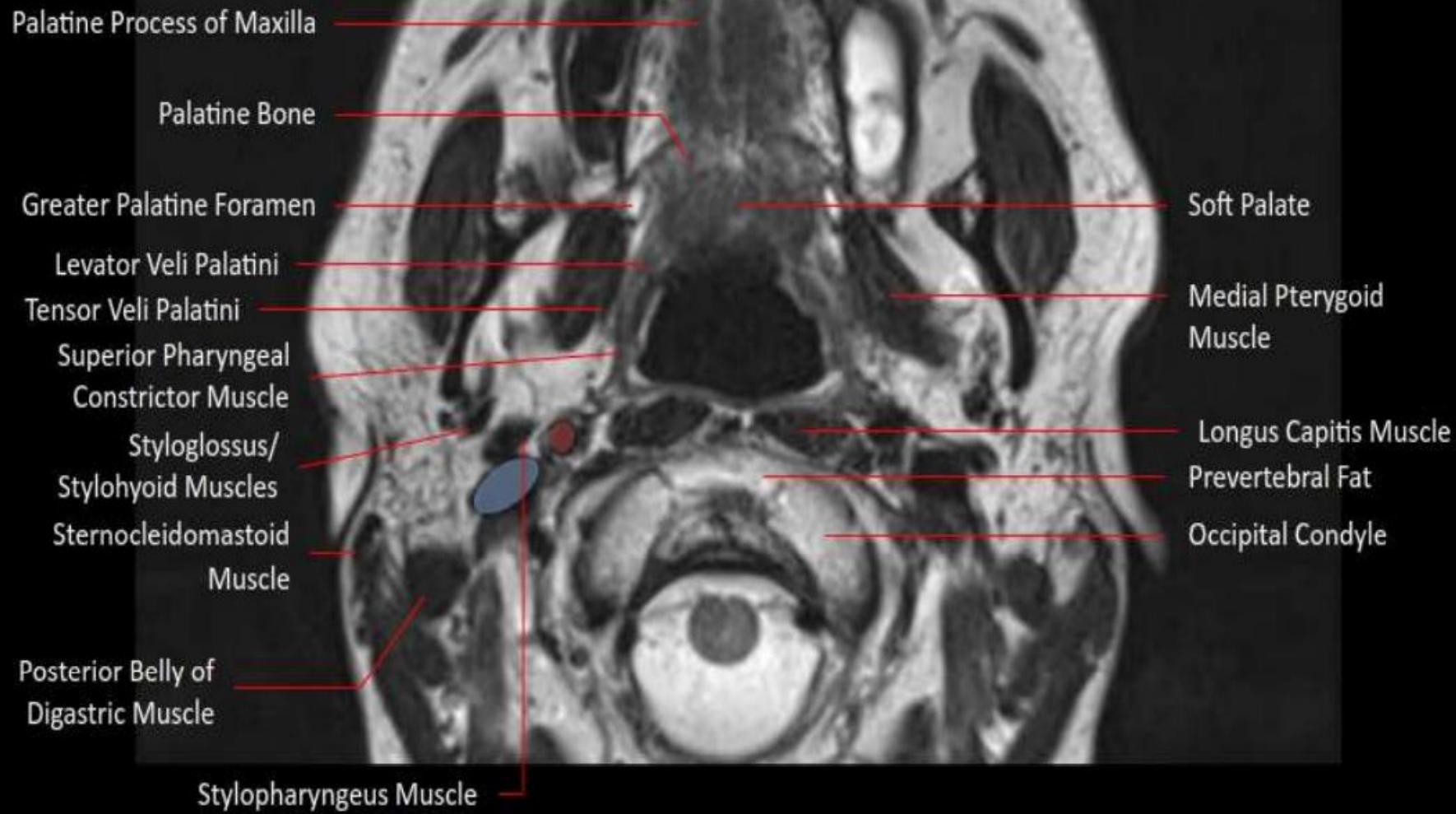


Levator veli palatini –

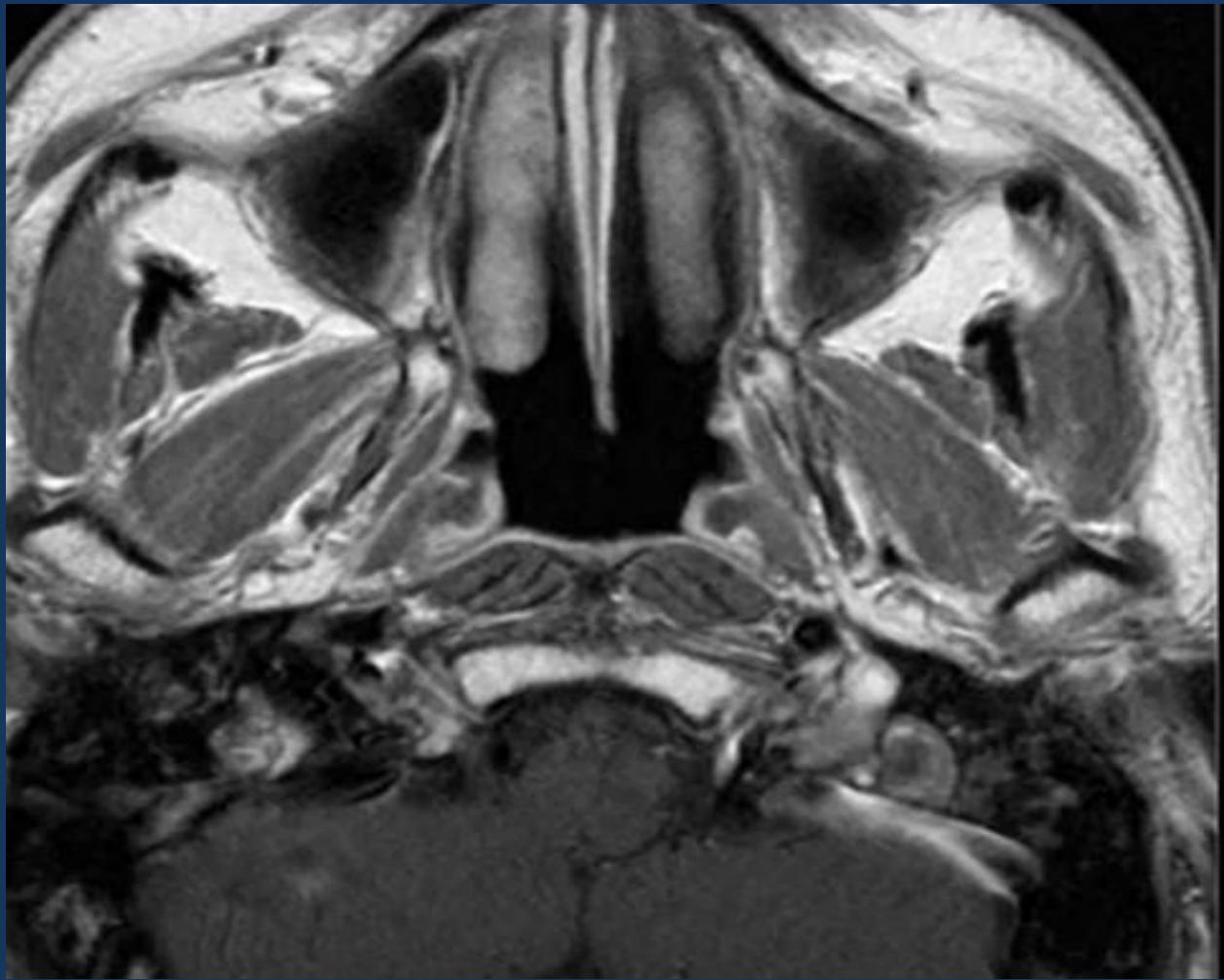
1. Under surface of apex of petrous temporal bone
2. From carotid sheath
3. Medial cartilaginous part of Auditory tube

Insertion

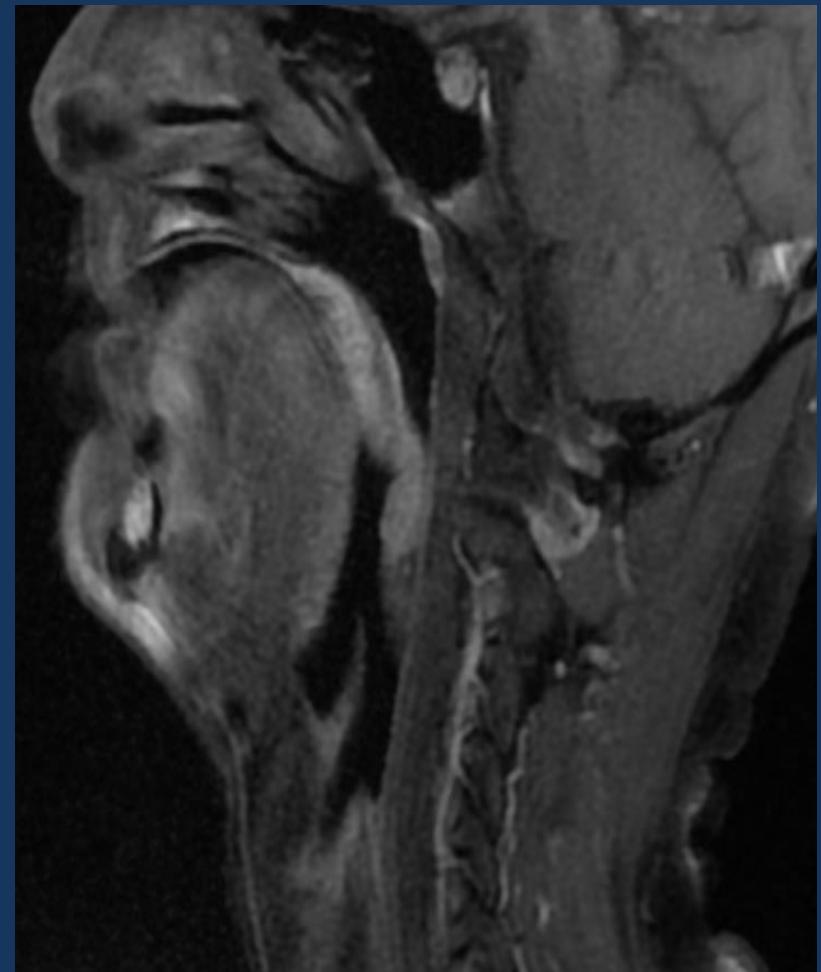
Palatine aponeurosis



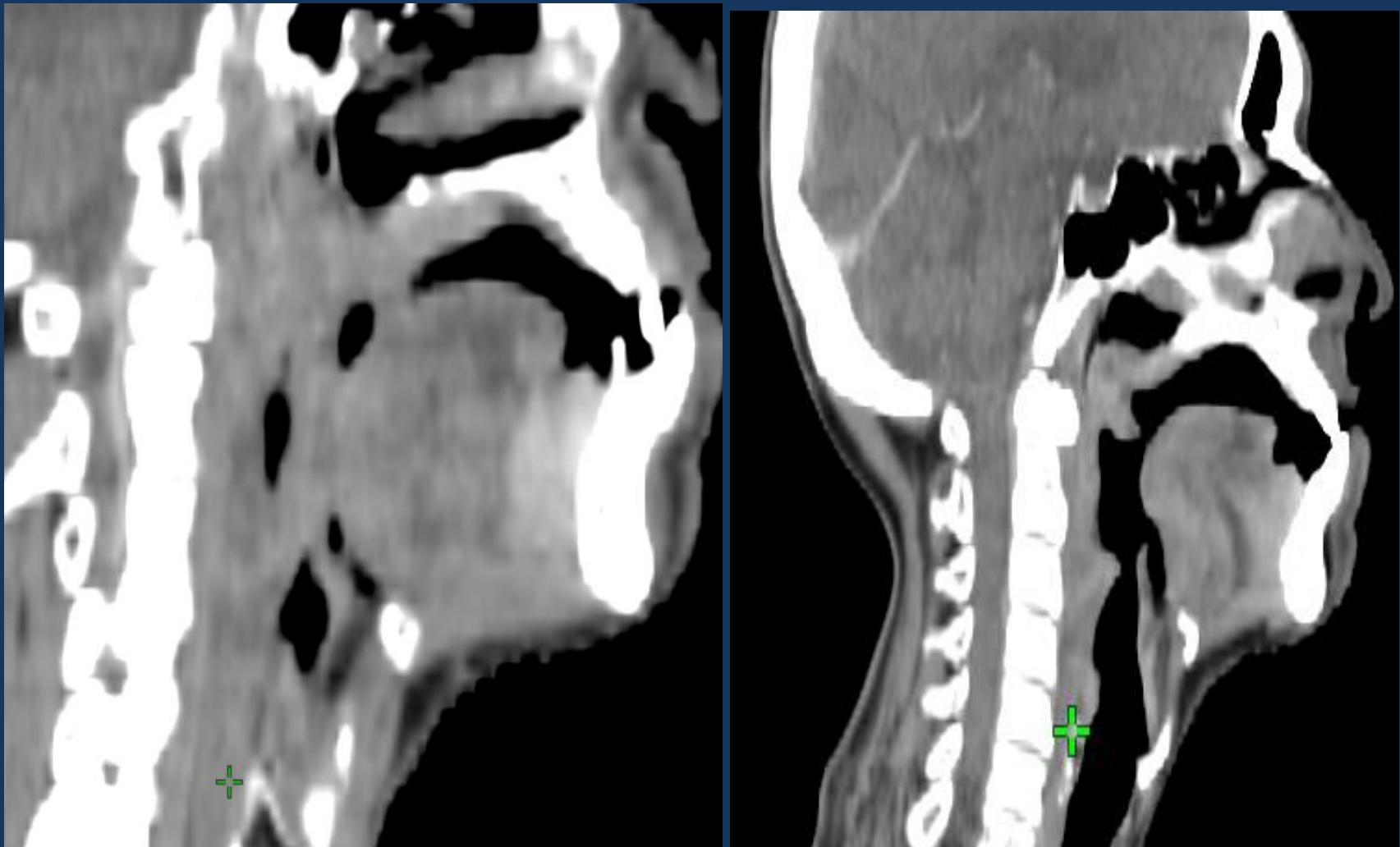
MRI



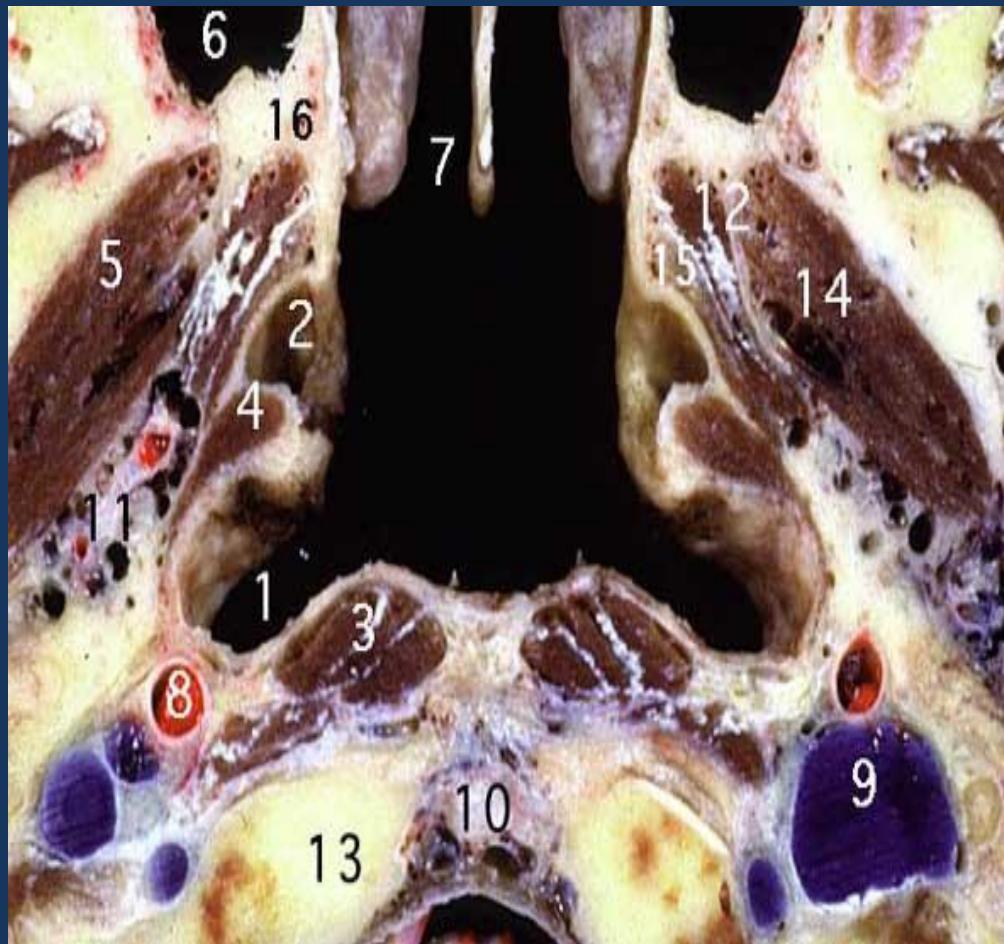
Ca Soft palate



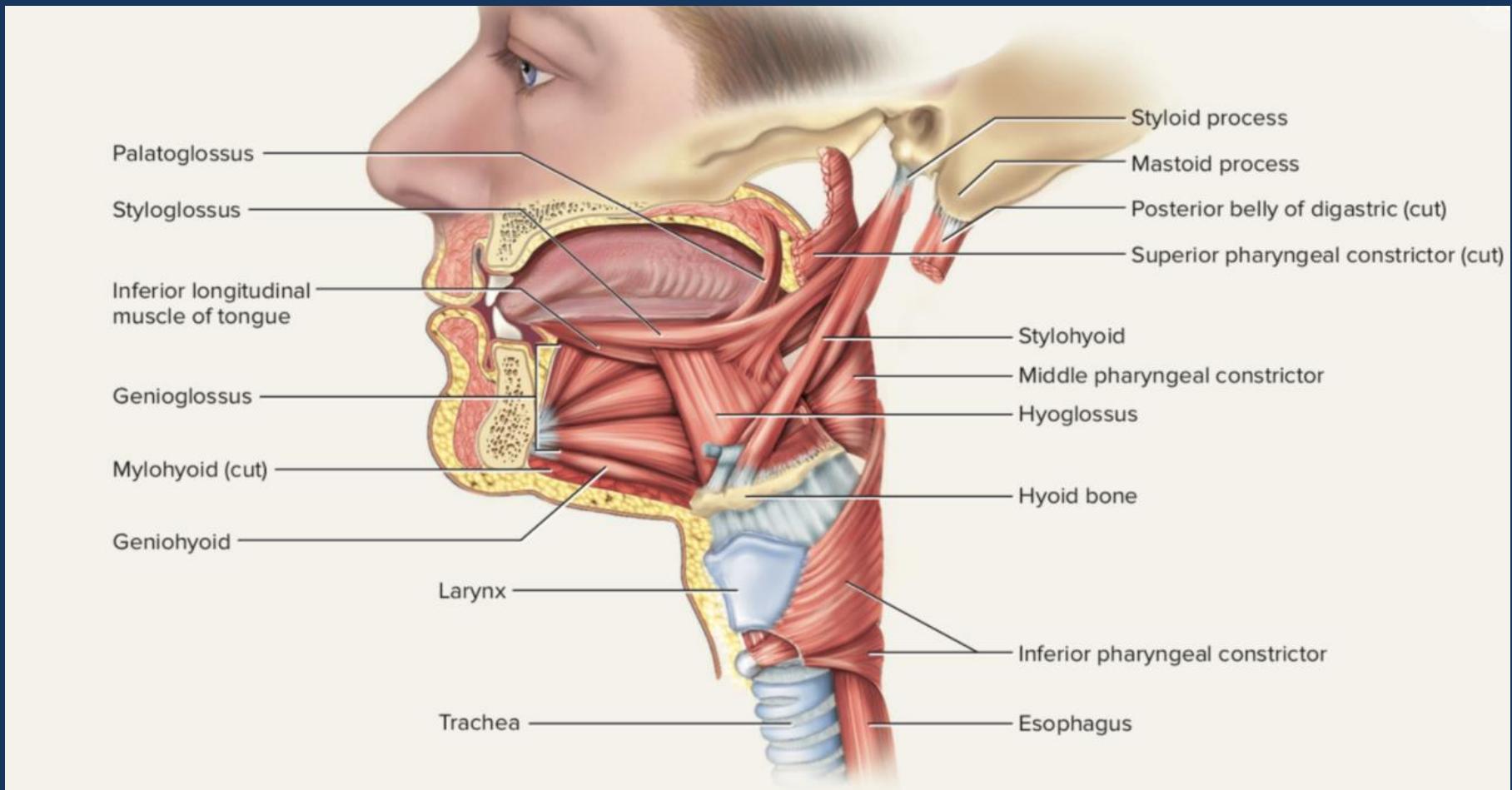
Soft palate- routes of spread



Cross sectional Anatomy



Tongue – Routes of spread



Base of tongue- Routes of spread

Inferiorly – Vallecula, PES

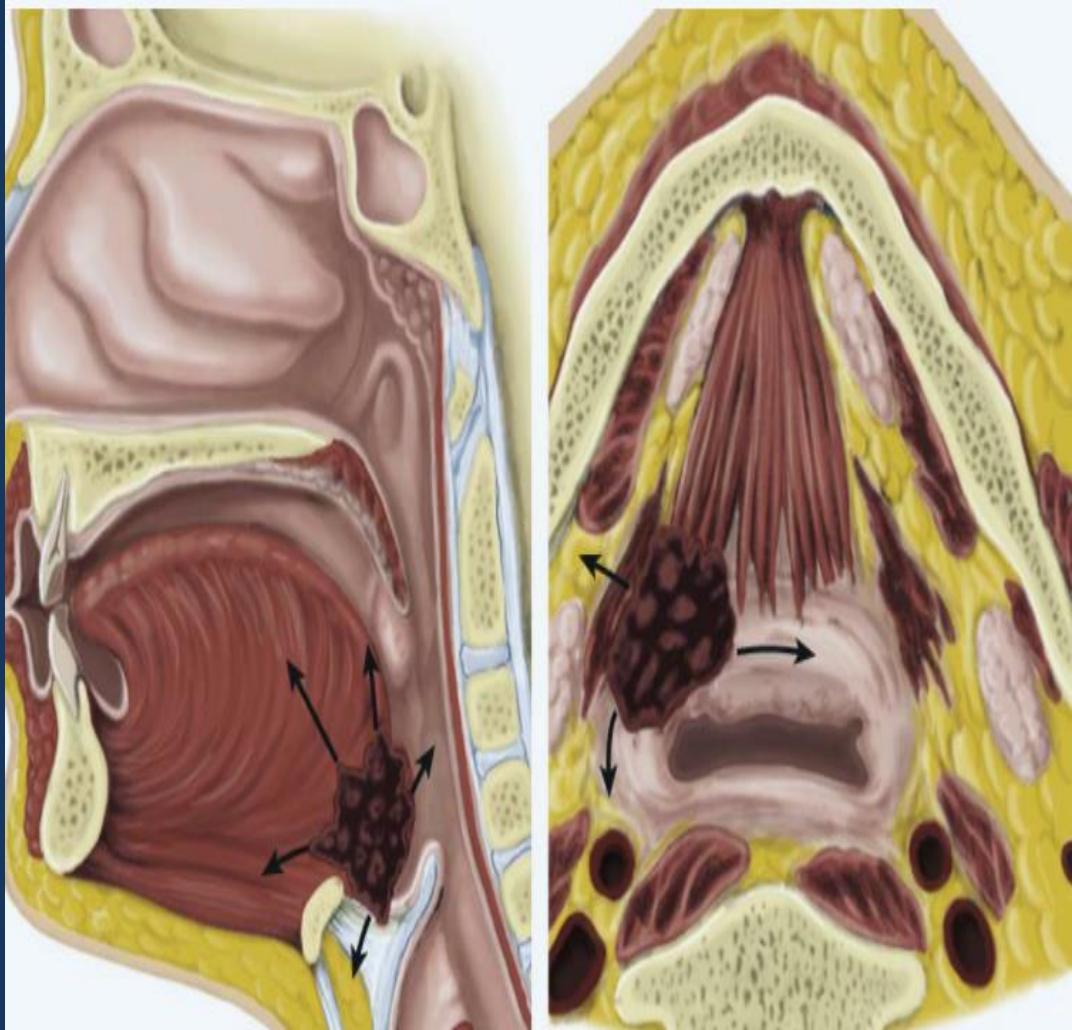
Laterally- Pterygo mandibular raphae

Anteriorly – Ant2/3 of tongue and FOM

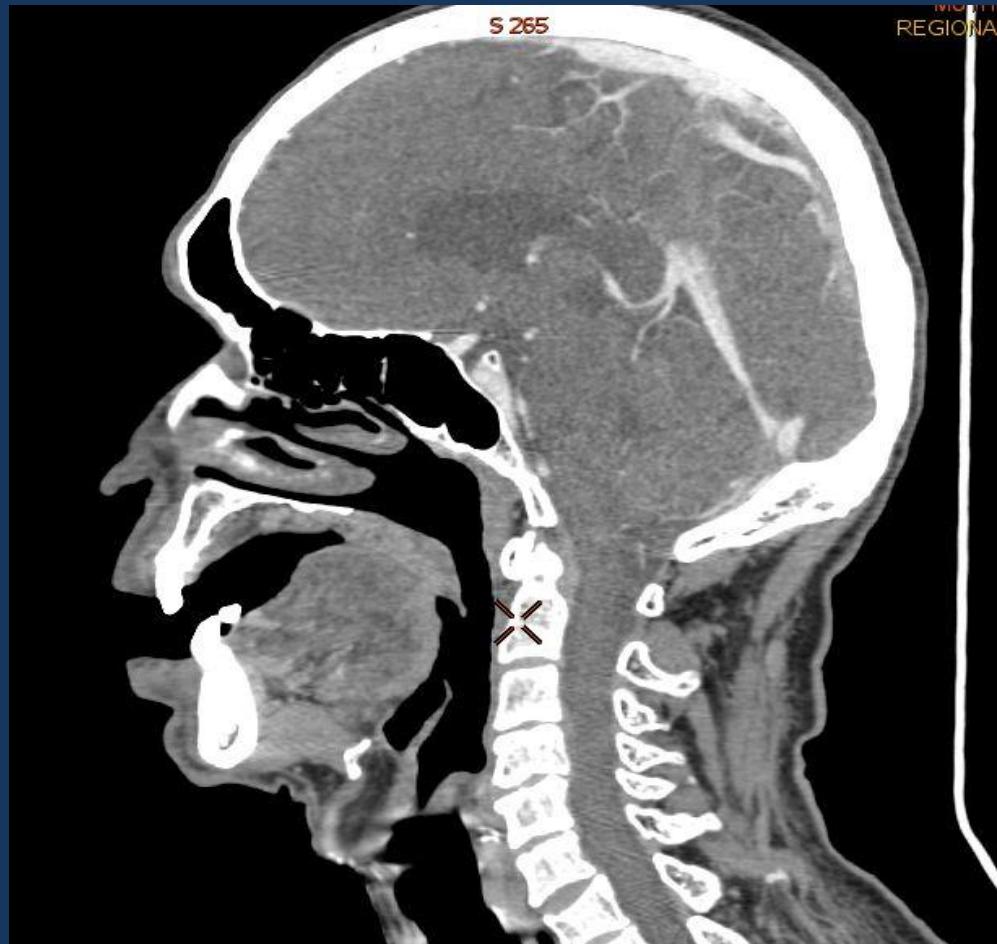
Posteriorly – Parapharyngeal space

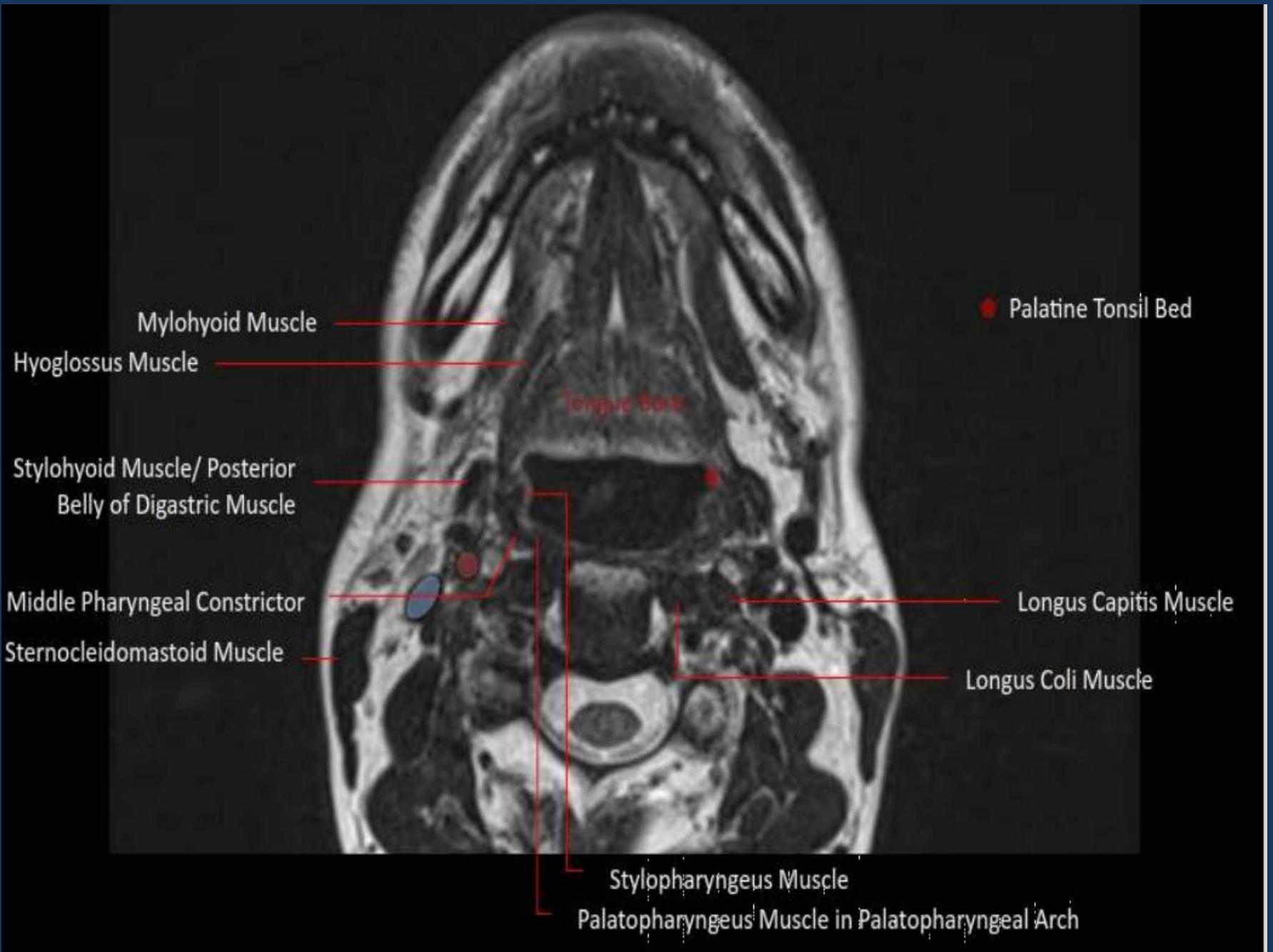
&Carotid sheath

Superiorly – Tonsils

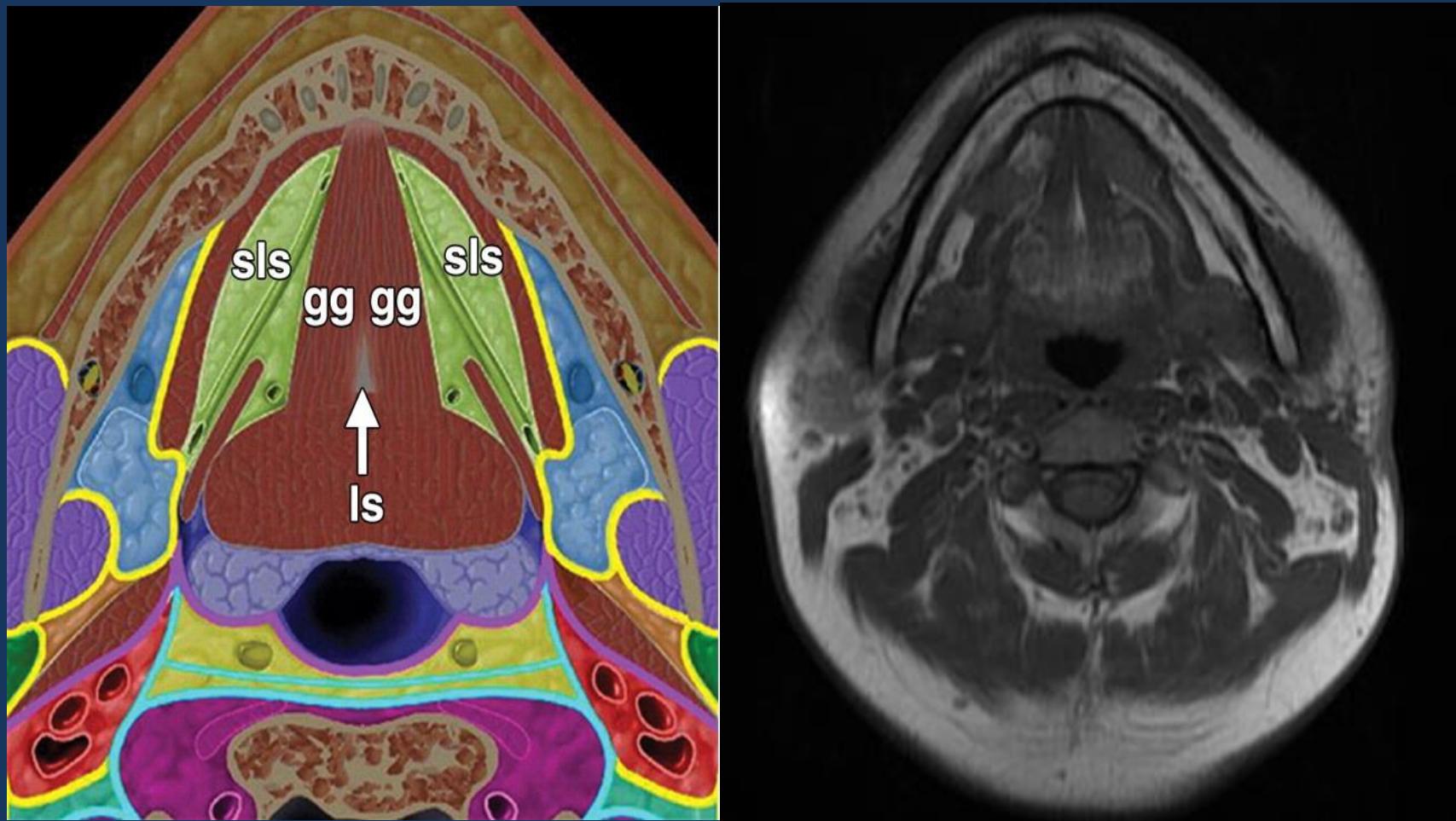


Base of tongue

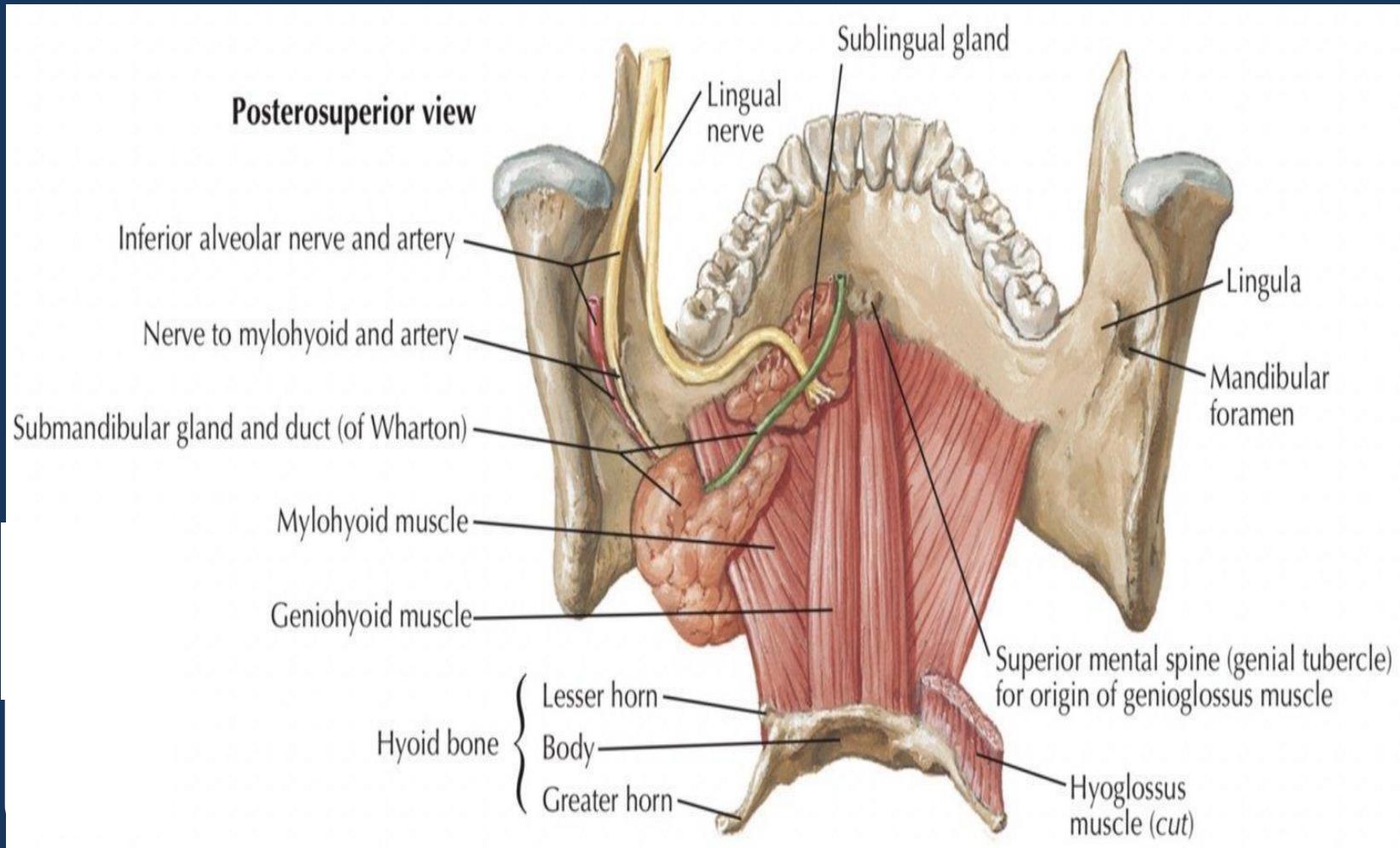




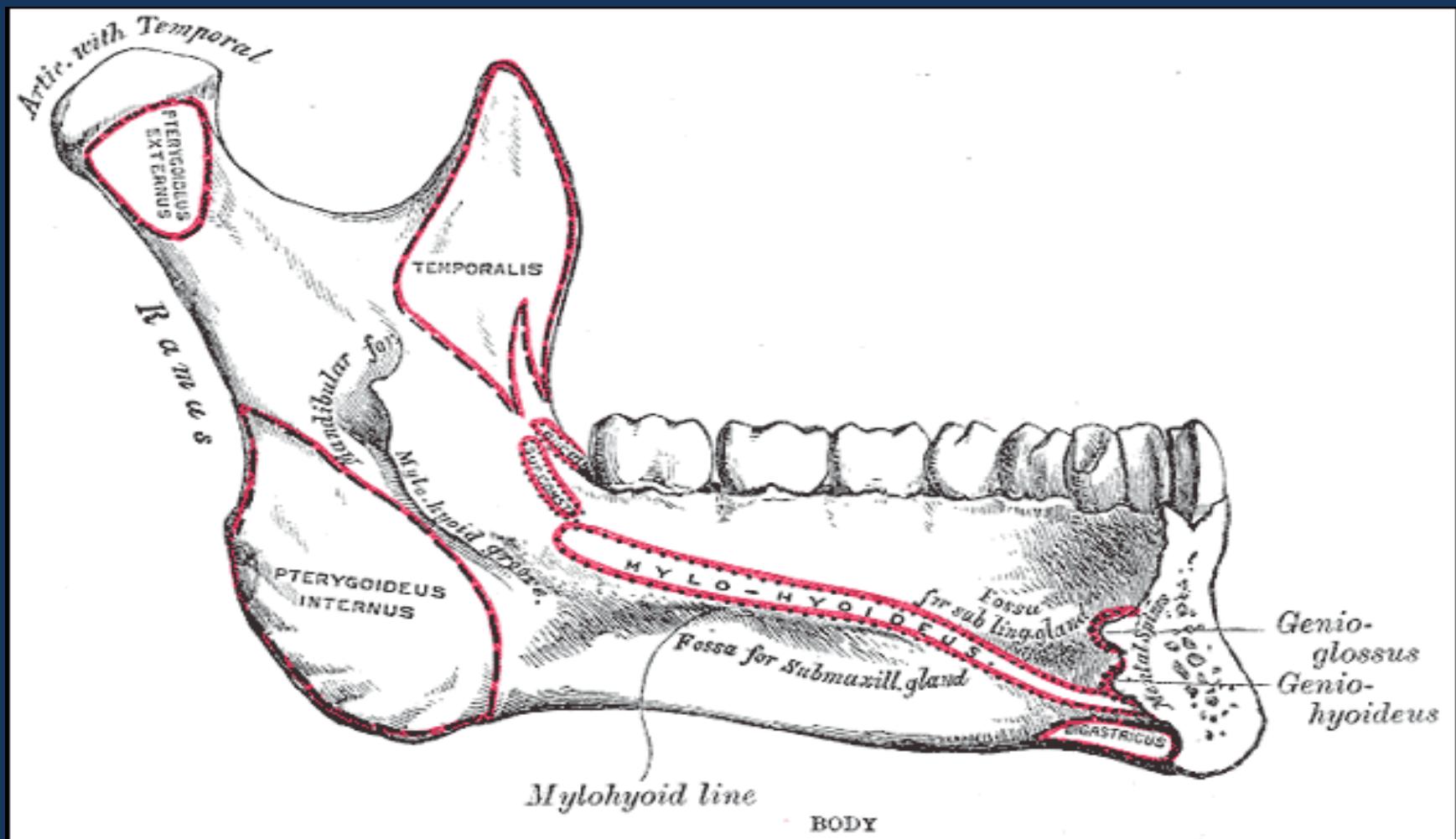
Sublingual space



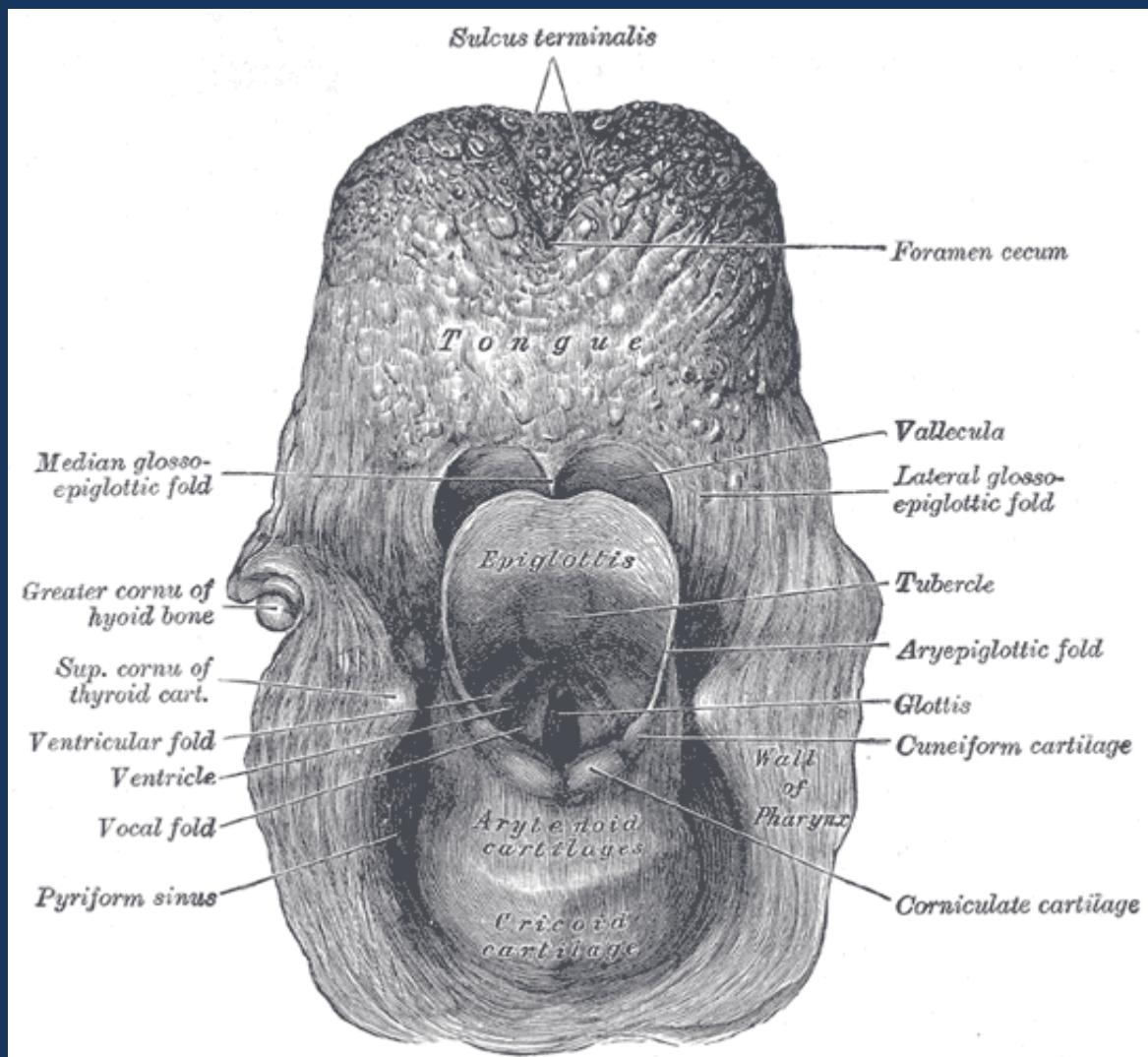
Floor of mouth



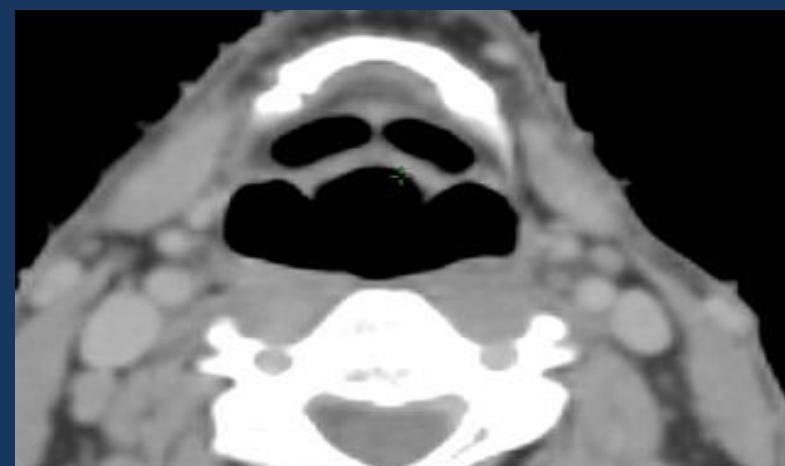
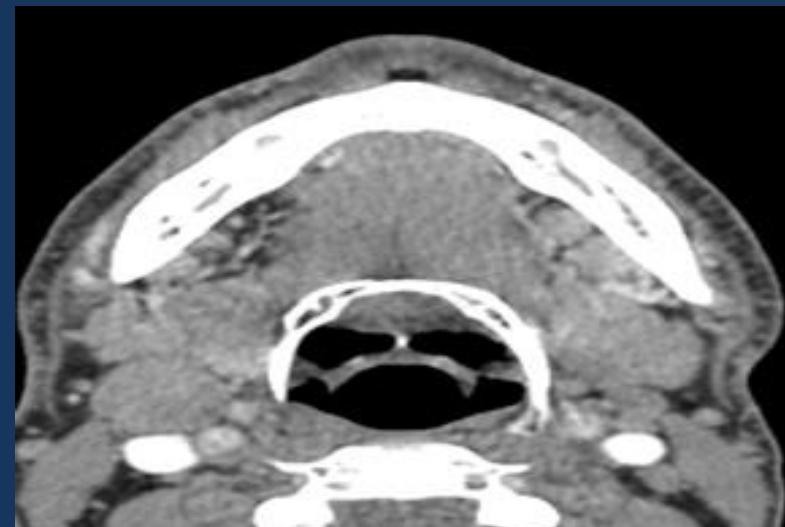
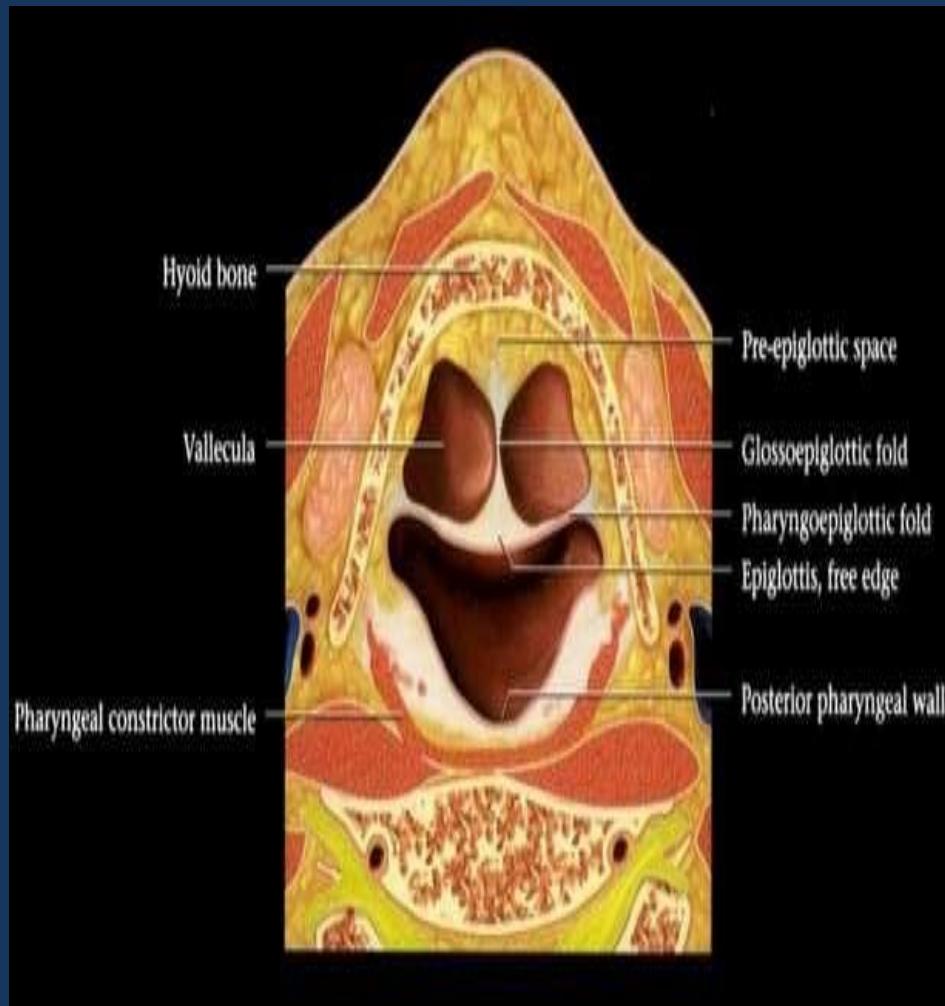
Various muscles attached ...



Vallecula



Hyoid level



Anterior Belly of Digastric Muscle

Hyoglossus Muscle

Stylohyoid Muscle/ Posterior
Belly of Digastric Muscle

Posterior Hyoid Bone

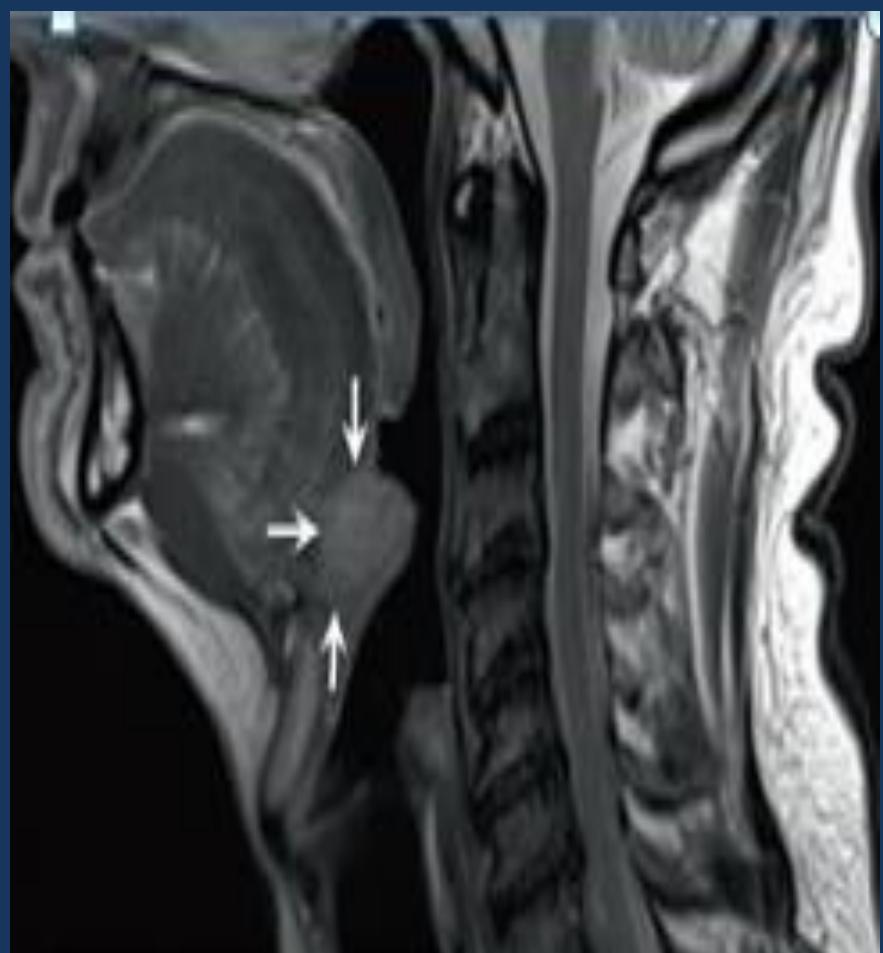
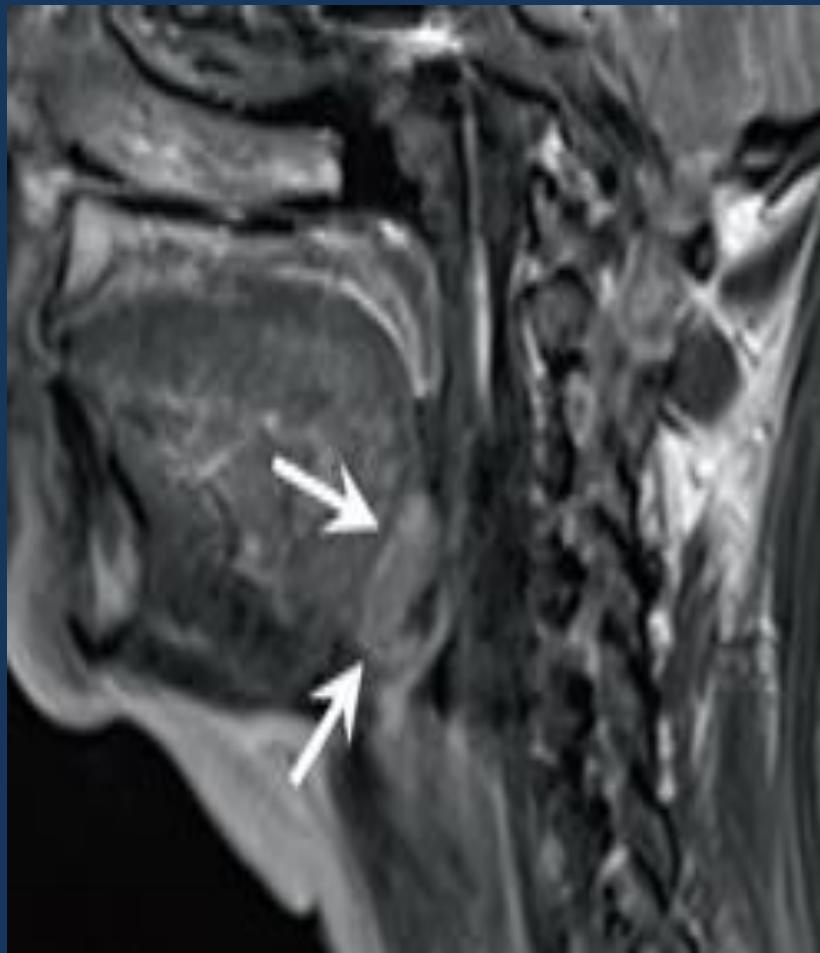
Sternocleidomastoid Muscle

Vallecula

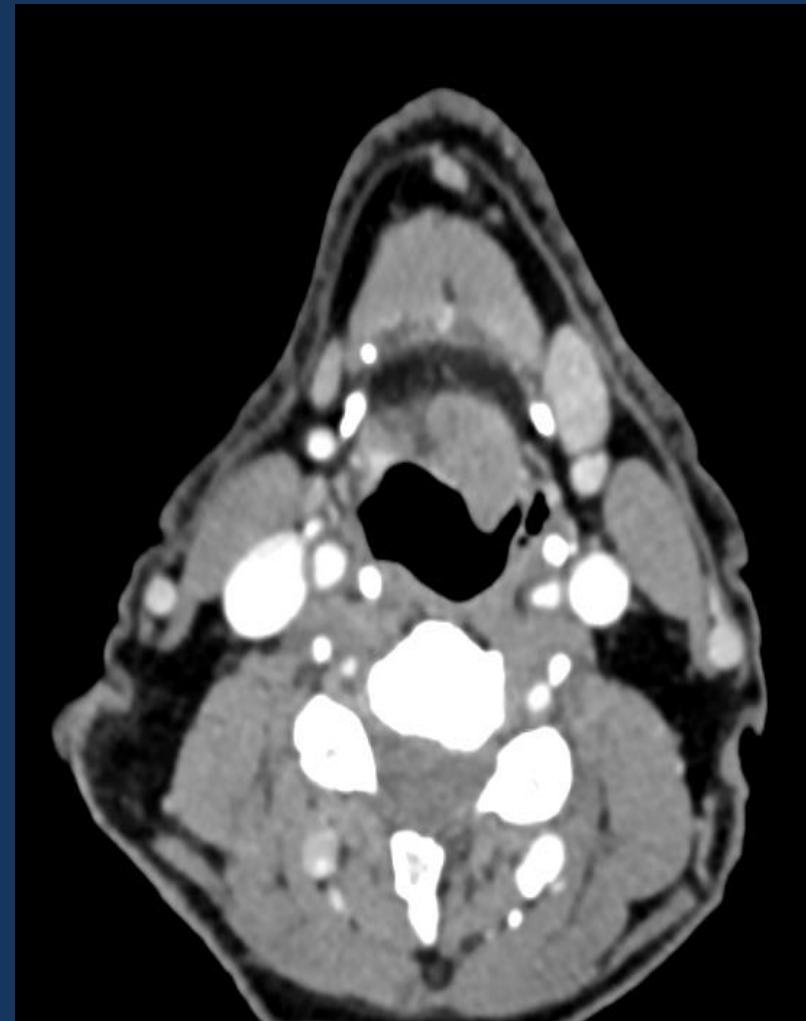
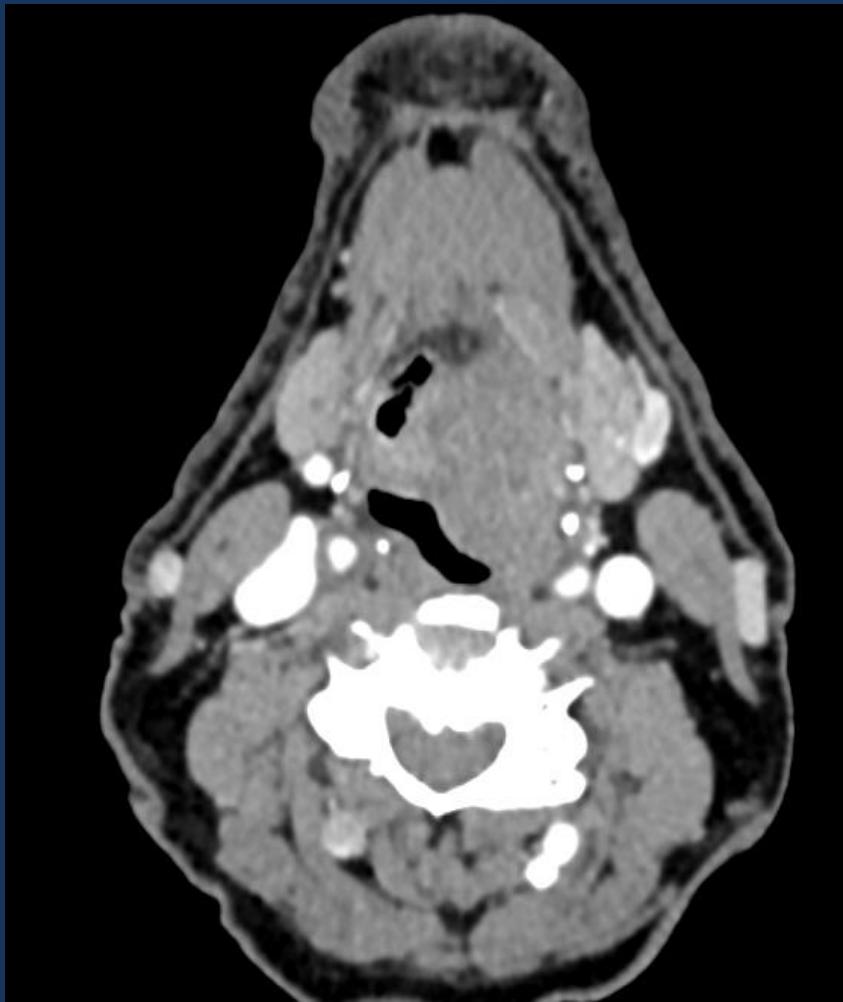
Epiglottis

Pharyngoepiglottic Fold

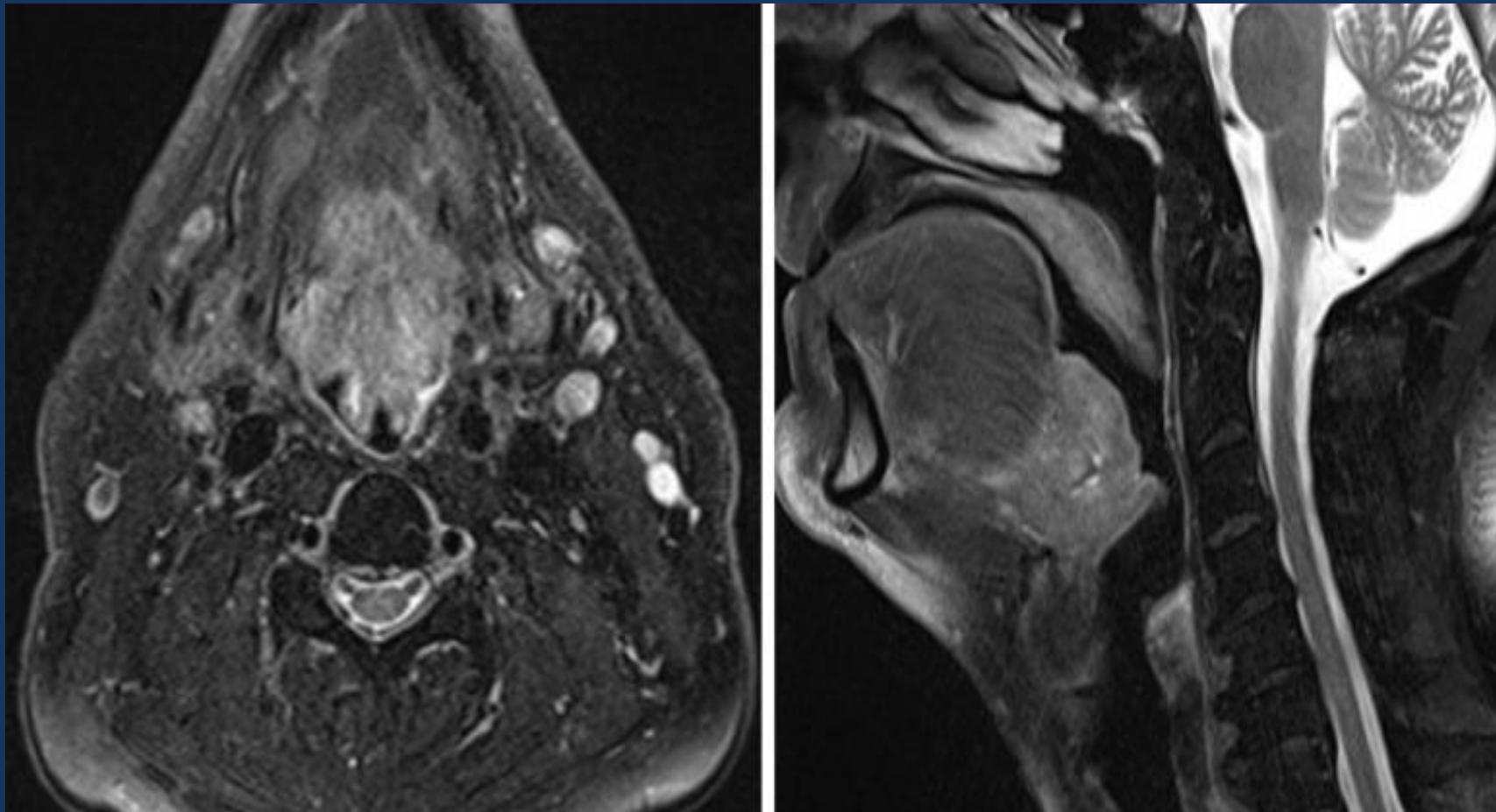
T2 & T3 Base of tongue



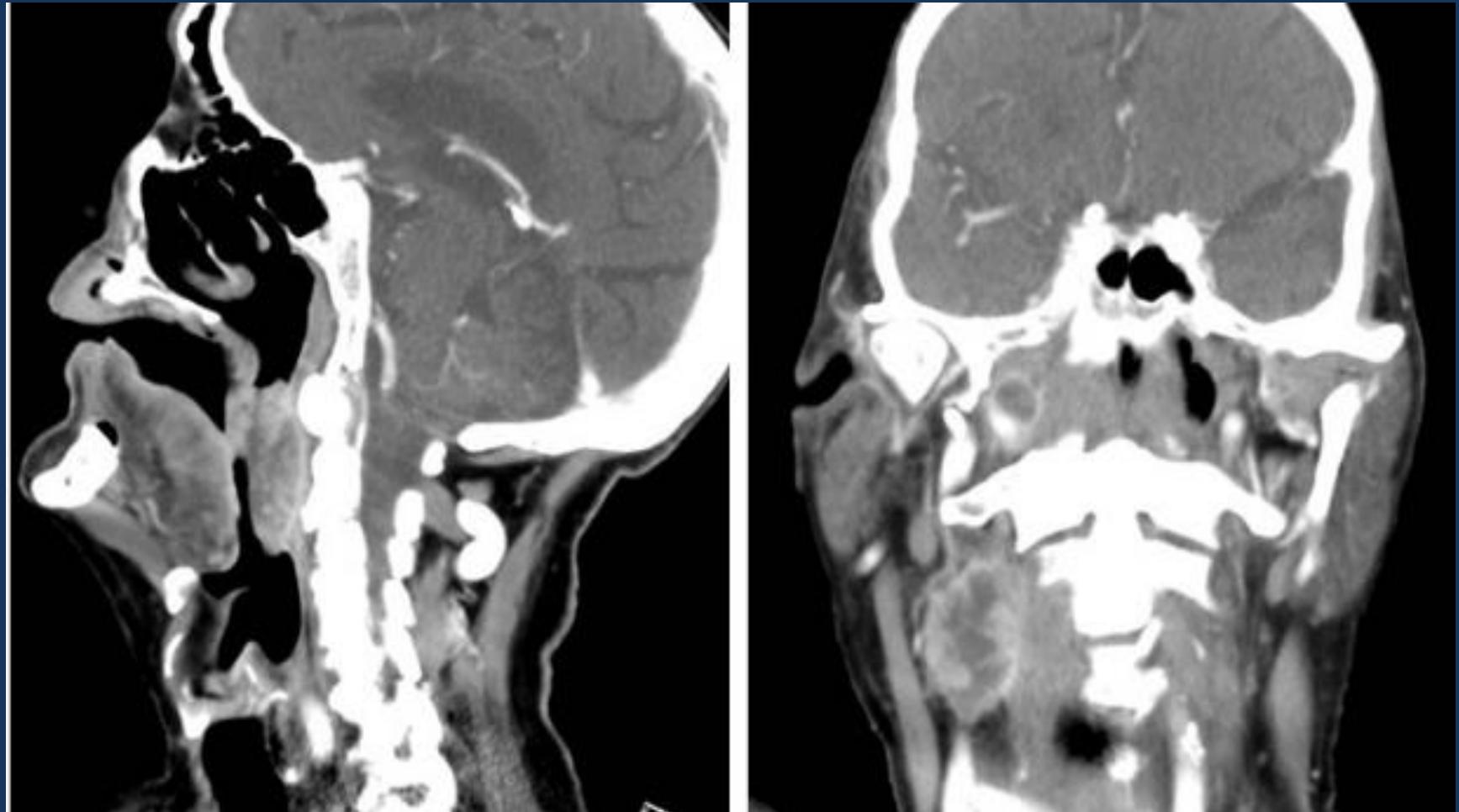
BOT & Vallecua



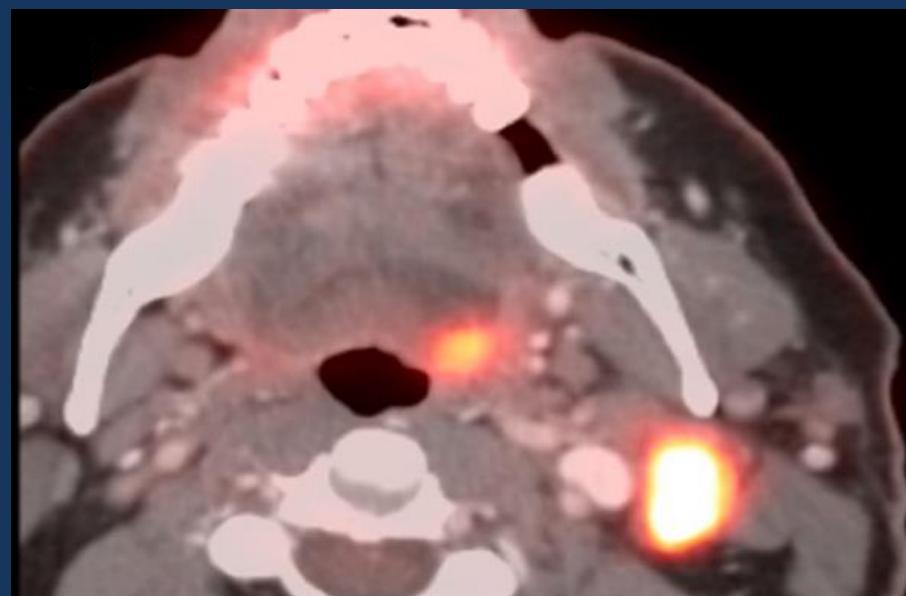
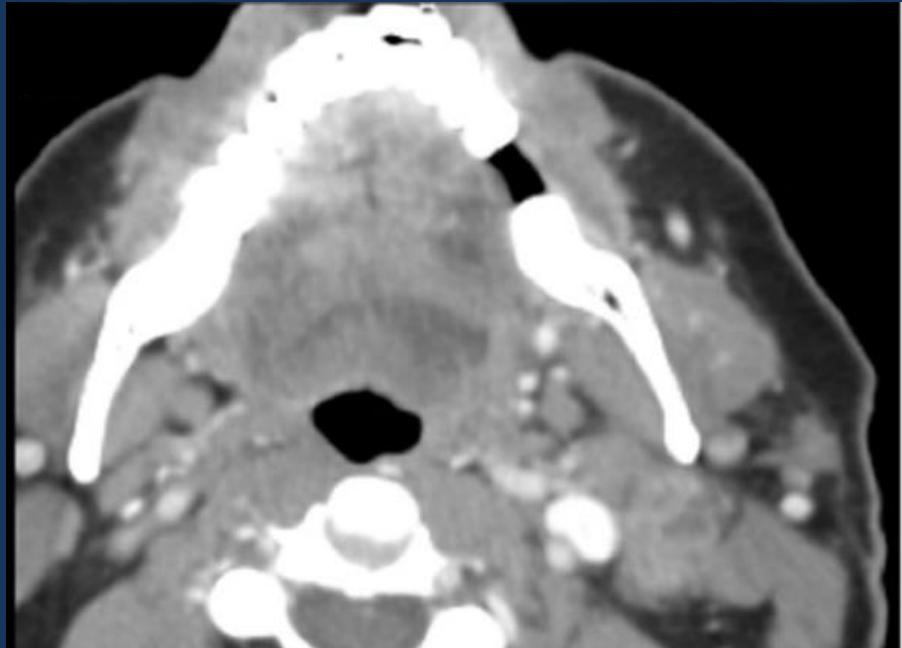
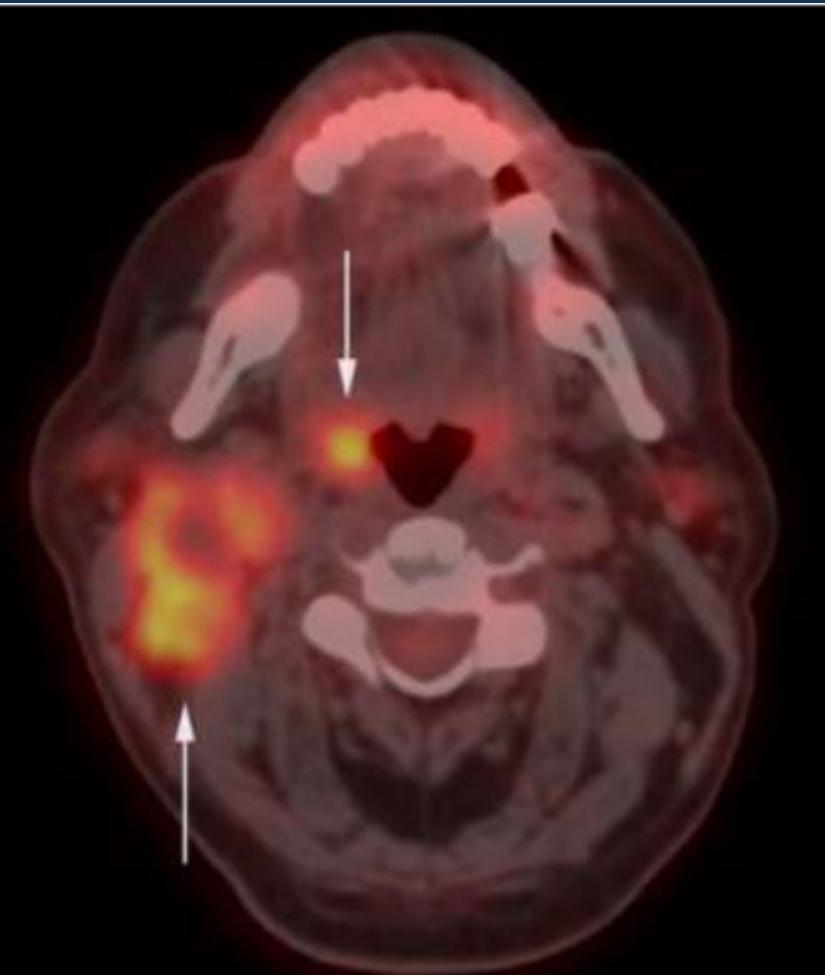
T2 or T4a?



PPW



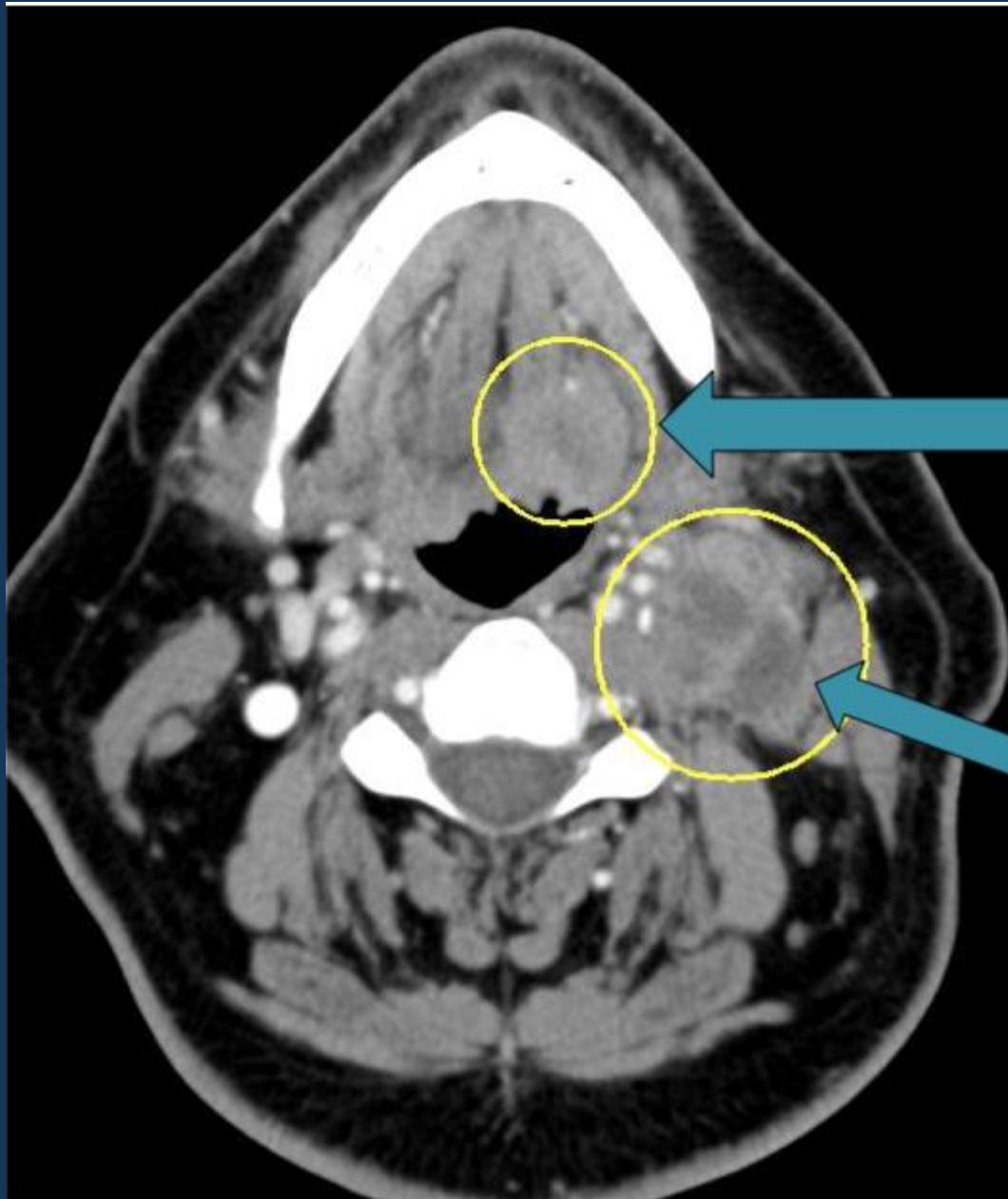
HPV positive



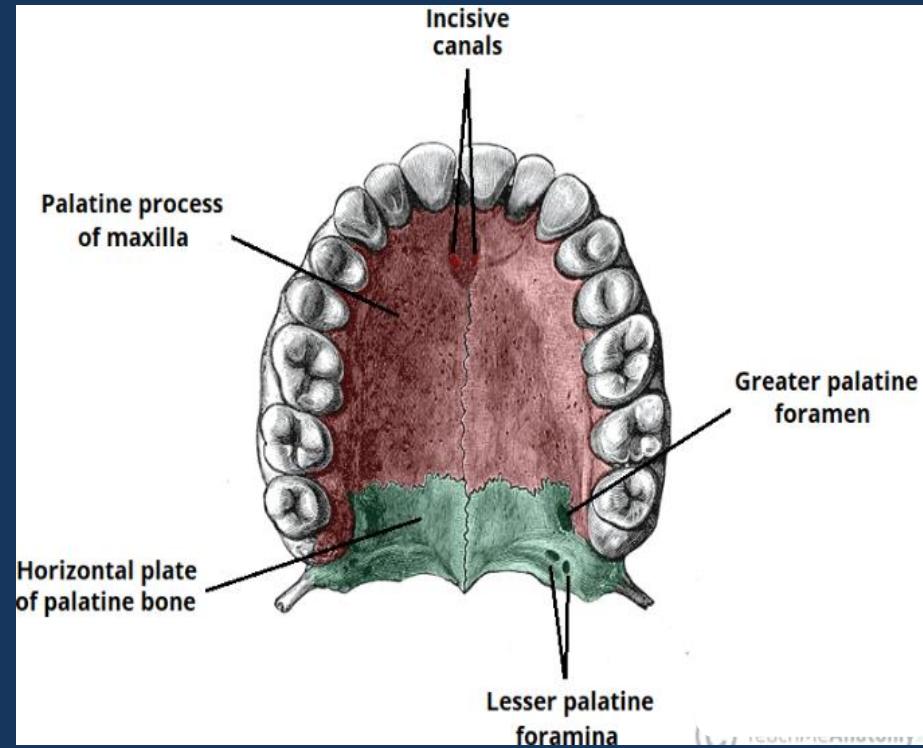
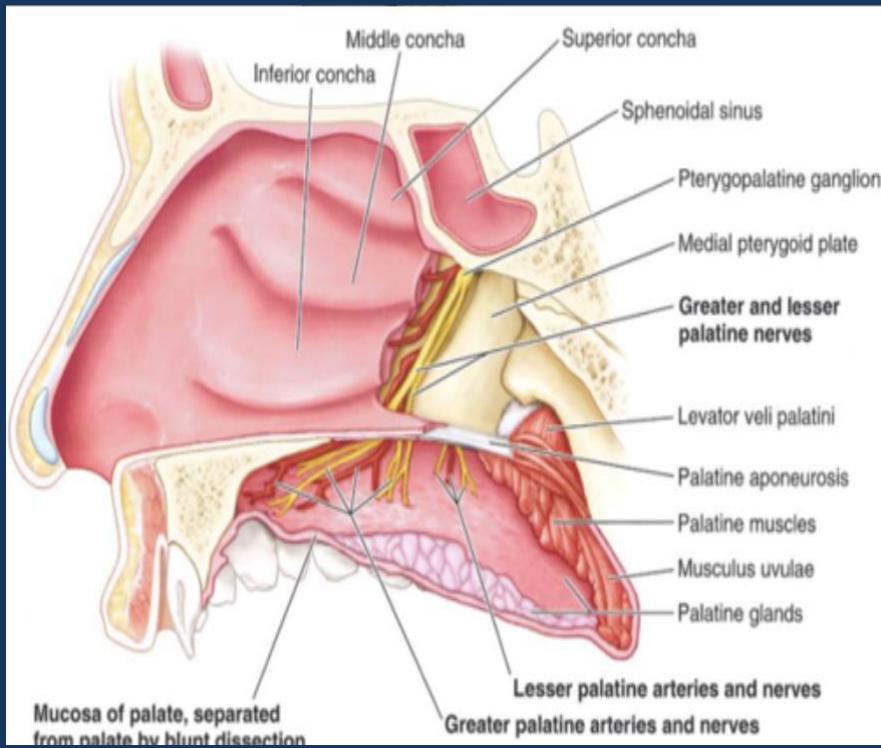
HPV +Ve

Small Primary

Large necrotic node

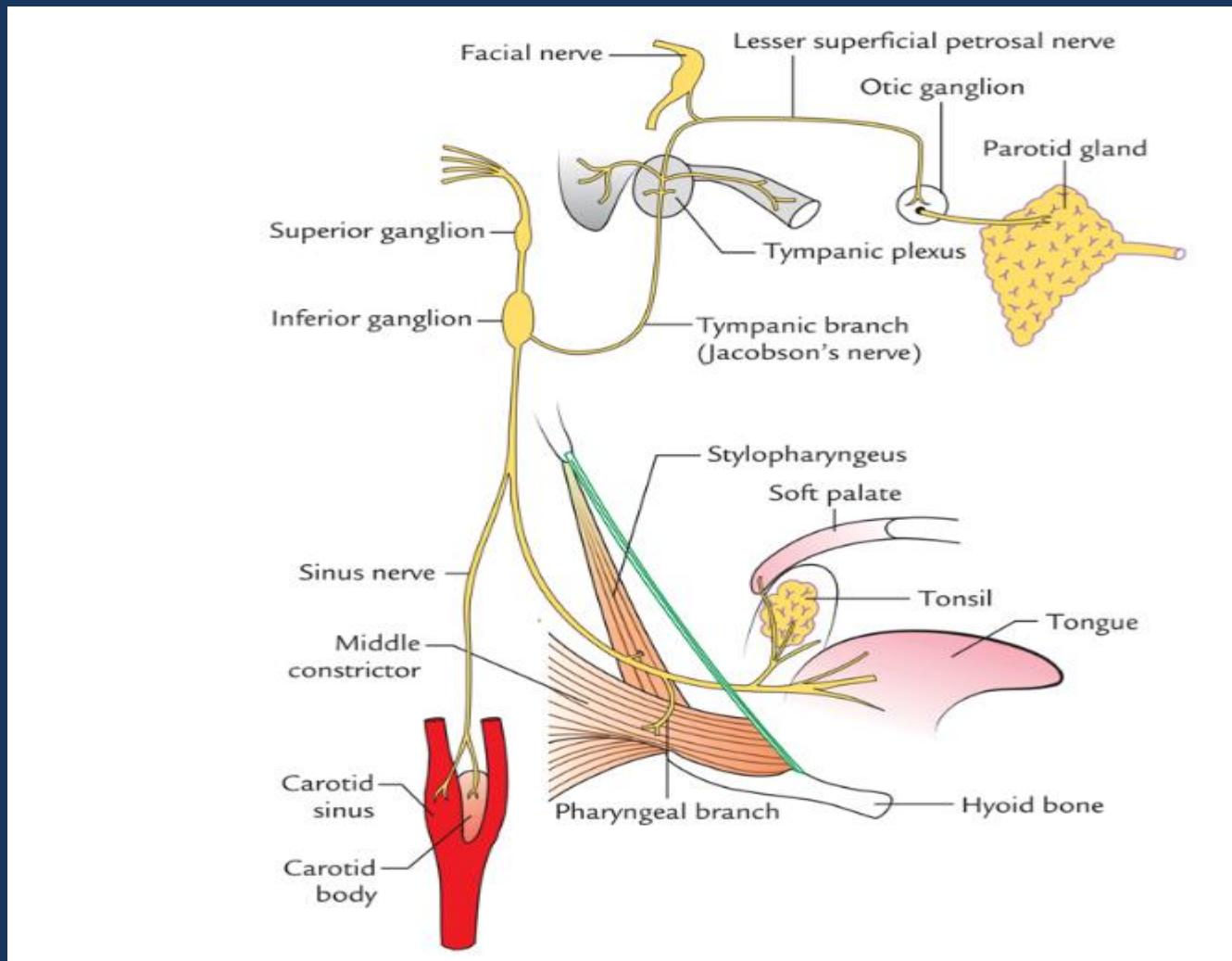


PNI- Pterygopalatine fossa

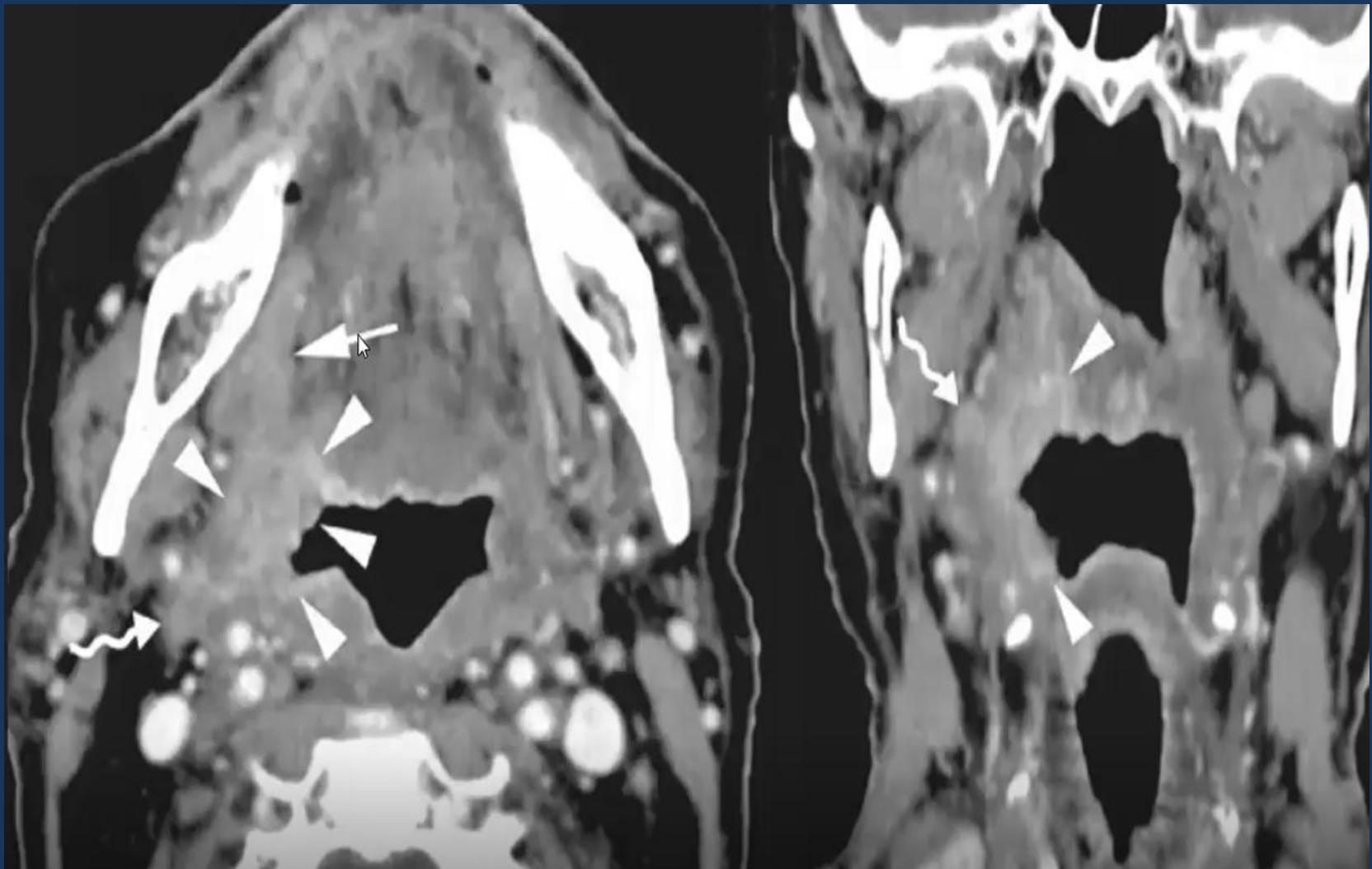


Direction	Passage	Connection
Posteriorly	foramen rotundum	middle cranial fossa
	pterygoid canal (Vidian)	middle cranial fossa, foramen lacerum
	palatovaginal canal (pharyngeal)	nasal cavity/nasopharynx
Anteriorly	inferior orbital fissure	orbit
Medially	sphenopalatine foramen	nasal cavity
Laterally	pterygomaxillary fissure	infratemporal fossa
Inferiorly	greater palatine canal (pterygopalatine)	oral cavity, lesser palatine canals

Referred otalgia from Oropharynx

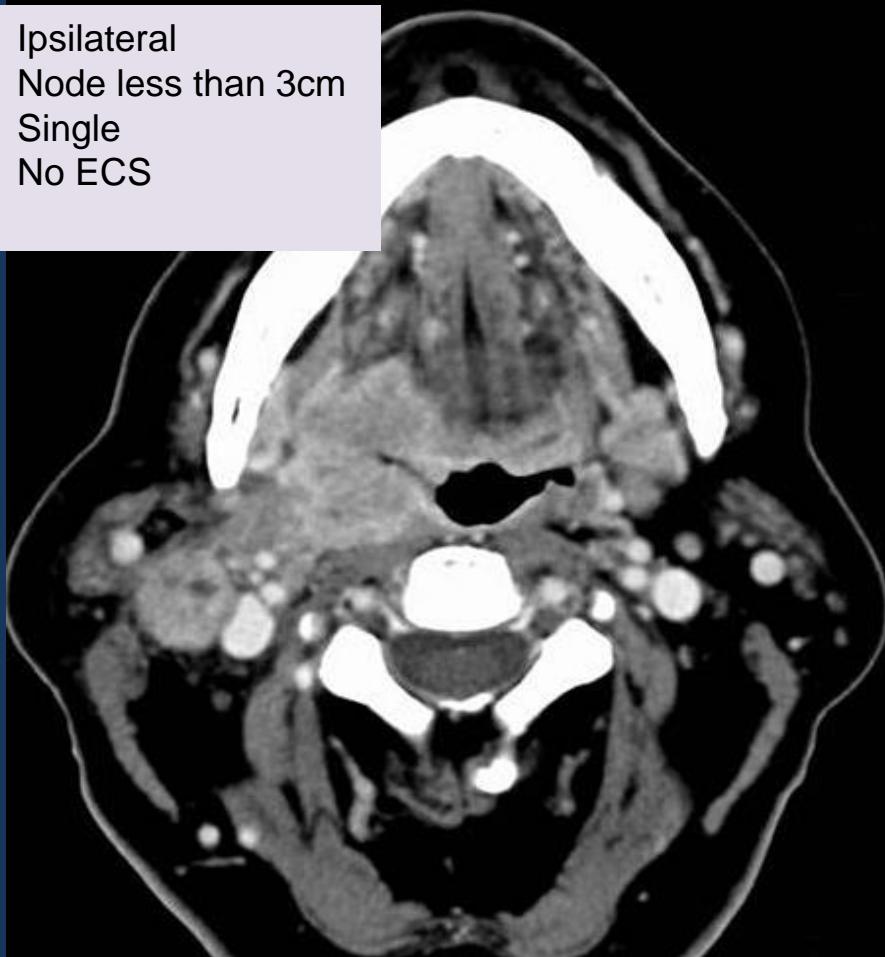


To summarise...



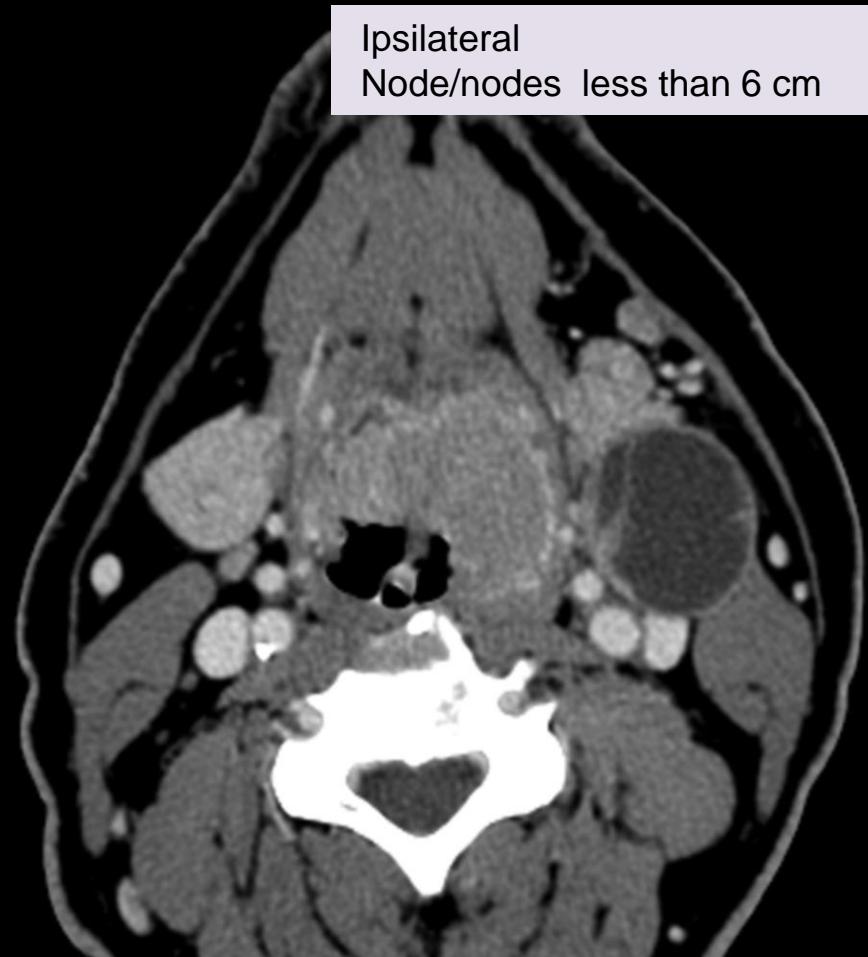
HPV-ve T2?T4aN1

Ipsilateral
Node less than 3cm
Single
No ECS



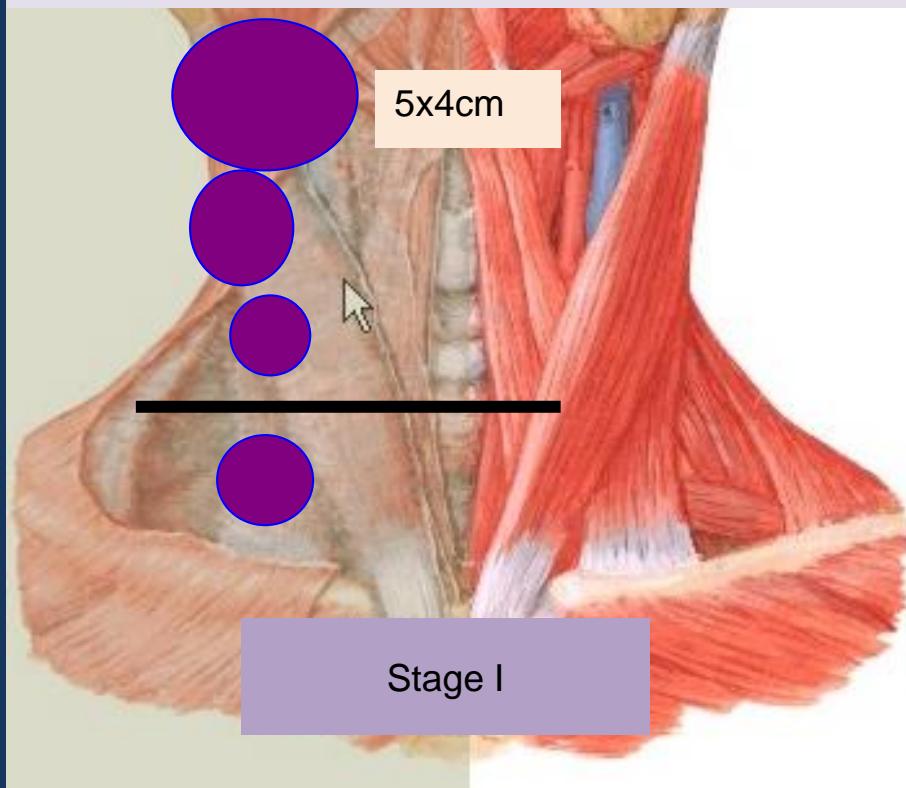
HPV+ve T2N1- Stage I

Ipsilateral
Node/nodes less than 6 cm



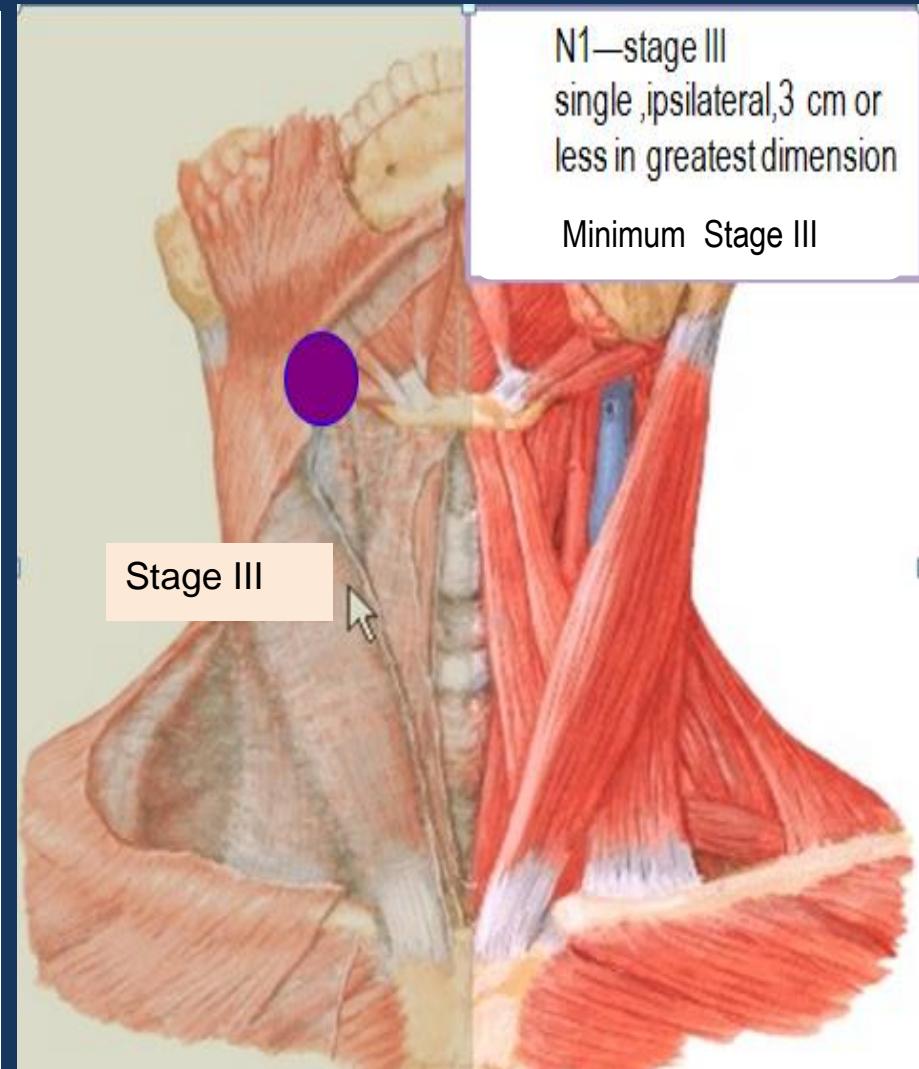
HPV positive

Nodal stage –N1 (Single or Multiple, Ipsilateral, if not more than 6 cm)- up to T-T2, Stage I(Lower border of cricoid is not included)



HPV -Ve

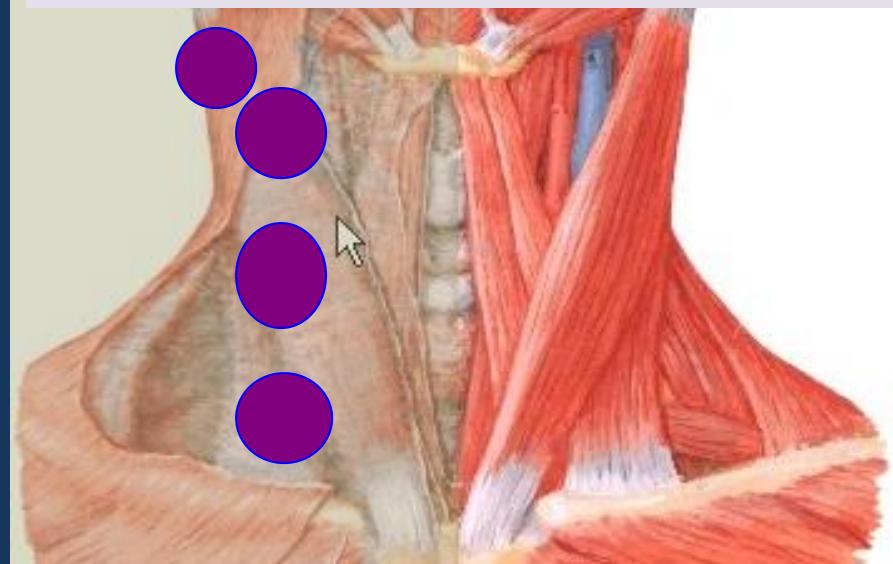
N1—stage III
single ,ipsilateral,3 cm or less in greatest dimension
Minimum Stage III



Nodal Staging

HPV positive- Nodal stage –N1 (Single or Multiple,Ipsilateral,if not more than 6 cm)- Stage I

HPV negative Oropharynx,Oral vaity,Larynx or Hypopharynx -N2b
Stage IVa



Nasopharynx–N3(Any node below lower border of cricoid cartilage) – Stage IVa

HPV negative Oropharynx,Oral vaity,Larynx or Hypopharynx – N2c Stage IVa

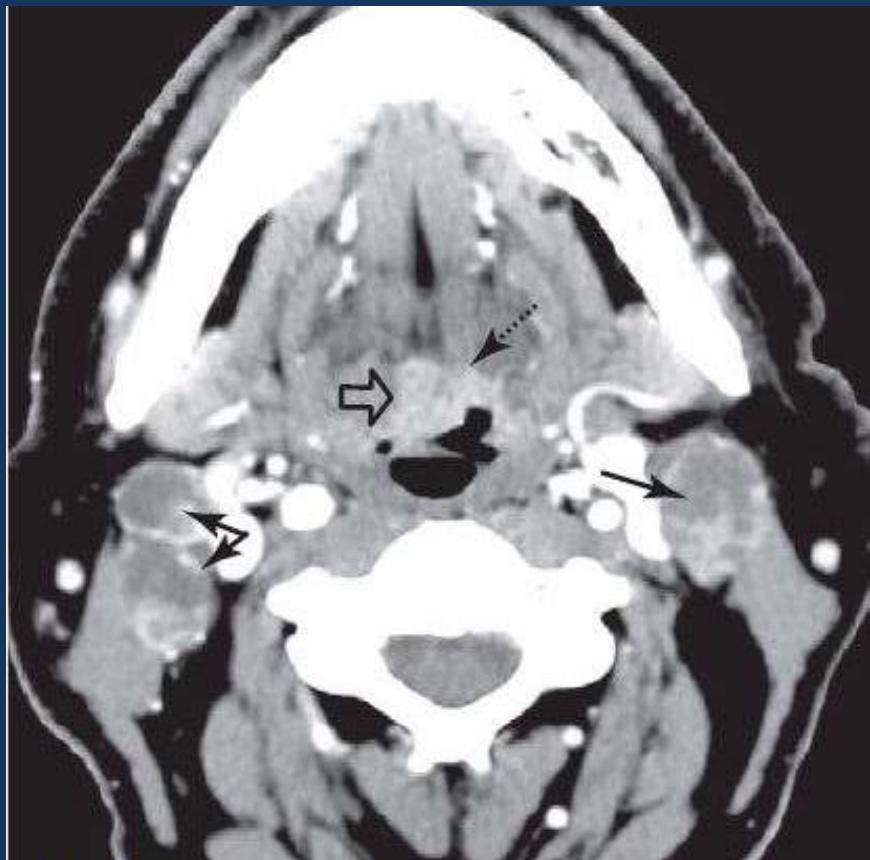


HPV positive – N2. Bilateral (Single or multiple).No sub classification for N2. (if not more than 6 cm) – Stage II

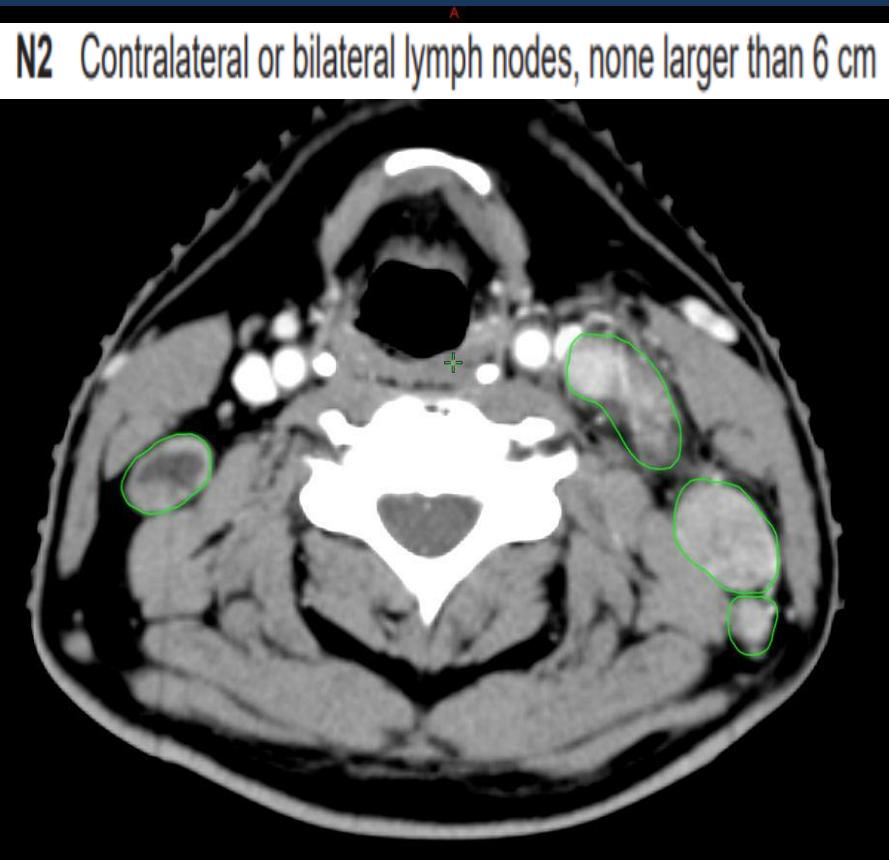


Ca Nasopharynx–N2 Bilateral (if not more than 6 cm) Stage III

Stage -T2N2c-Stage IVa

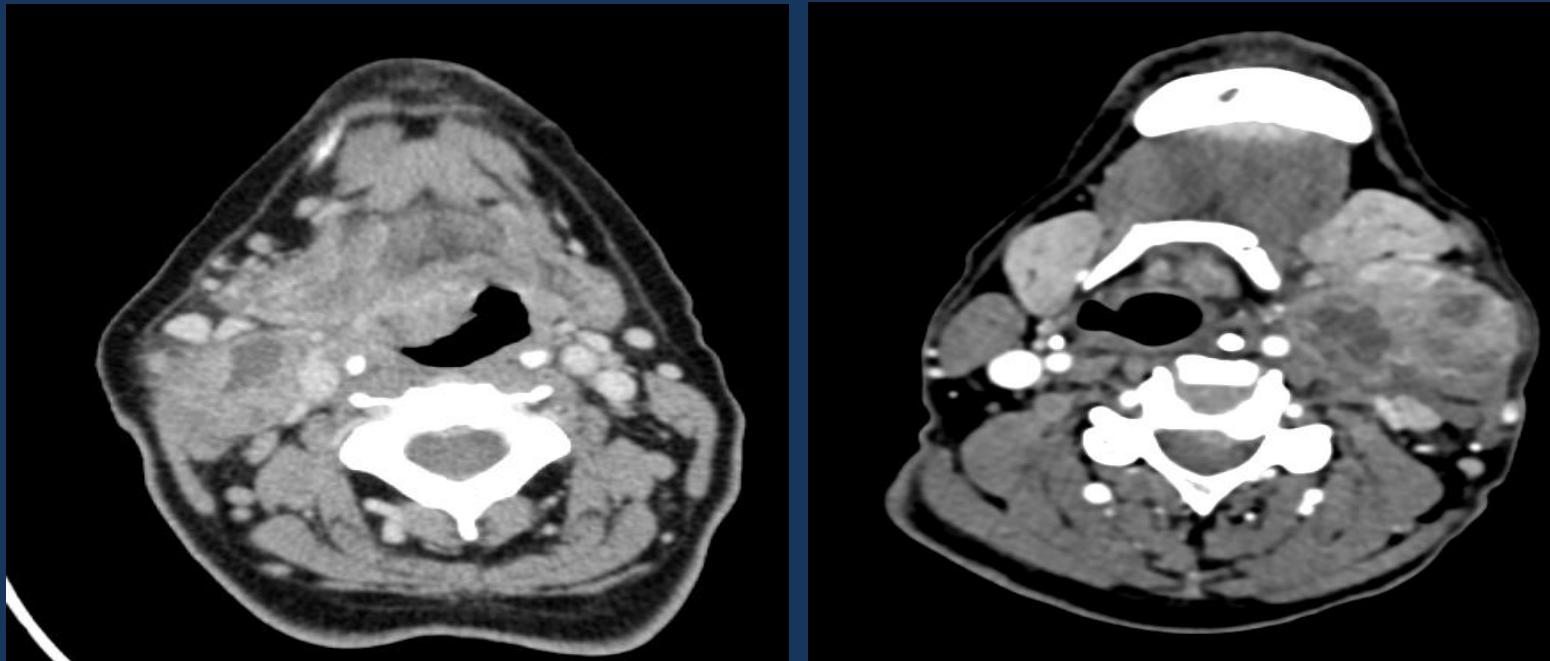


p16 positive T2N2M0- Stage II



Bilateral or C/L node , none more than 6 cm

N3

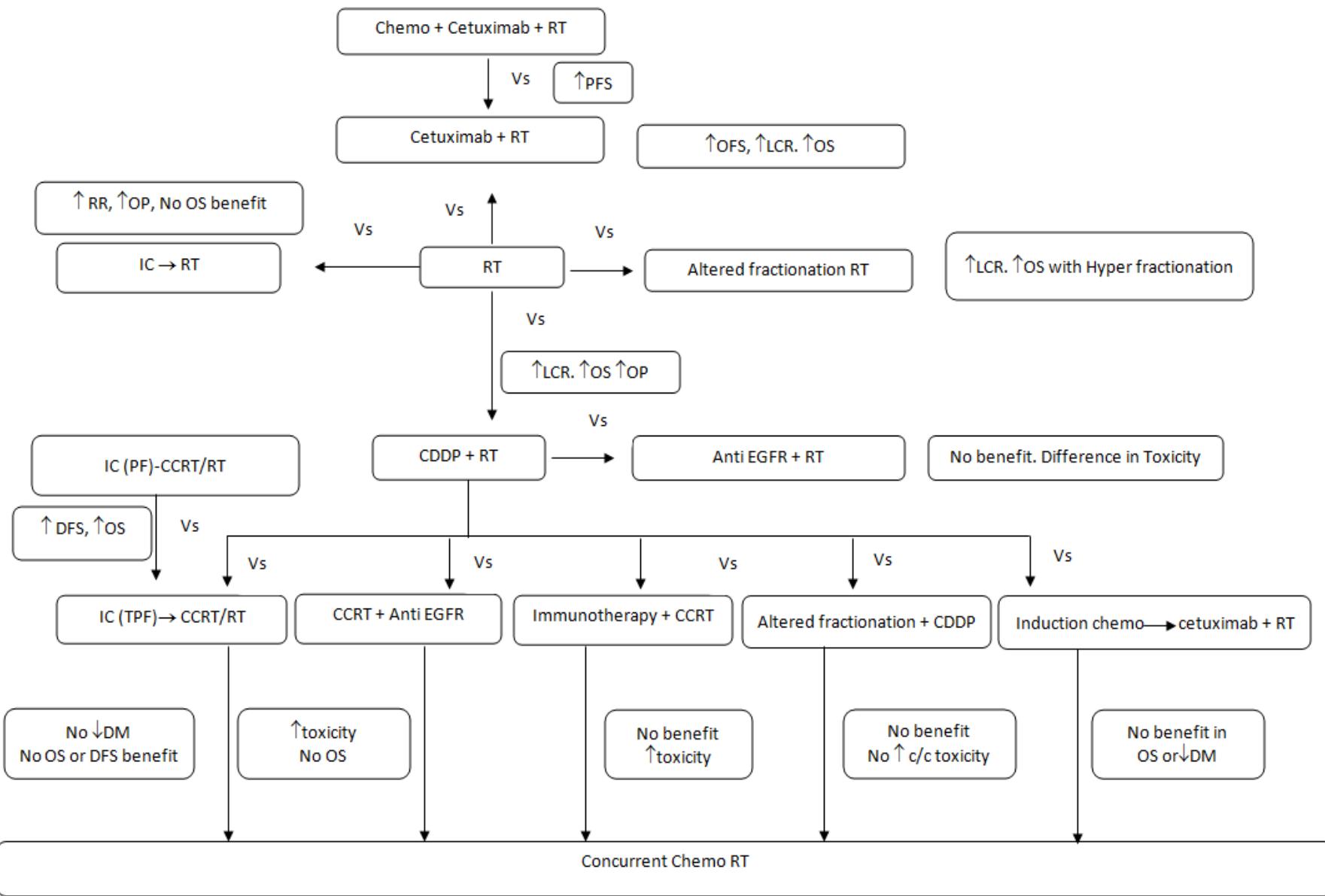


Nodal Staging	HNSCC	HPV positive	Nasopharynx
N3	Stage IVb N3a & N3b	Stage III	Stage IVa

Composite Group

Stage	HPV +Ve Ca Oropharynx	HPV -Ve Ca Oropharynx
Stage I	T-T2 ,N0-N1	T1 N0
Stage II	T3 or N2	T2N0
Stage III	T4or N3	T3 or N1
Stage IVa	Only Stage –IV, M1	T4a or N2
Stage IVb	NA	T4b or N3
Stage IVc	NA	M1

LAHNSCC



Conclusions – ChemoRT

- Induction chemo followed by RT- No OS & LCR, better OP
- Concurrent Chemo RT- Standard of care
- Induction chemo followed by Chemo RT- No benefit
- Cetuximab + RT- If not suitable for platinum
- Chemo RT along with Targeted therapy- No improvement in OS
- Altered fractionation – Reasonable alternative
- Immunotherapy along with Chemo RT – No benefit
- Best induction chemo-TPF

Conclusions

- Replace Cisplatin with Cetuximab – 3 Negative Phase III trials
- NACT → Decreased RT doses – Positive Phase II, Phase III underway
- CTRT with decreased RT and chemo doses- Positive Phase II study
- Omitting Chemotherapy- HN002 Phase II Trial – Same OS, Phase III needed
- Protons instead of Photons- Phase II/III trial underway
- Less invasive surgery (TORS)- Phase III trials underway



International Guideline

Delineation of the primary tumour Clinical Target Volumes (CTV-P) in laryngeal, hypopharyngeal, oropharyngeal and oral cavity squamous cell carcinoma: AIRO, CACA, DAHANCA, EORTC, GEORCC, GORTEC, HKNPCSG, HNCIG, IAG-KHT, LPRHHT, NCIC CTG, NCRI, NRG Oncology, PHNS, SBRT, SOMERA, SRO, SSHNO, TROG consensus guidelines



Vincent Grégoire ^{a,*}, Mererid Evans ^b, Quynh-Thu Le ^c, Jean Bourhis ^d, Volker Budach ^e, Amy Chen ^f, Abraham Eisbruch ^g, Mei Feng ^h, Jordi Giralt ⁱ, Tejpal Gupta ^j, Marc Hamoir ^k, Juliana K. Helito ^l, Chaosu Hu ^m, Keith Hunter ⁿ, Jorgen Johansen ^o, Johannes Kaanders ^p, Sarbani Ghosh Laskar ^j, Anne Lee ^q, Philippe Maingon ^r, Antti Mäkitie ^s, Francesco Micciche ^t, Piero Nicolai ^u, Brian O'Sullivan ^v, Adela Poitevin ^w, Sandro Porceddu ^x, Krzysztof Składowski ^y, Silke Tribius ^z, John Waldron ^v, Joseph Wee ^{aa}, Min Yao ^{ab}, Sue S. Yom ^{ac}, Frank Zimmerman ^{ad}, Cai Grau ^{ae}



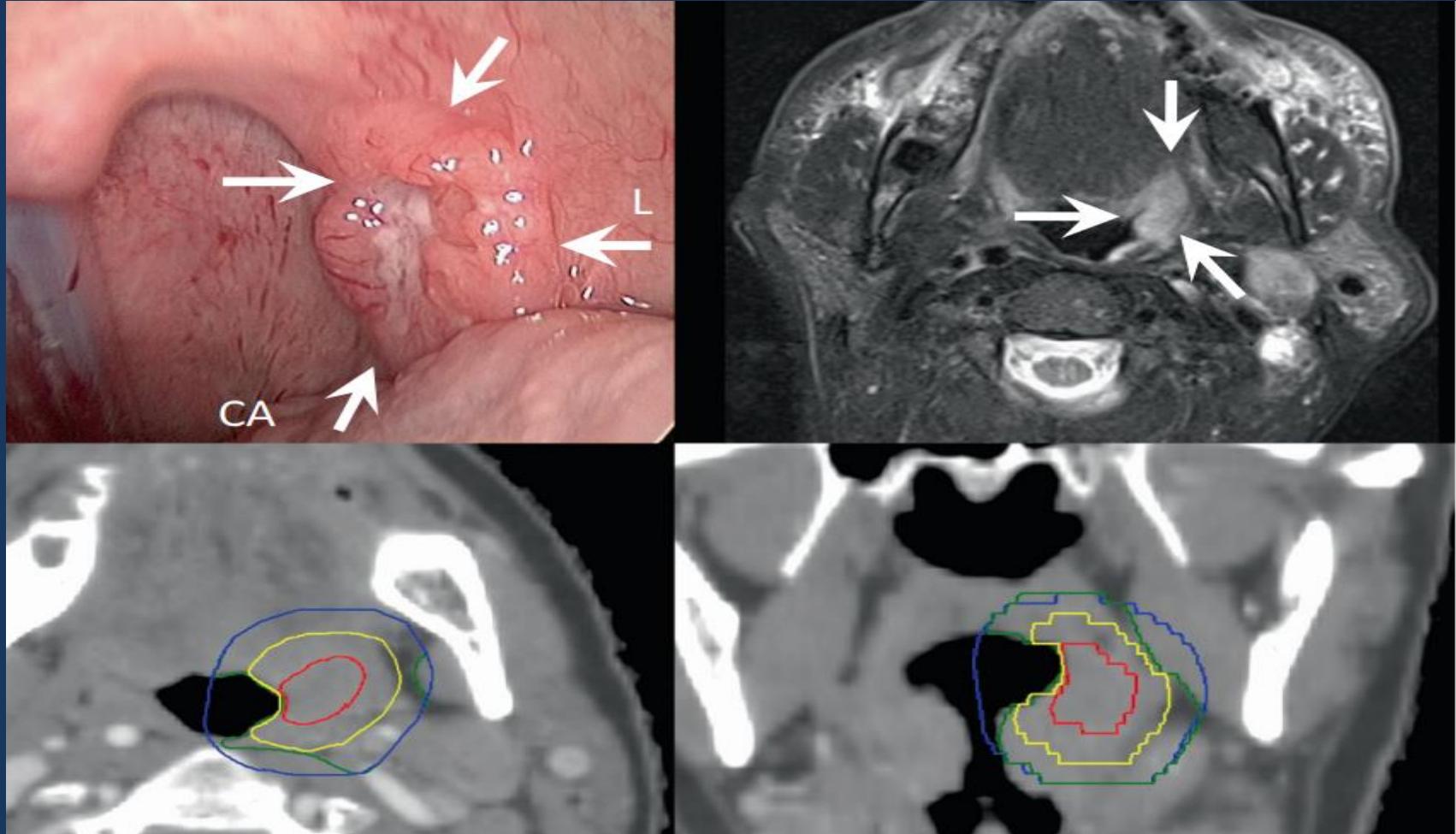
Guidelines

Selection of lymph node target volumes for definitive head and neck radiation therapy: a 2019 Update

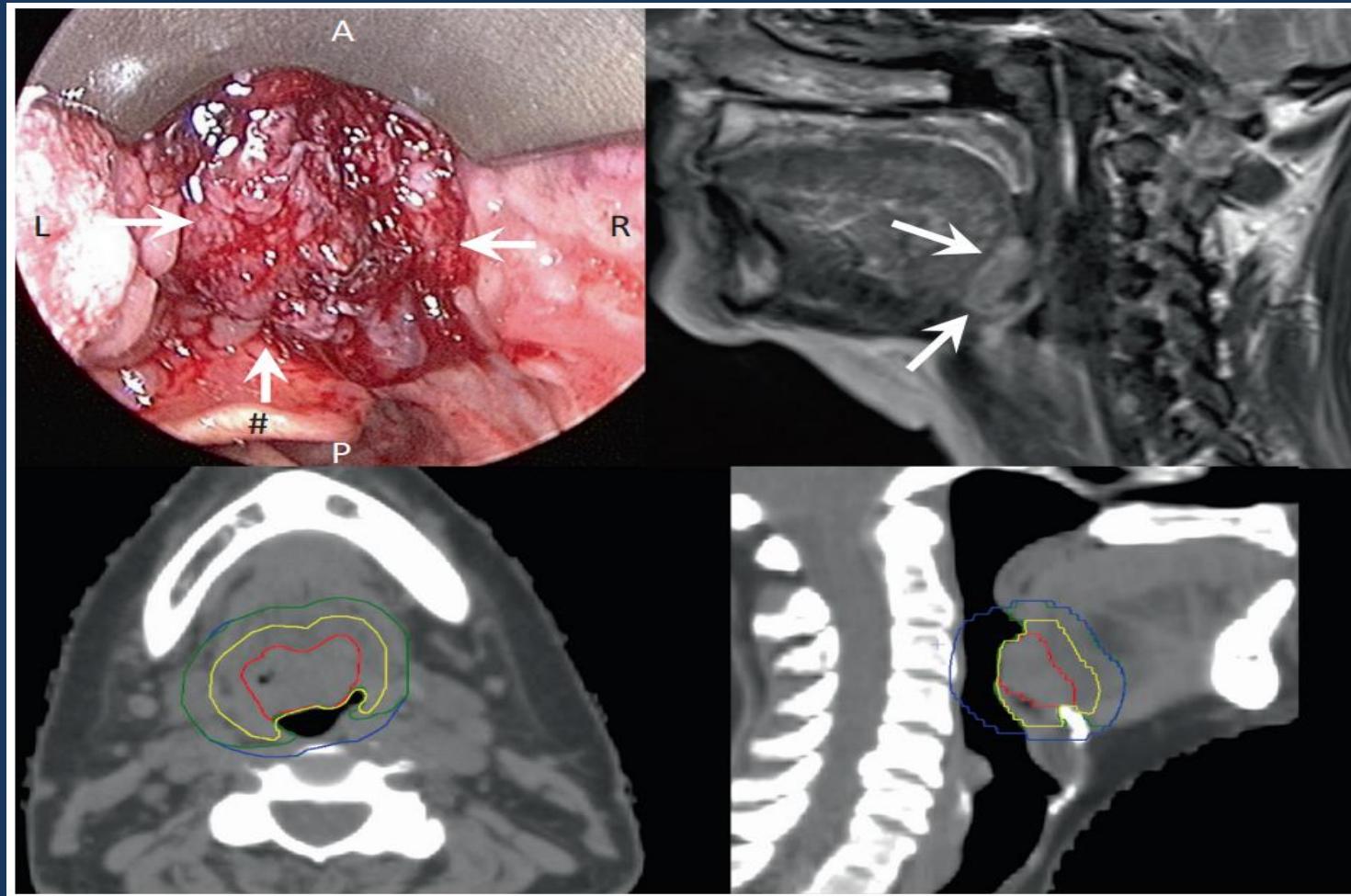


Julian Biau ^{a,b,*}, Michel Lapeyre ^b, Idriss Troussier ^a, Wilfried Budach ^c, Jordi Giralt ^d, Cai Grau ^e, Joanna Kazmierska ^f, Johannes A. Langendijk ^g, Mahmut Ozsahin ^a, Brian O'Sullivan ^h, Jean Bourhis ^{a,1}, Vincent Grégoire ^{i,*,1}

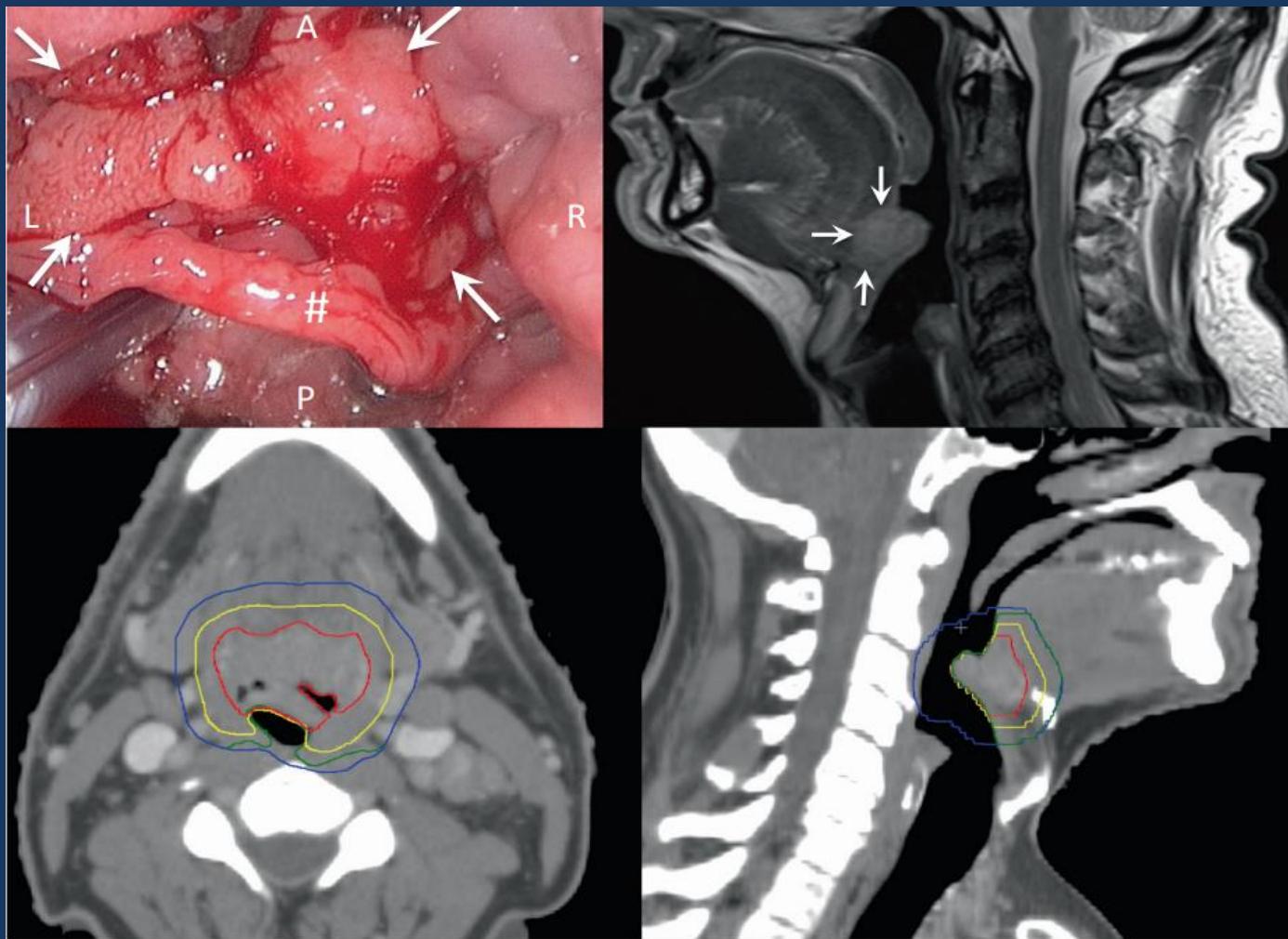
CTV- T2 N0 Tonsil



T2N0 BOT



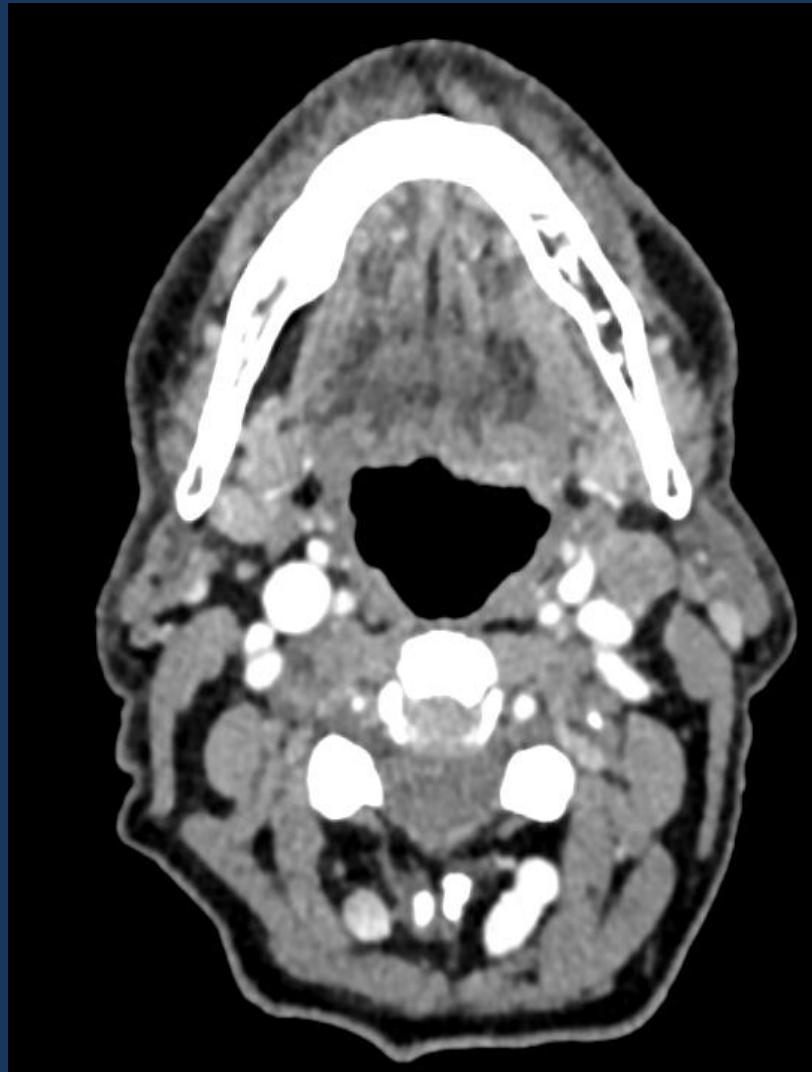
T3N0 BOT



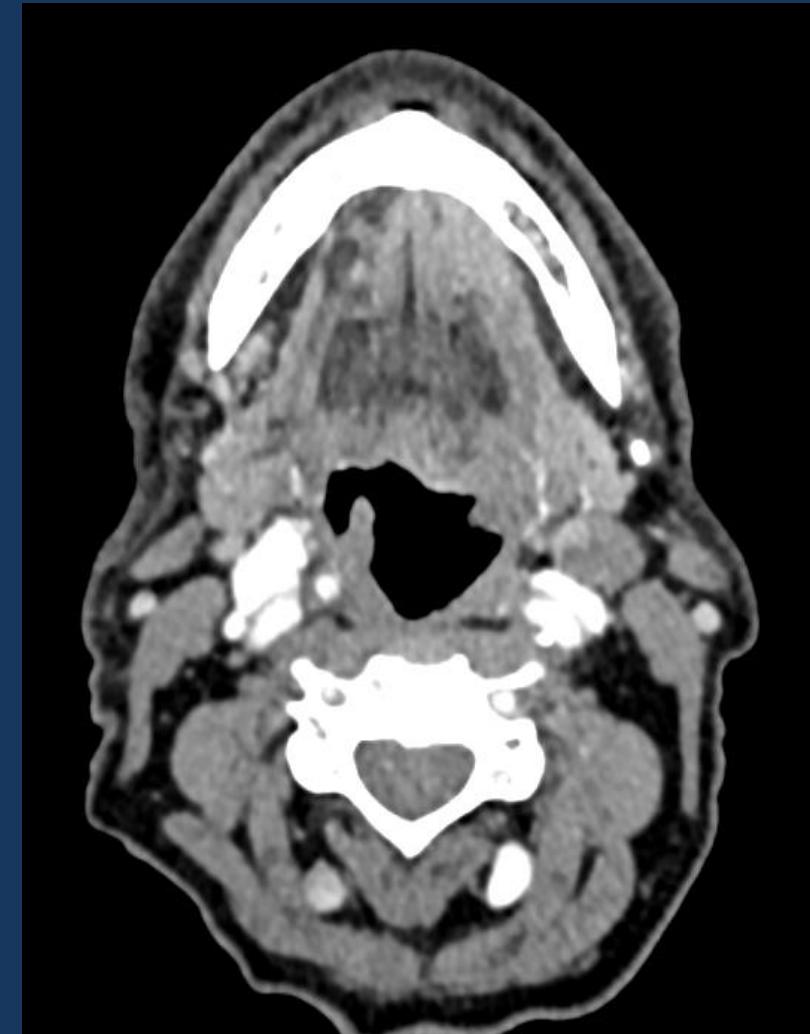
Check list –BOT

- Ant2/3 tongue
- FOM
- TLS
- Tonsil
- Soft palate
- Vallecula
- SGL and PES
- Posterior pharyngeal wall
- Parapharyngeal space
- Medial pterygoid
- Node – Levels , U/L or Bilateral , Any ECS

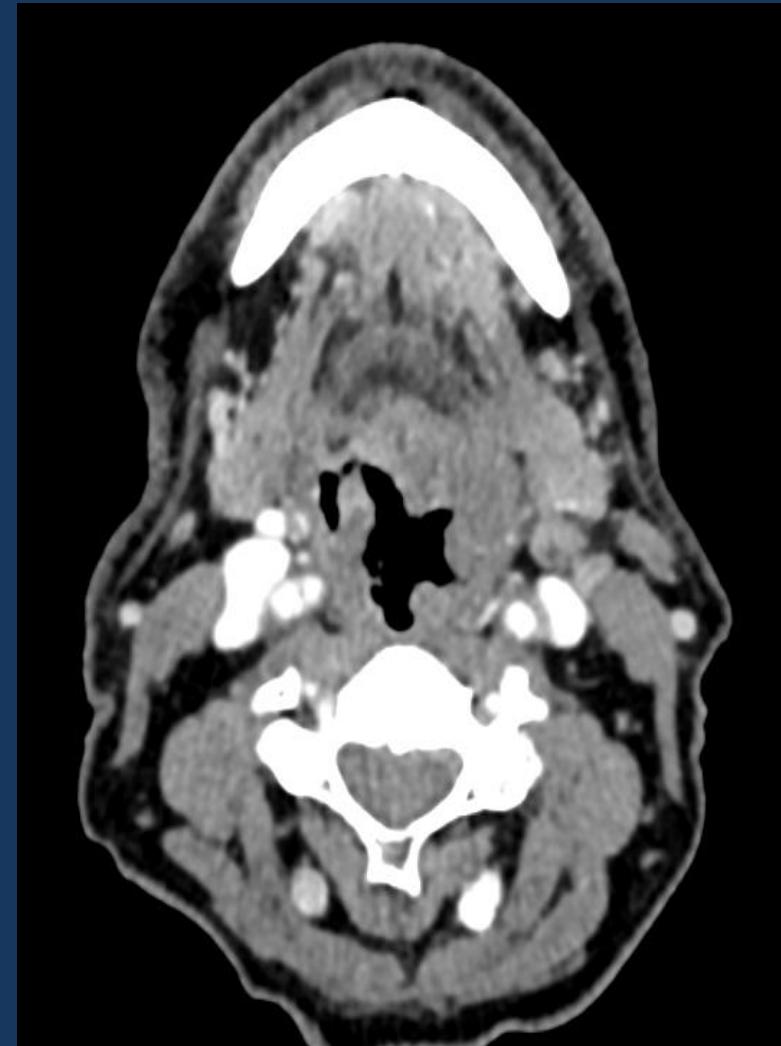
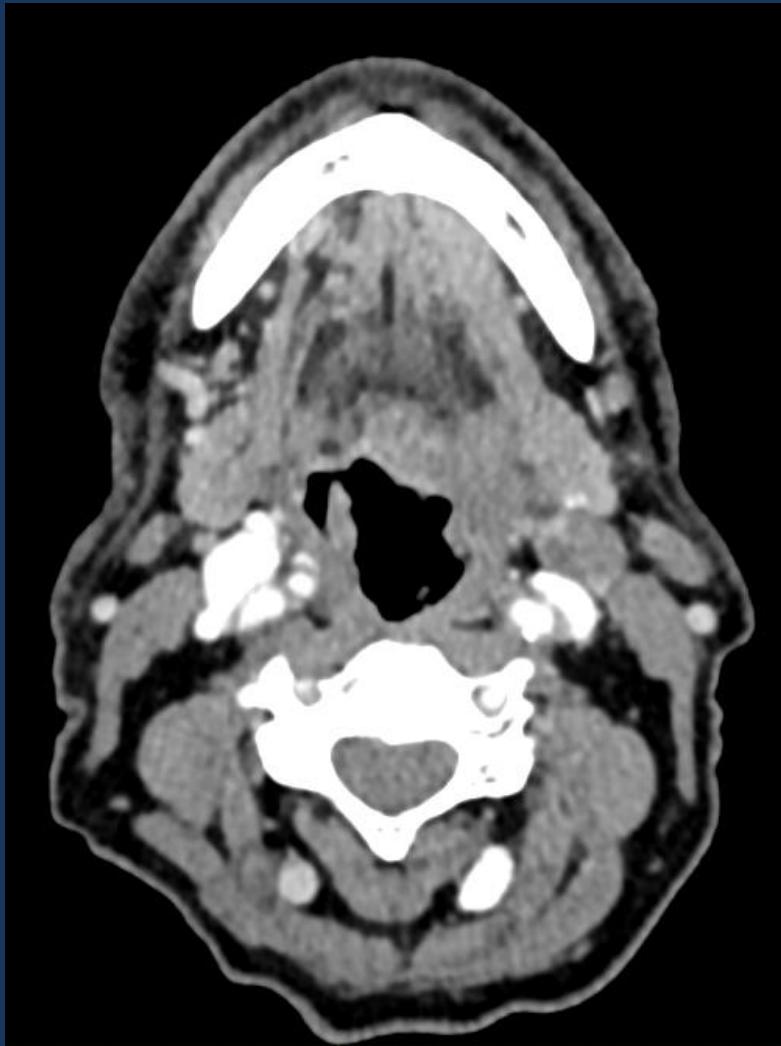
CT scan



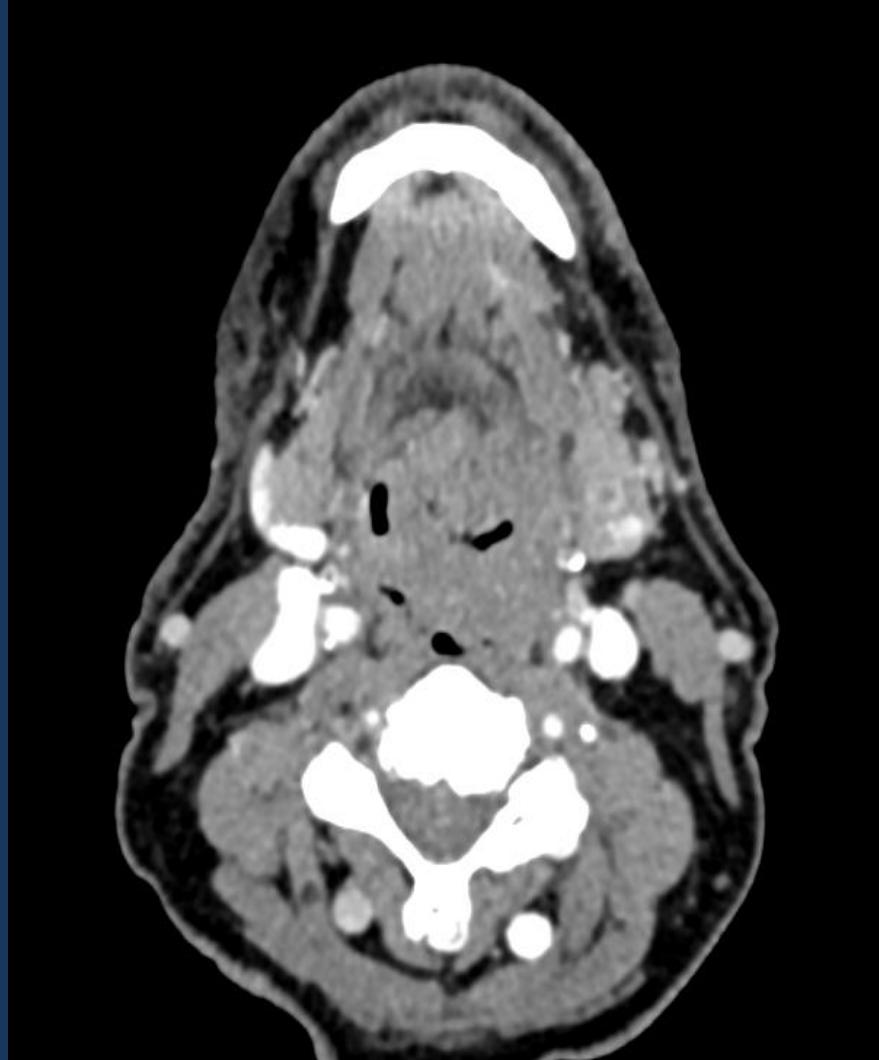
CT scan



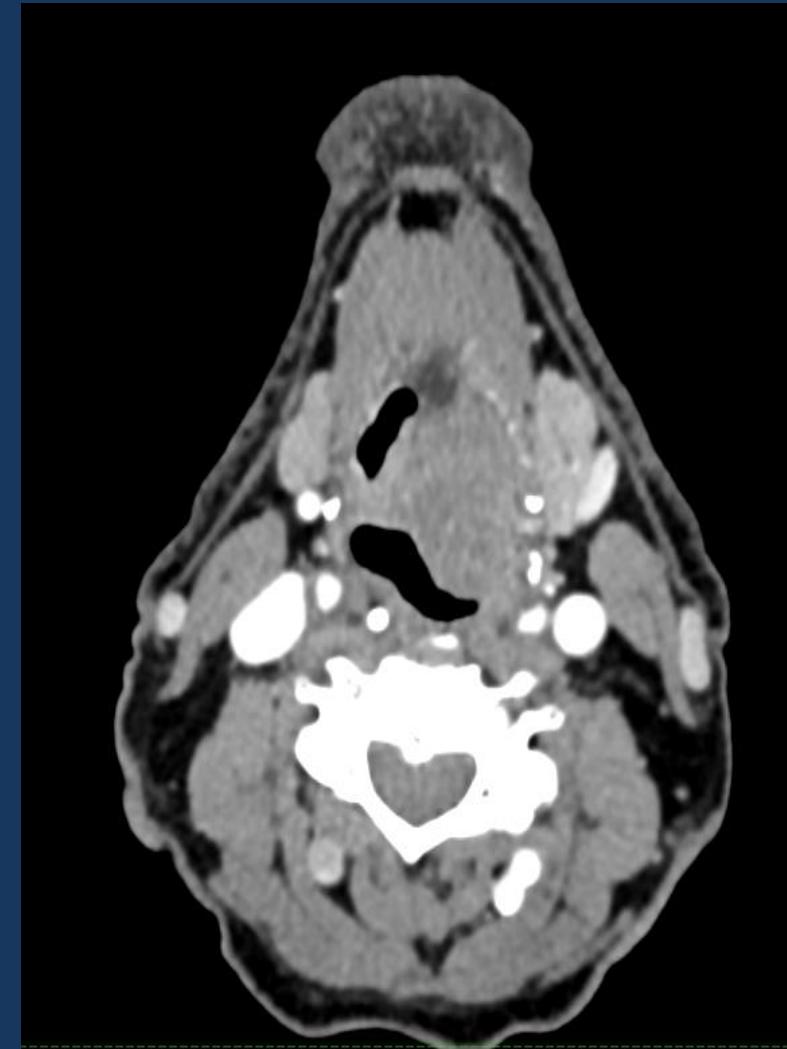
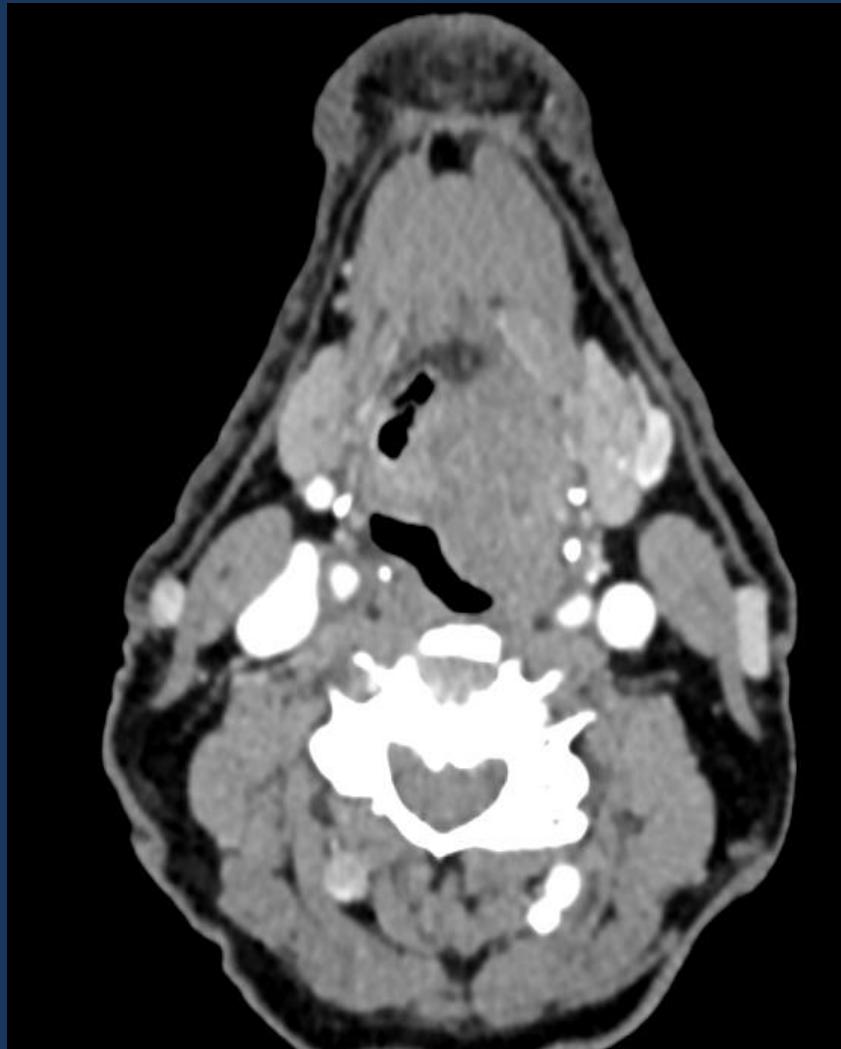
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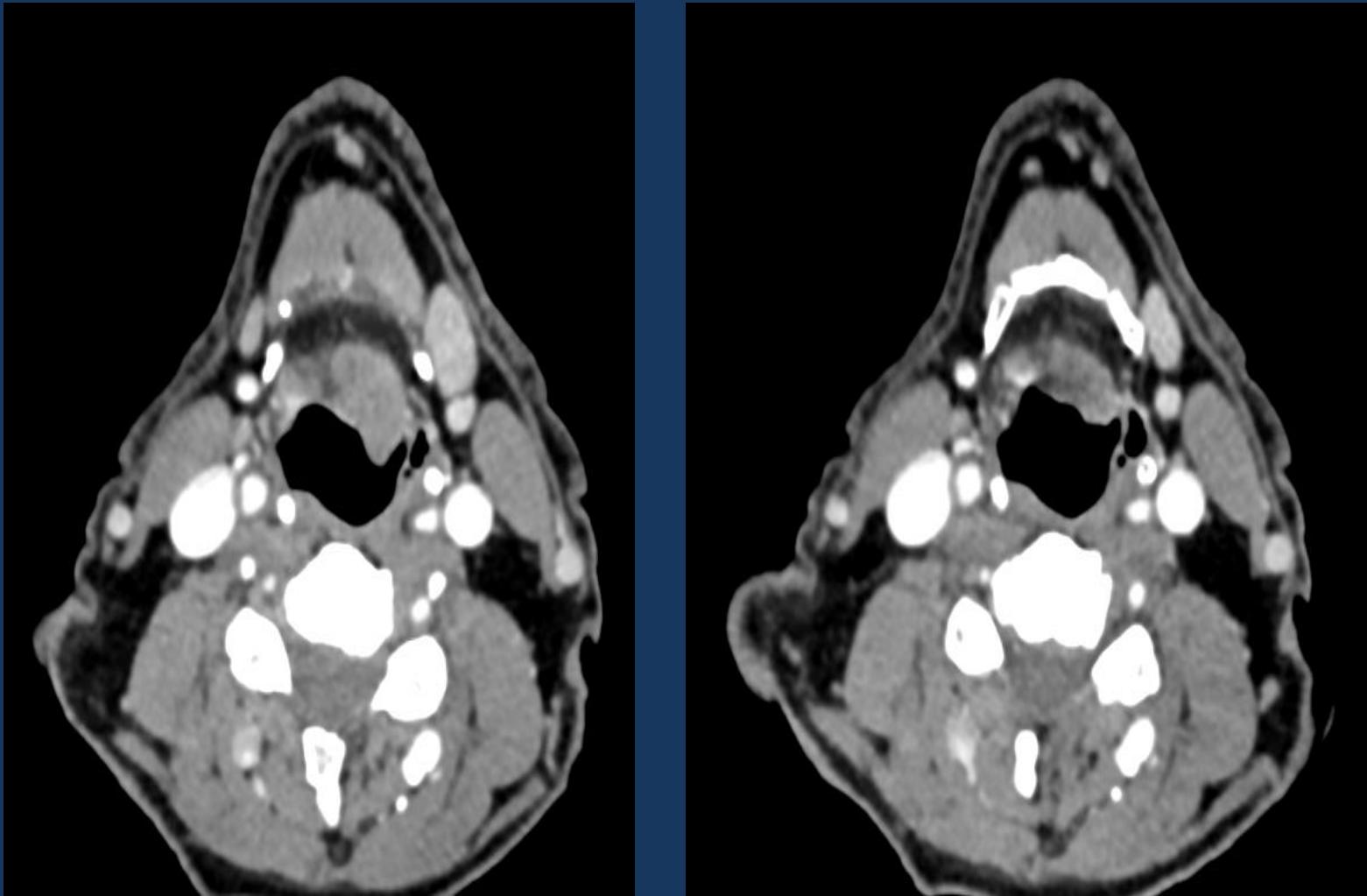
CT scan



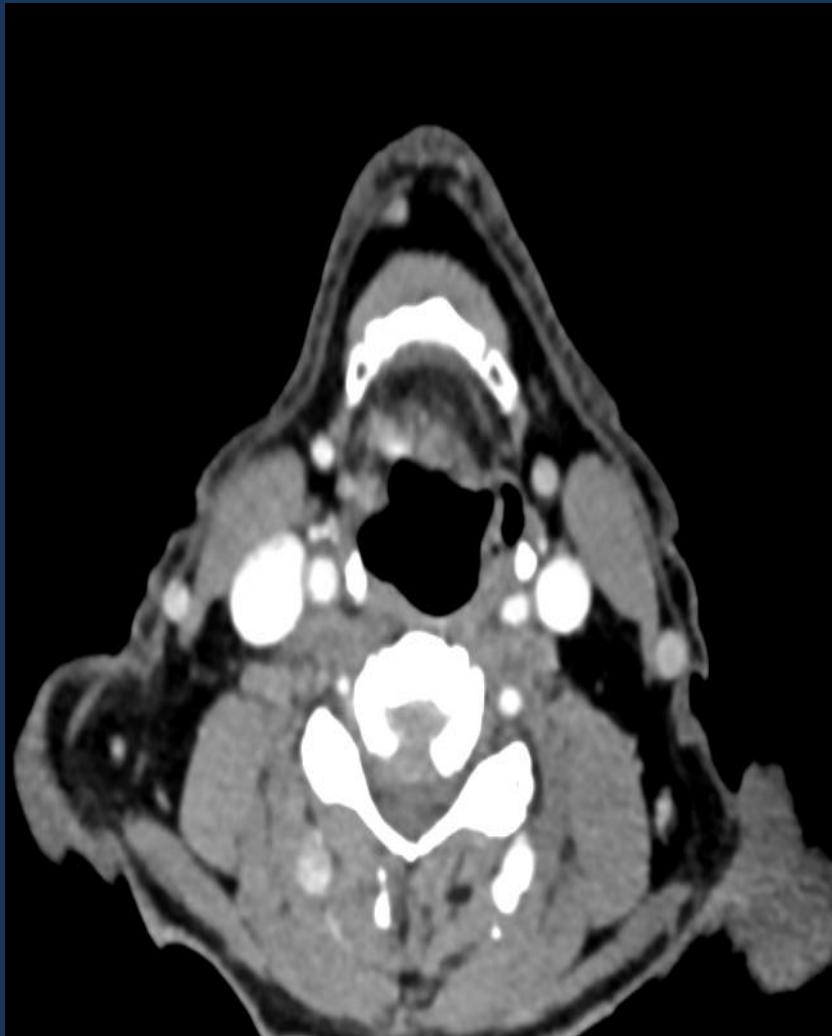
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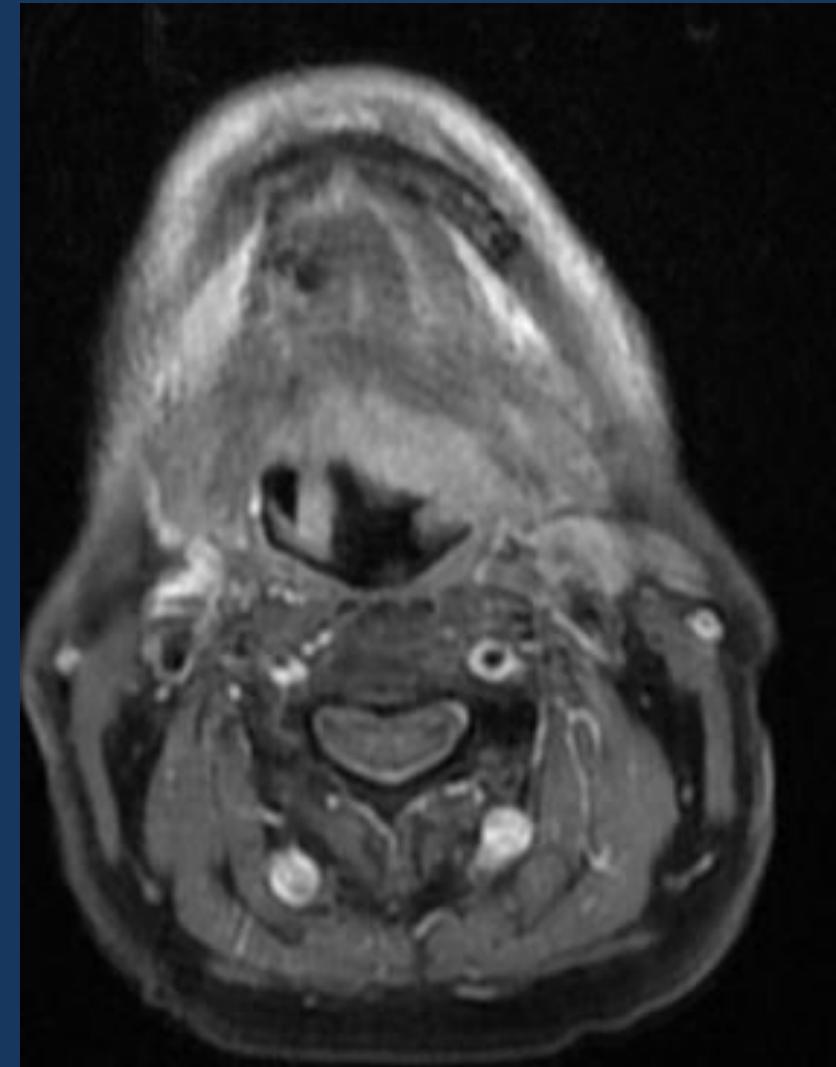
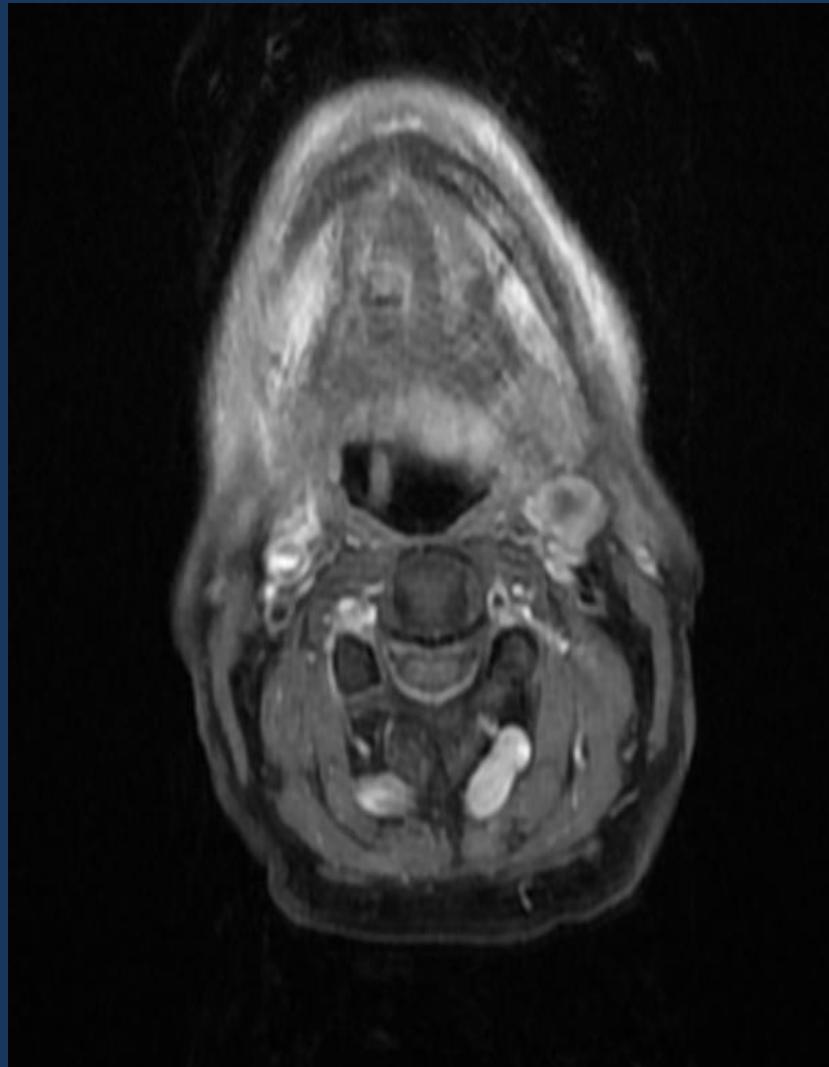
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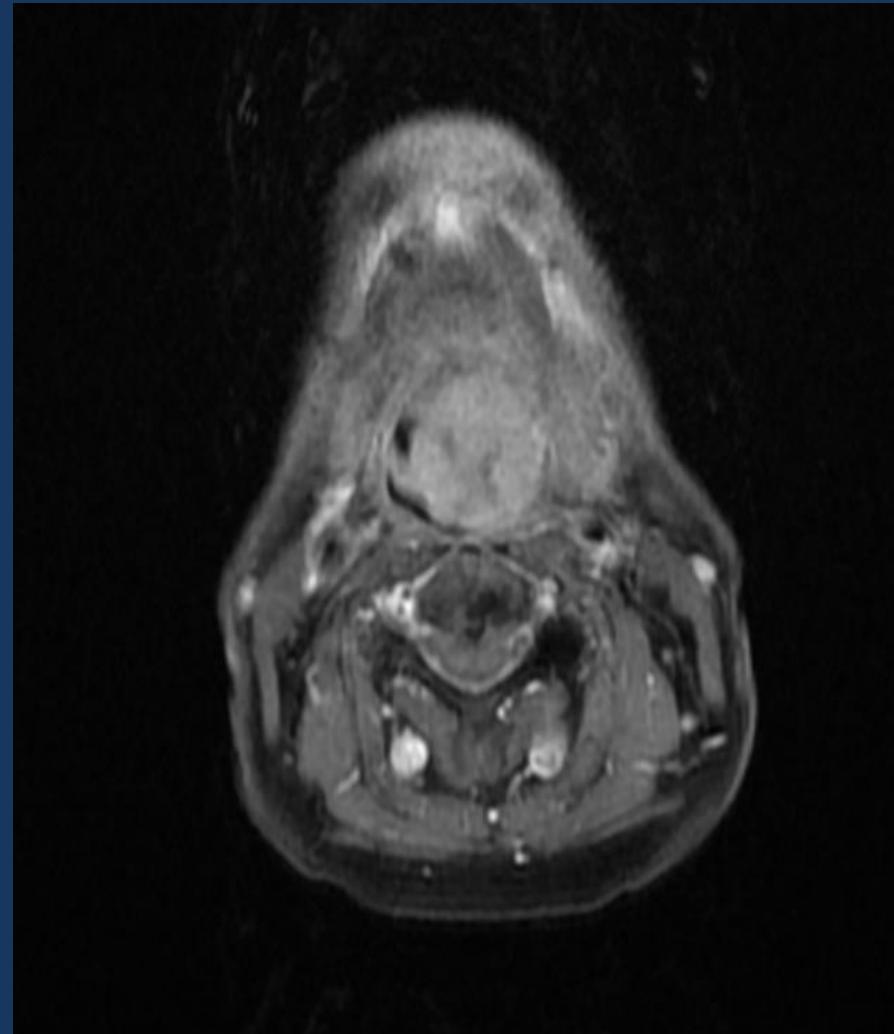
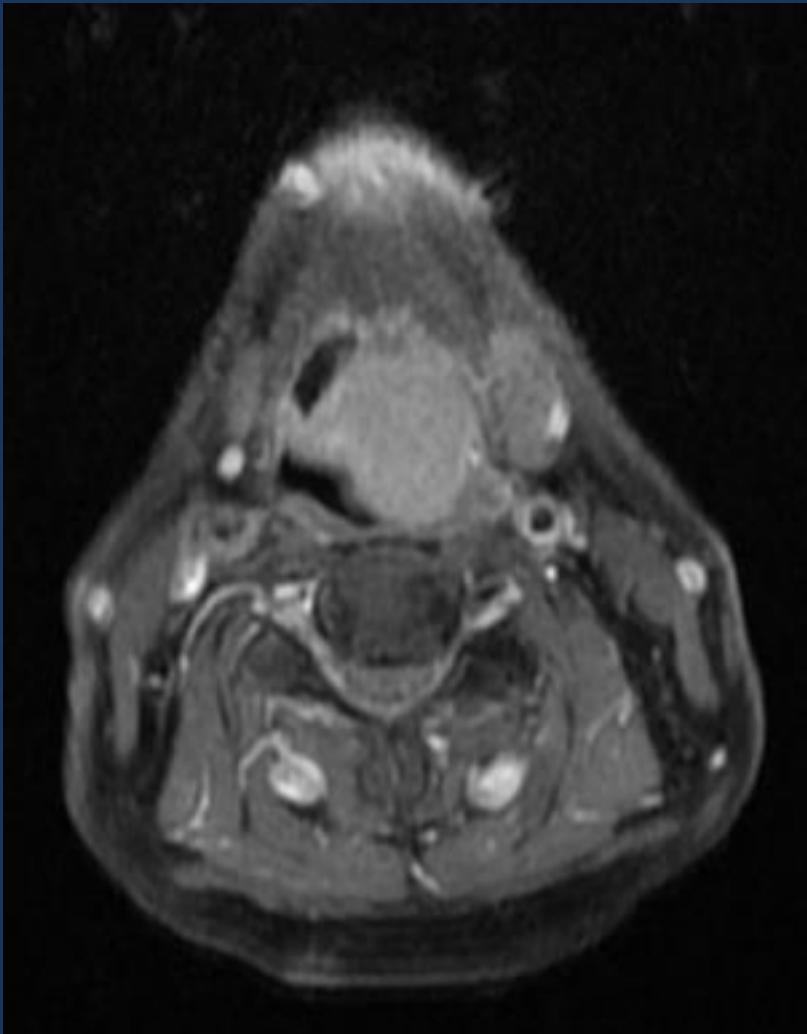
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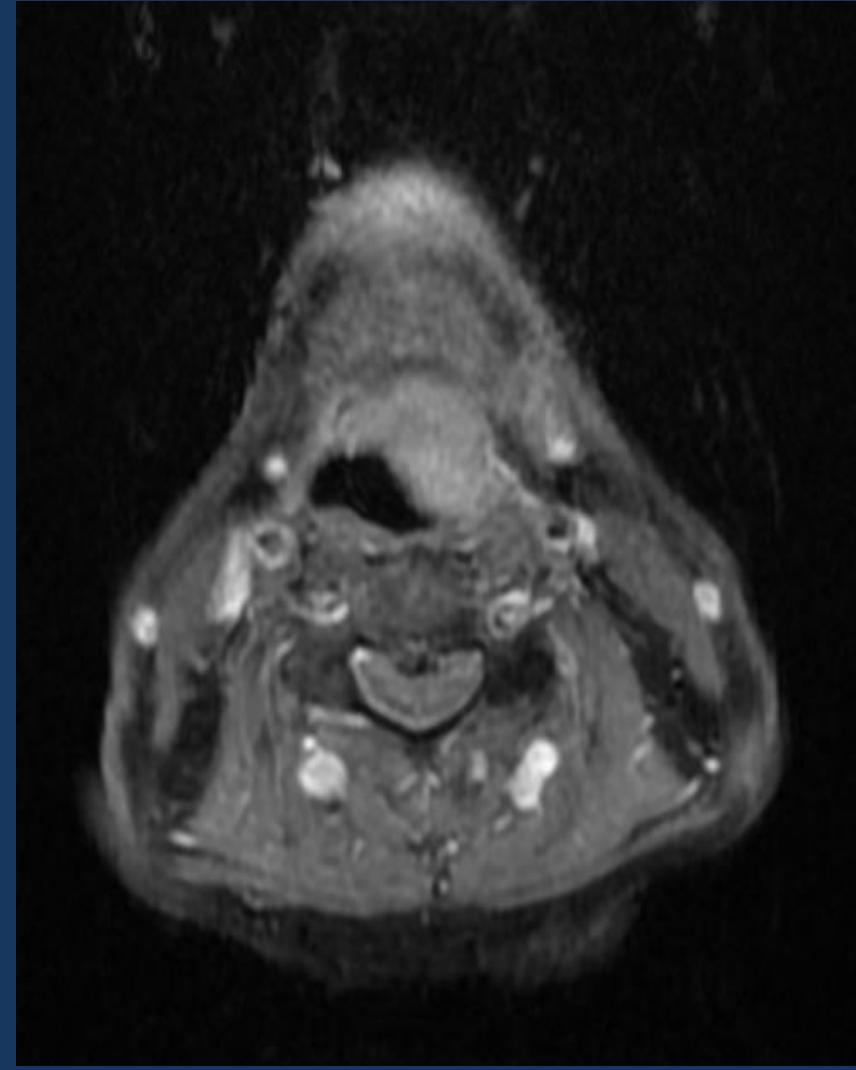
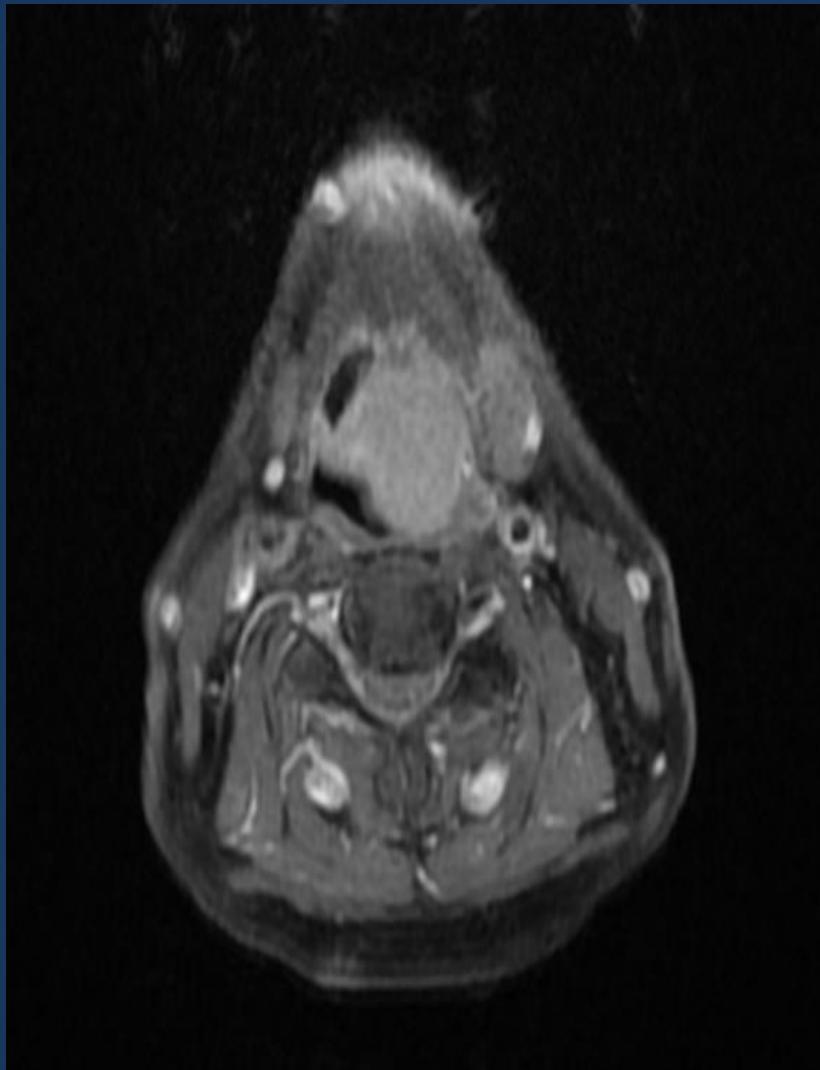
MRI



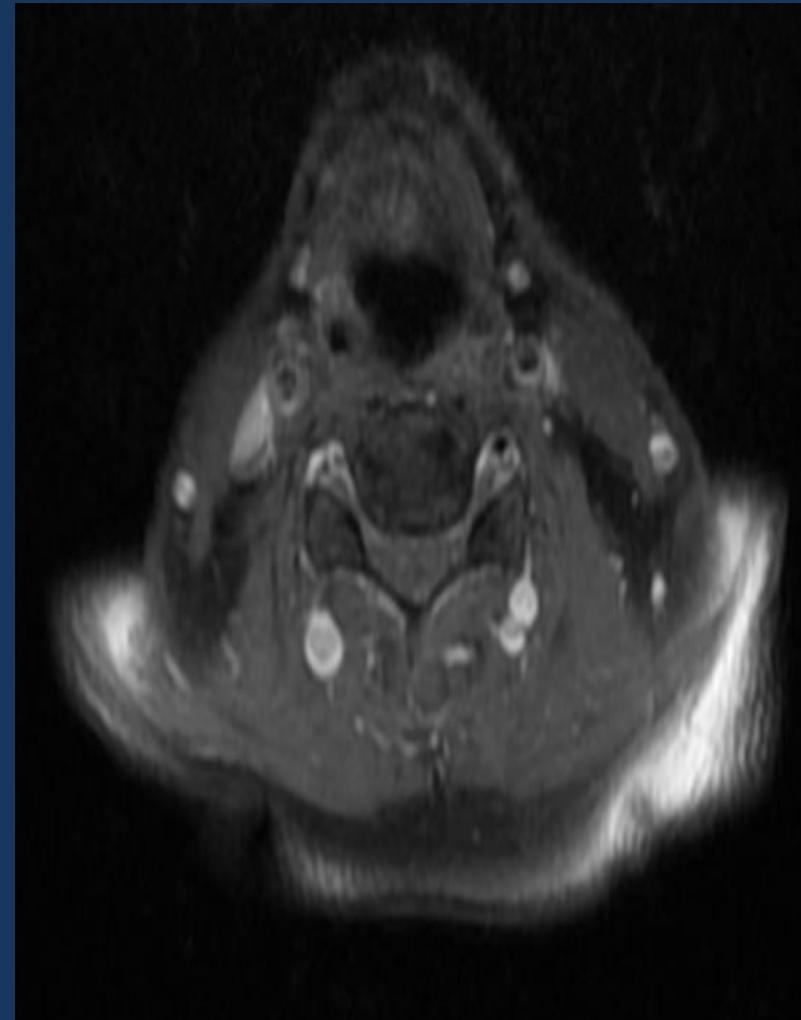
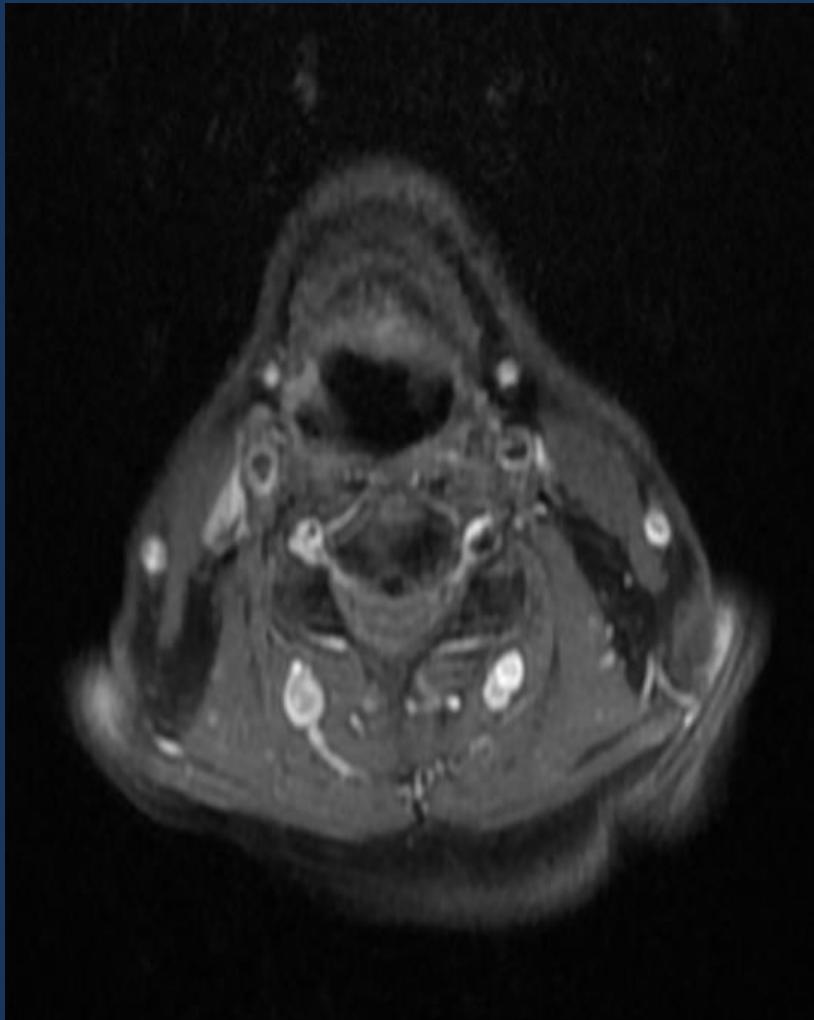
Ca BOT - MRI



MRI

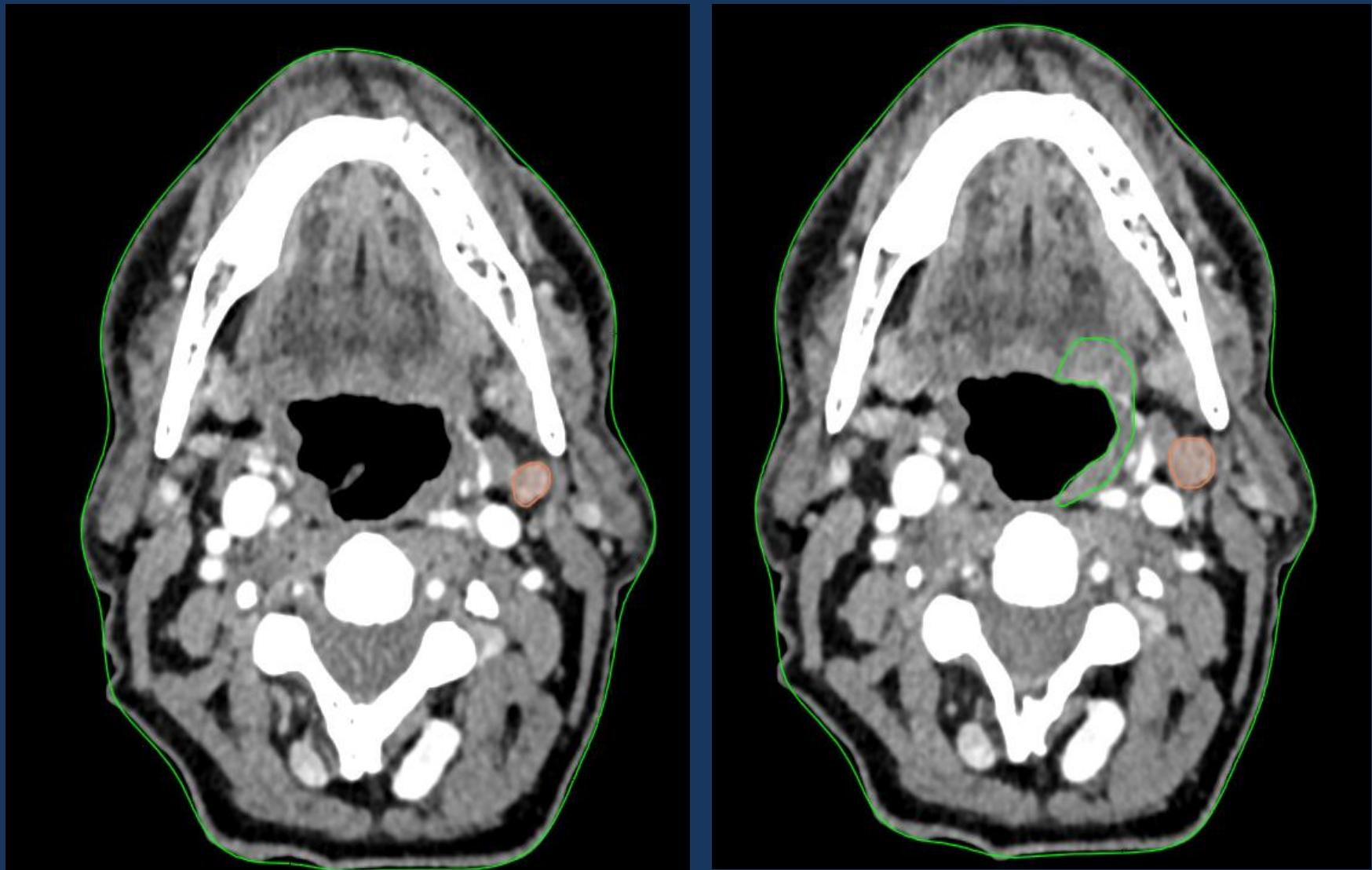


MRI

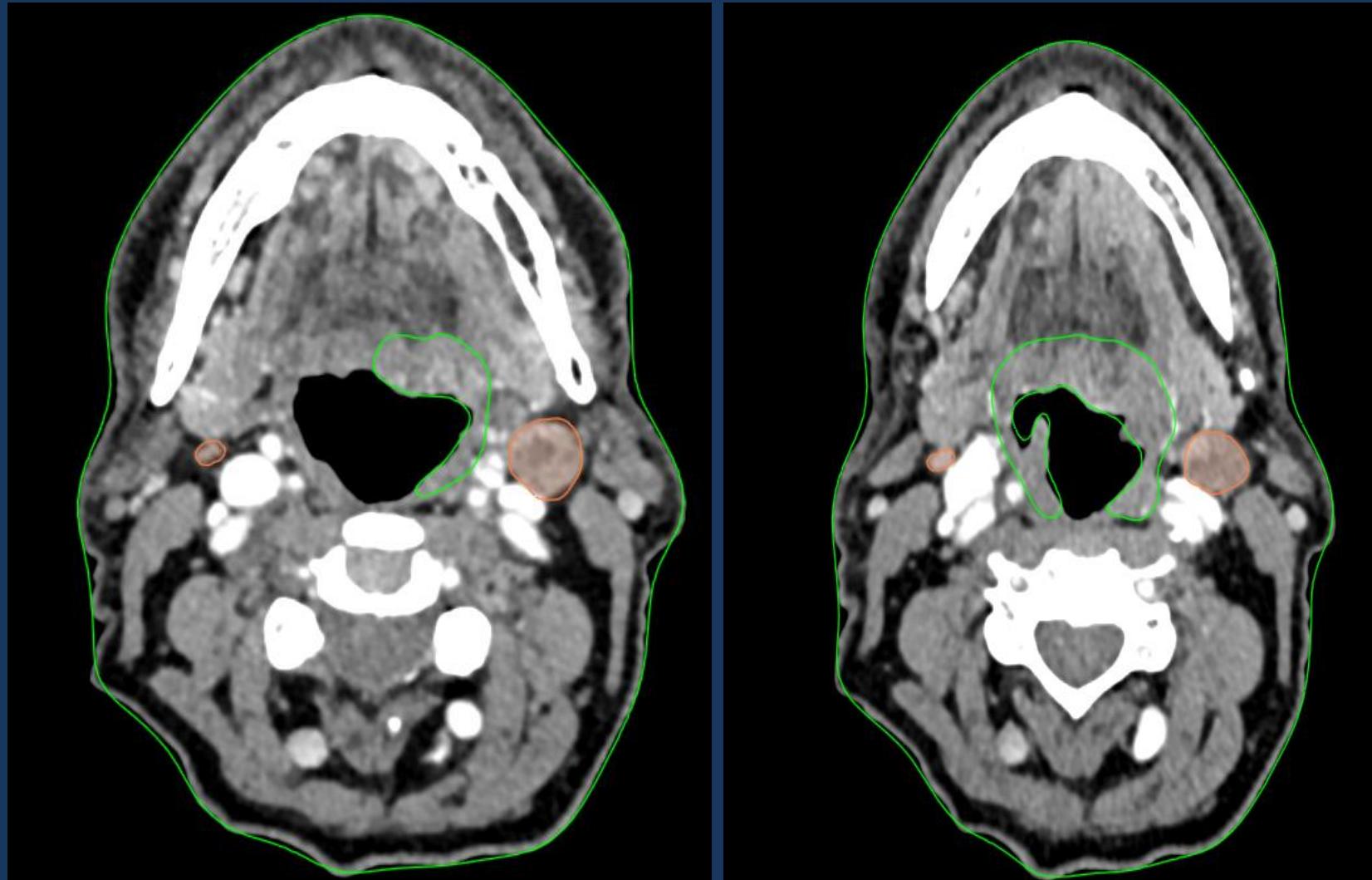


Stage of the disease?

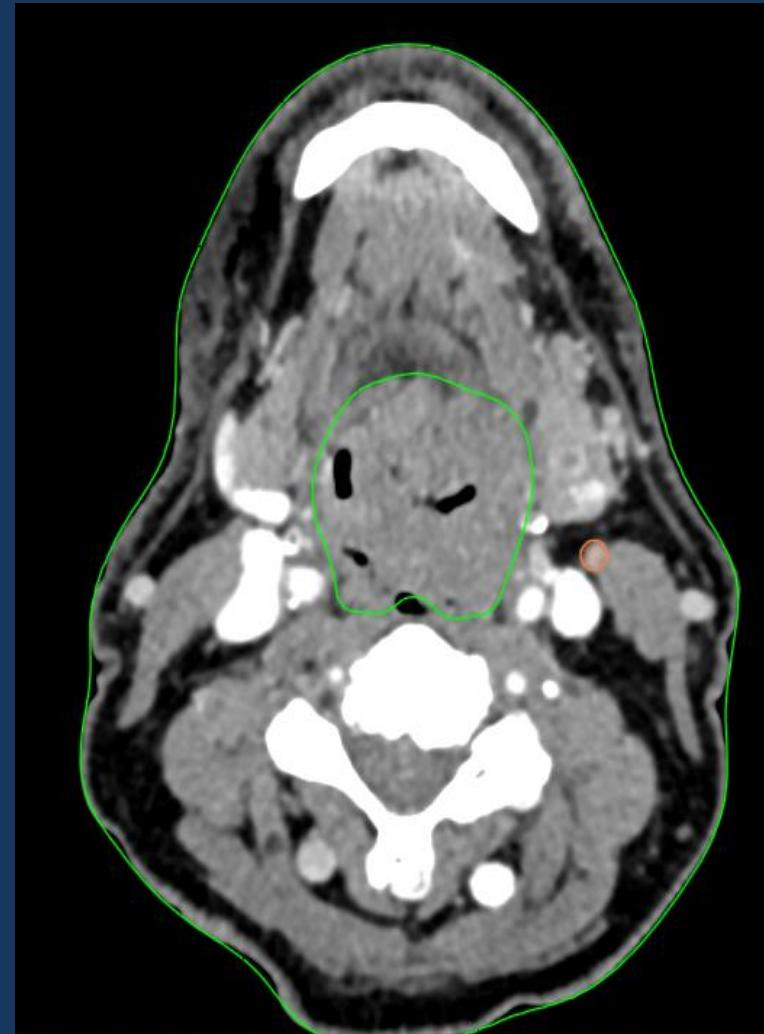
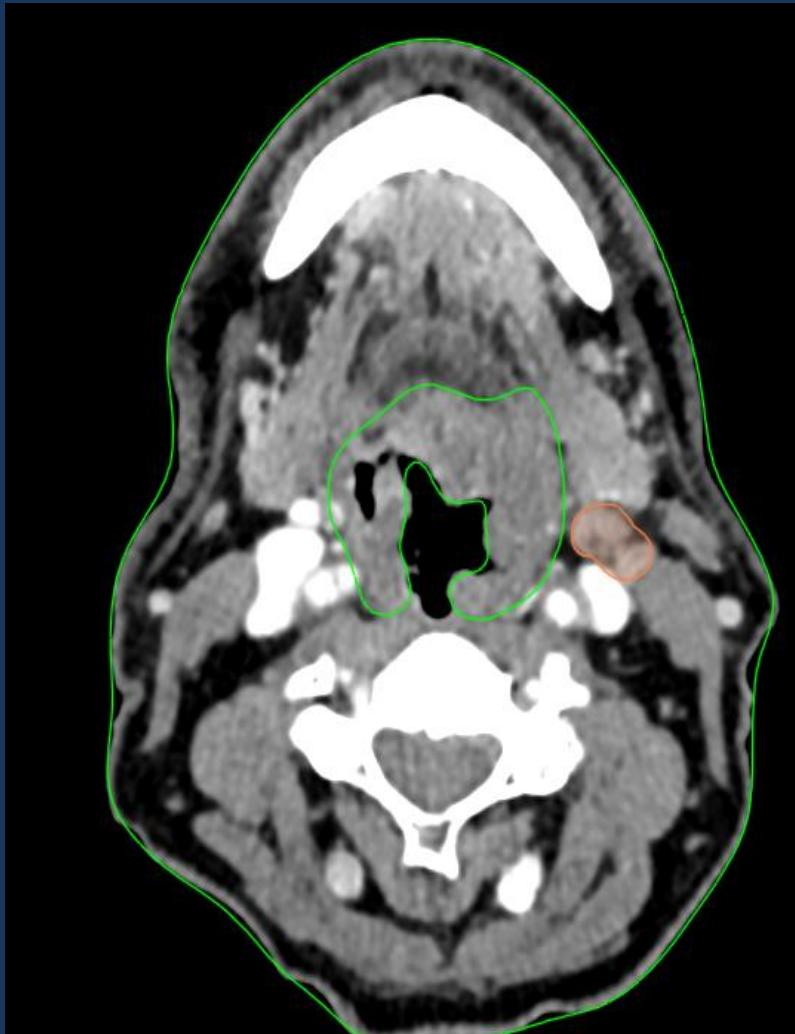
GTVp and GTVn



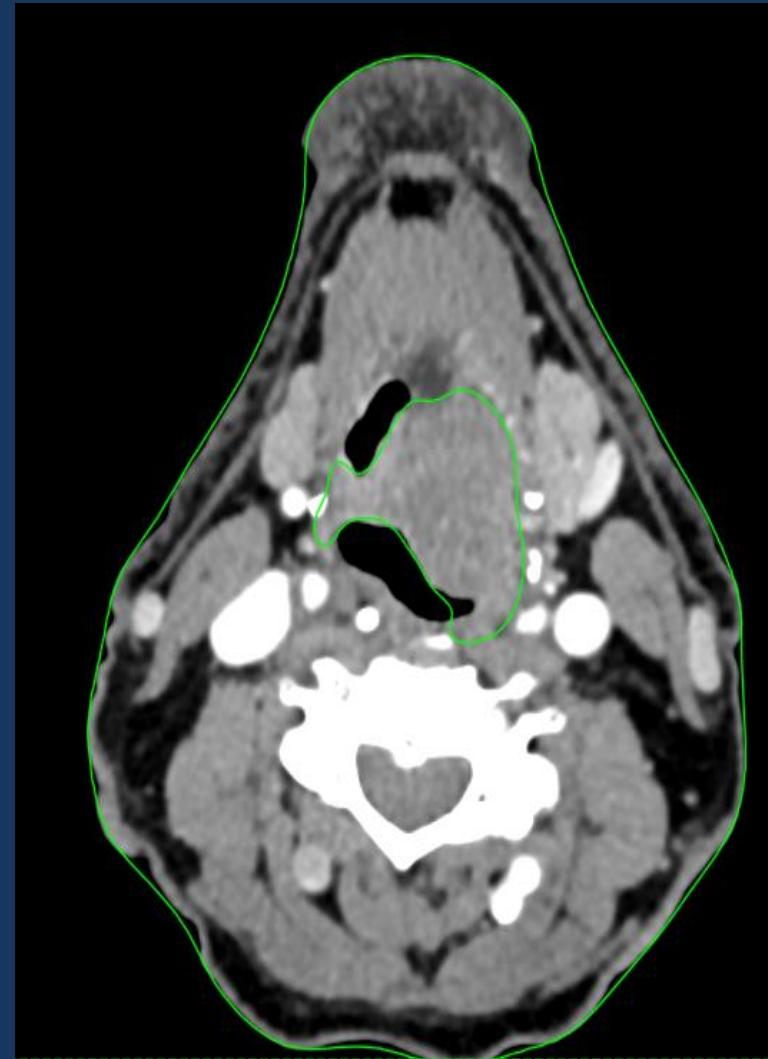
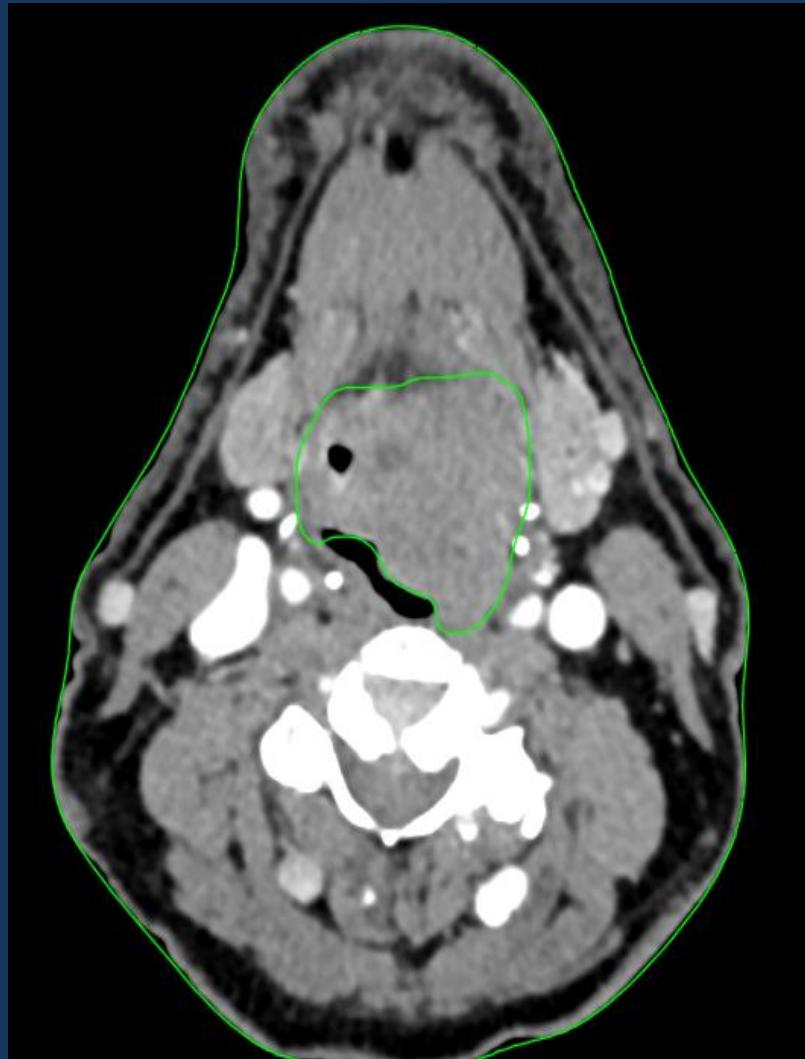
GTVp and GTVn



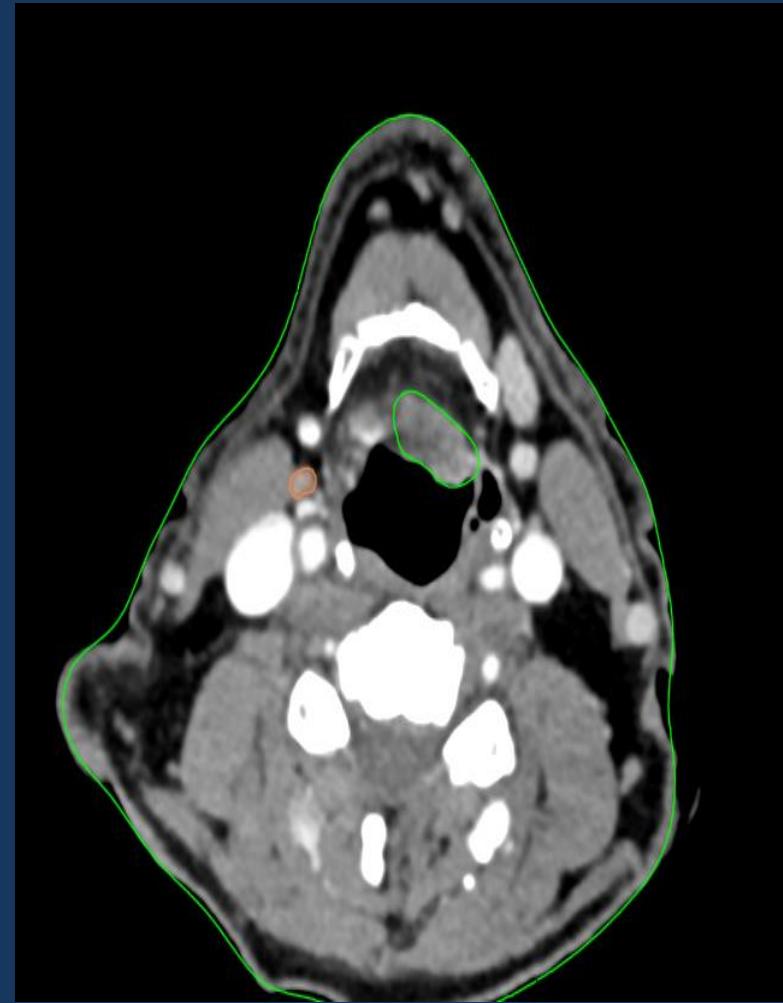
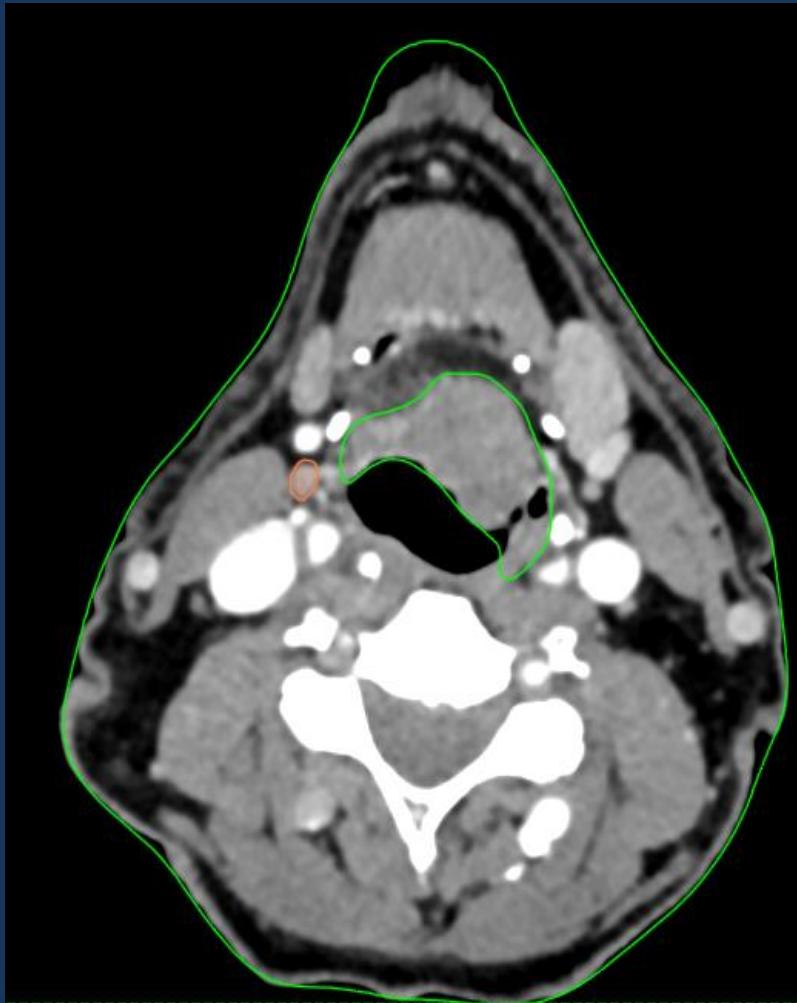
GTVp and GTVn



GTVp



GTVp and GTVn



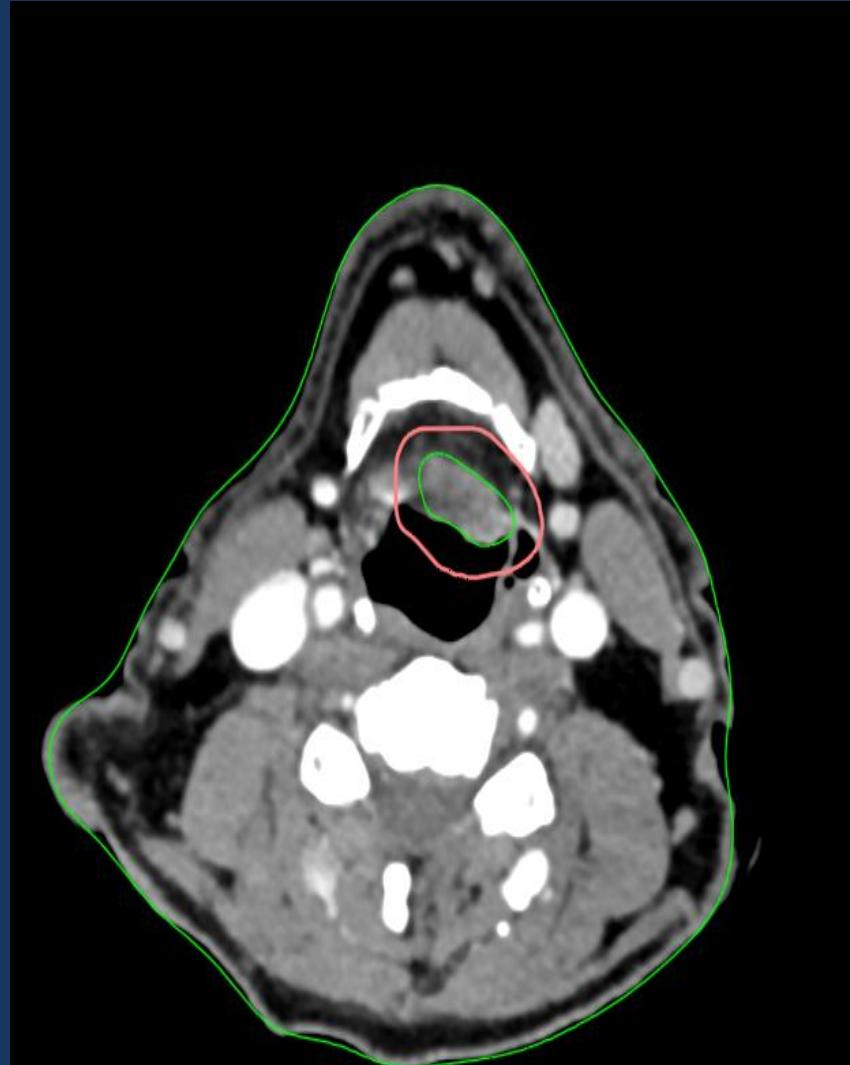
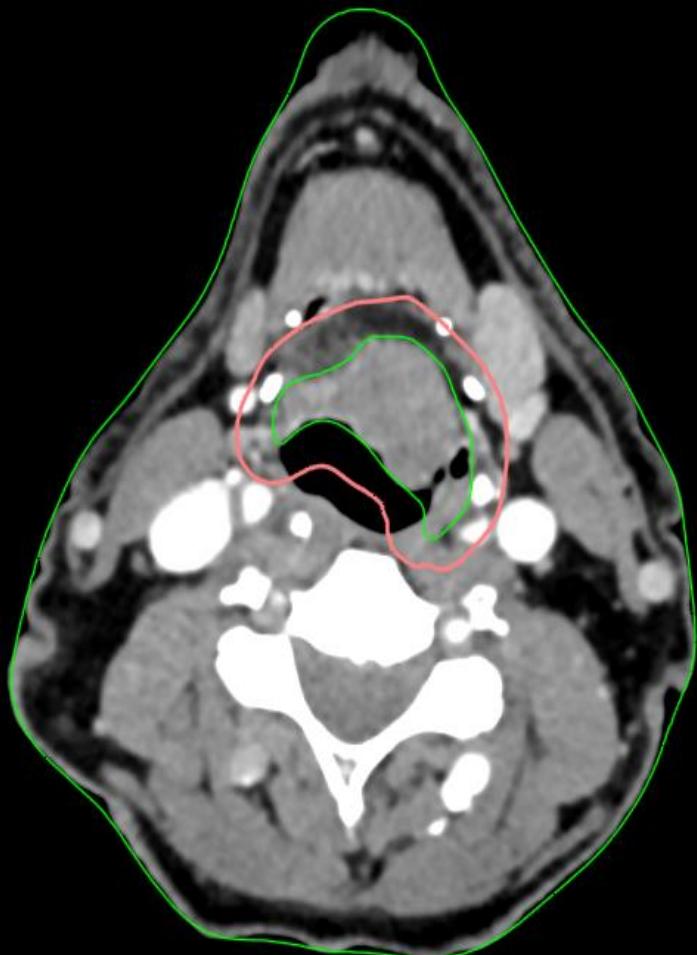
CTVp1



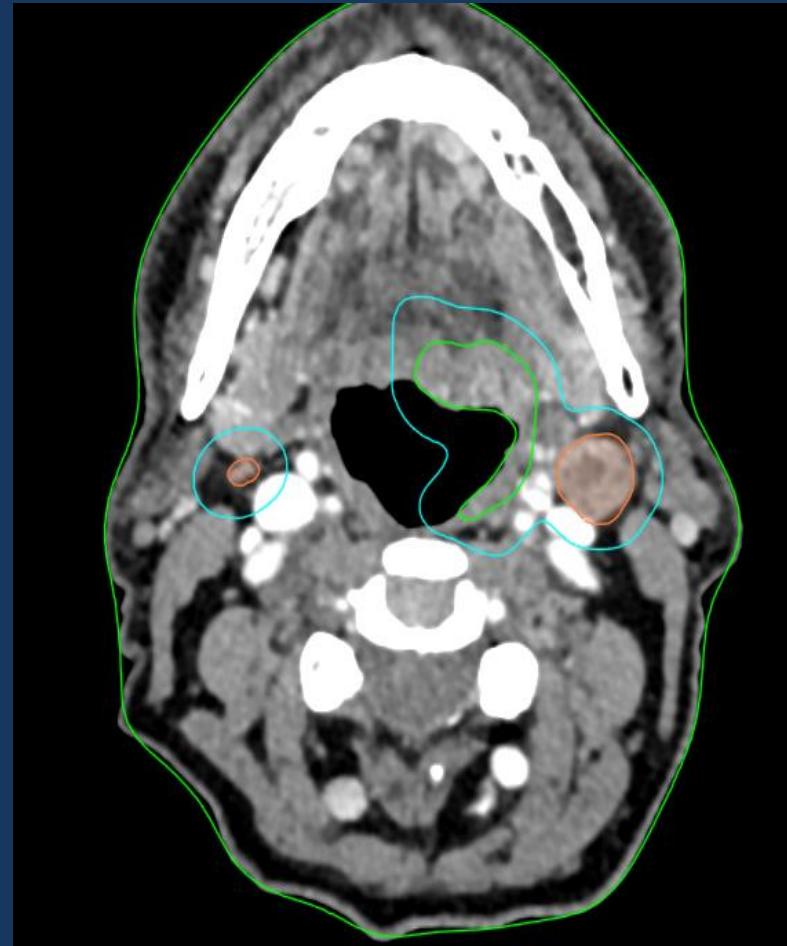
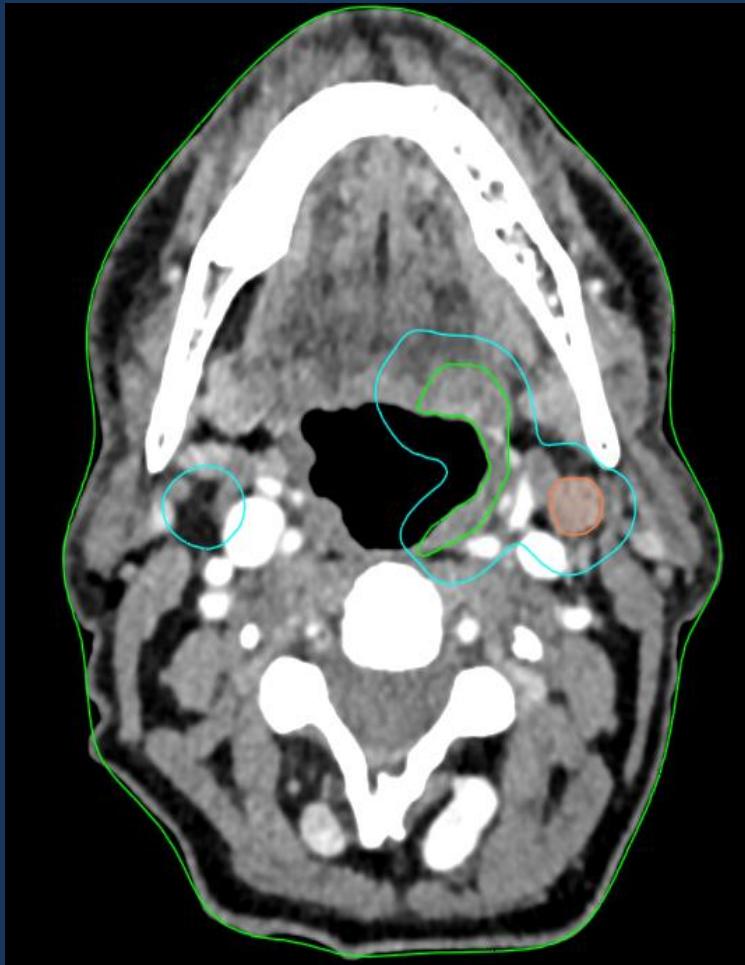
CTVp1



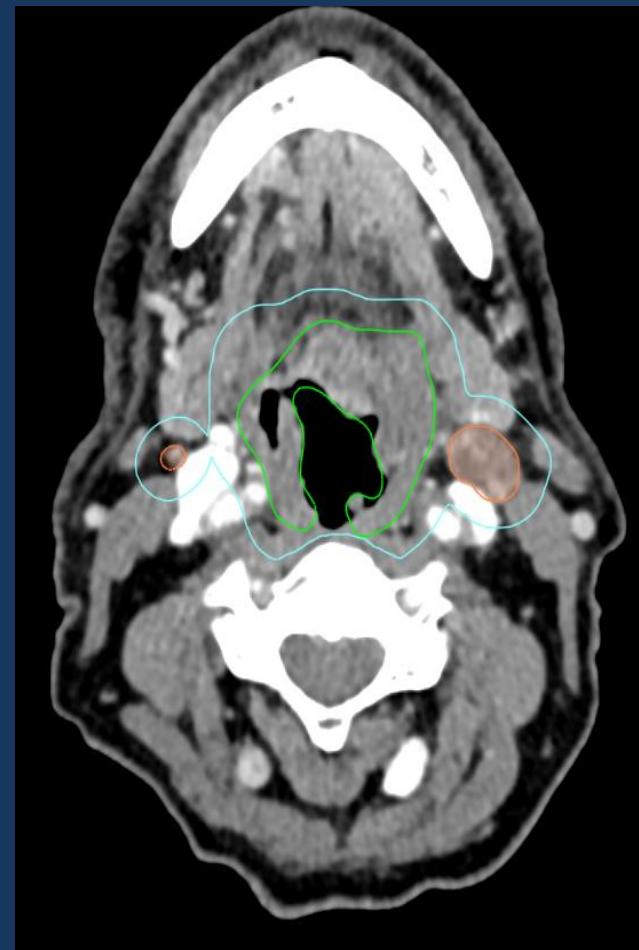
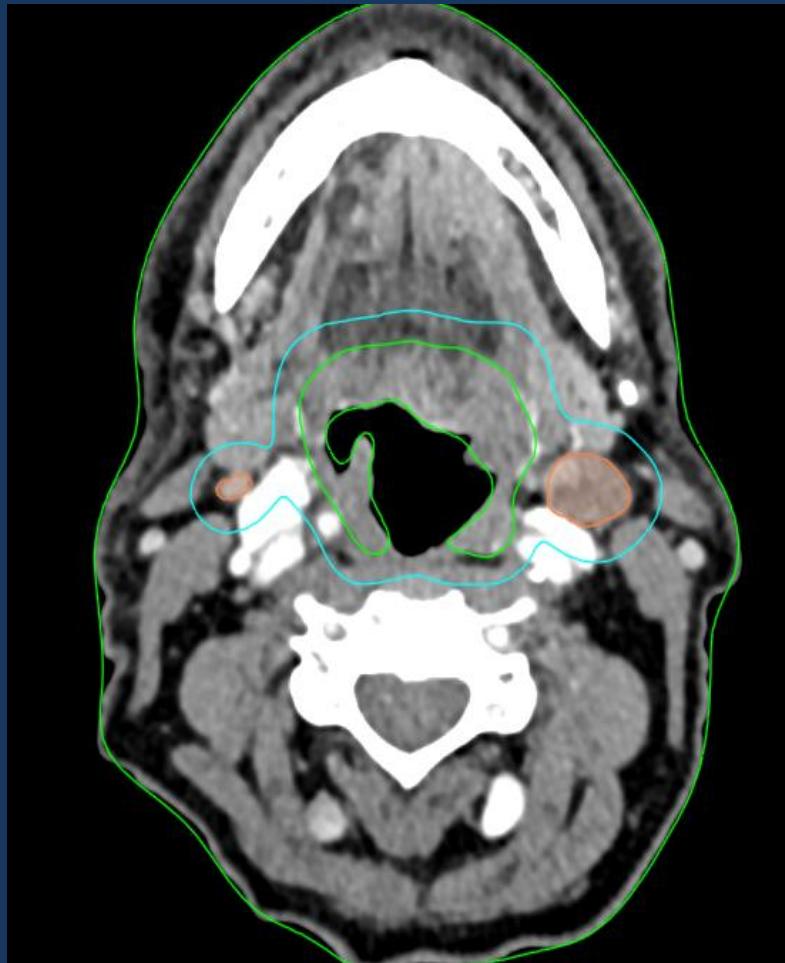
CTVp1



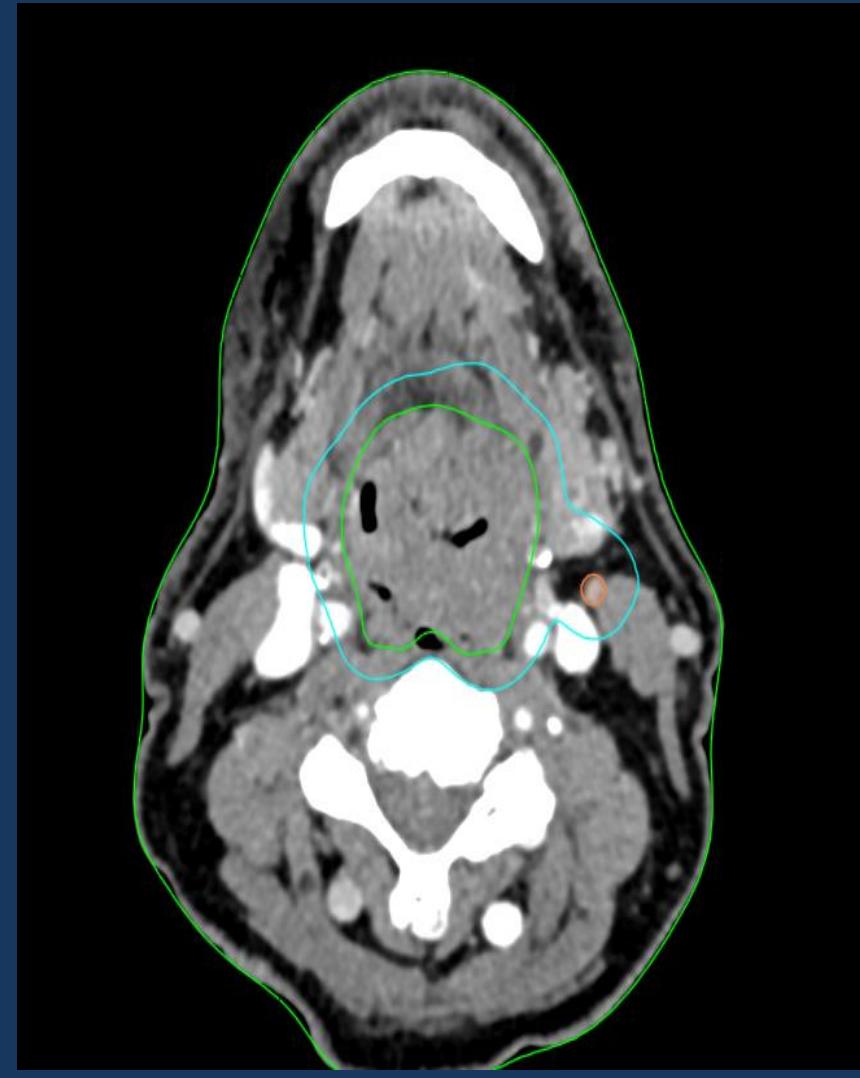
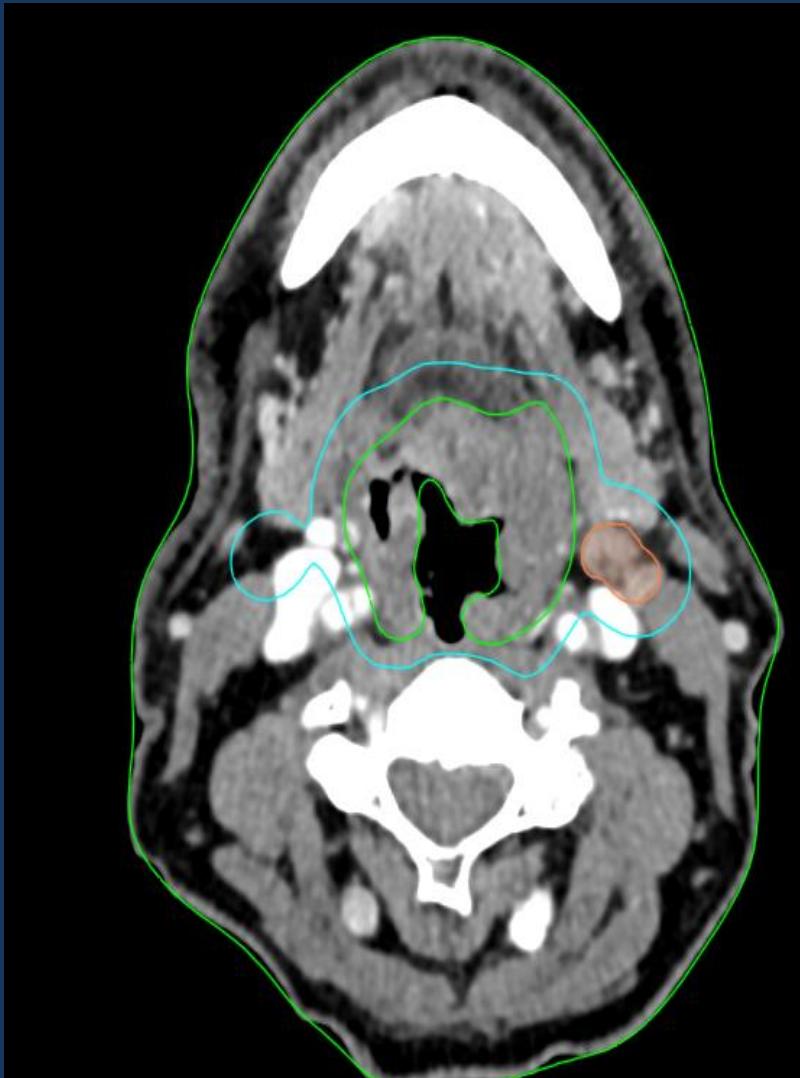
CTV66



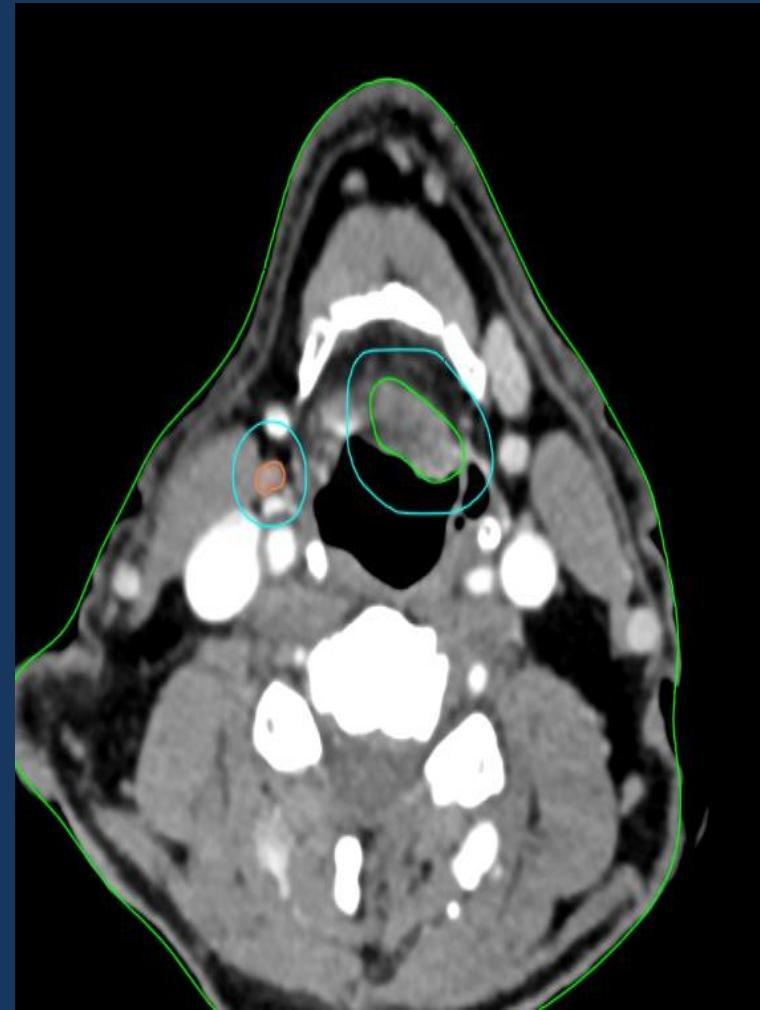
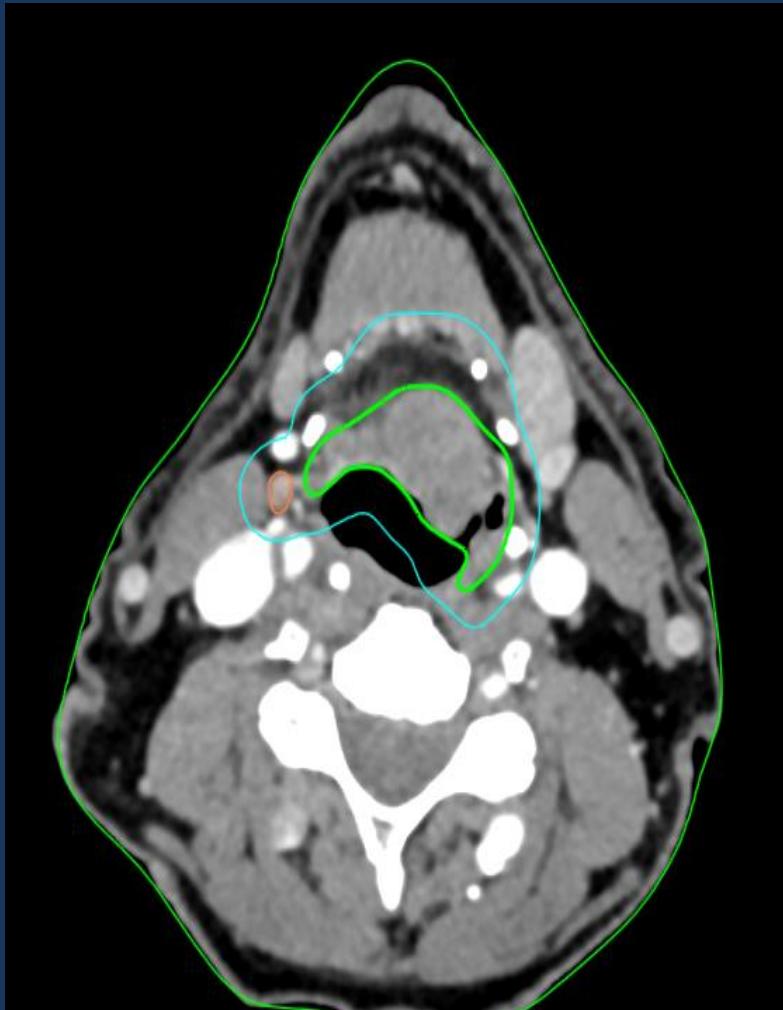
CTV66



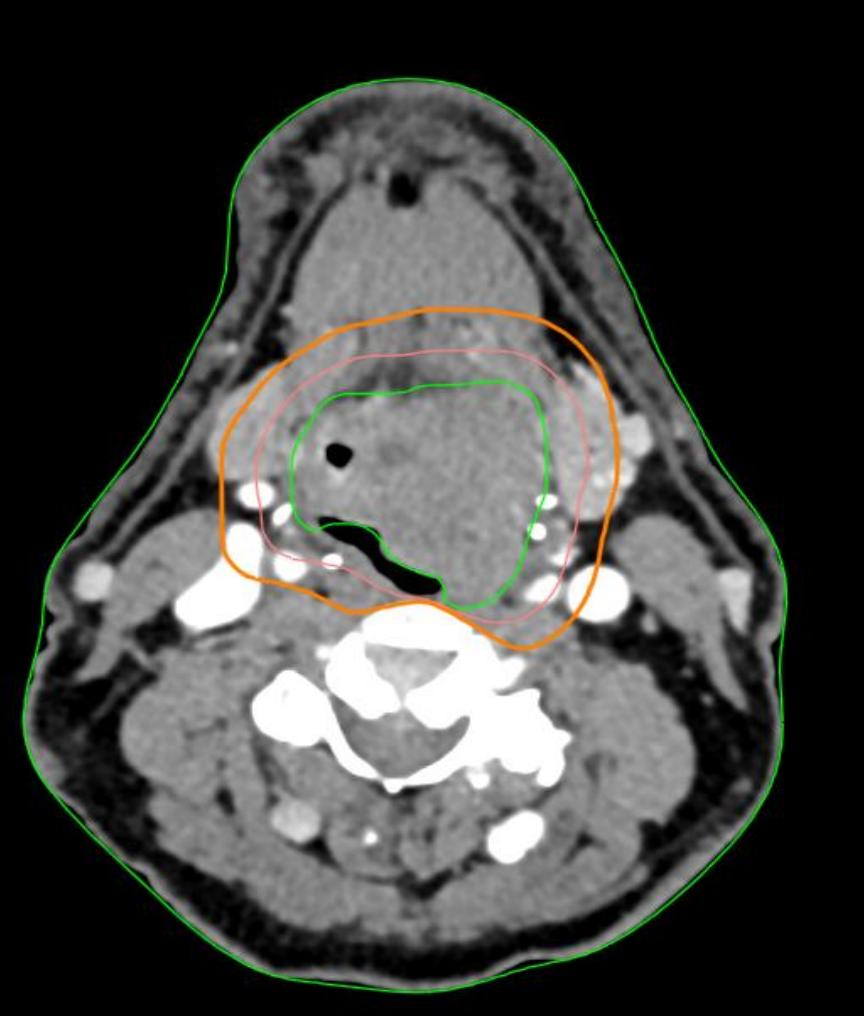
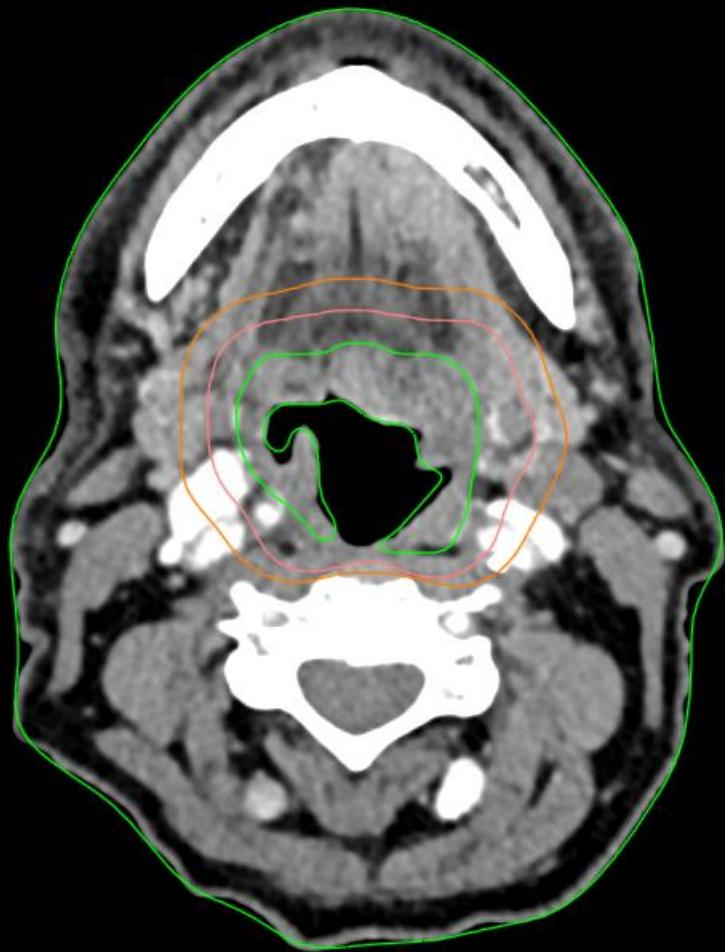
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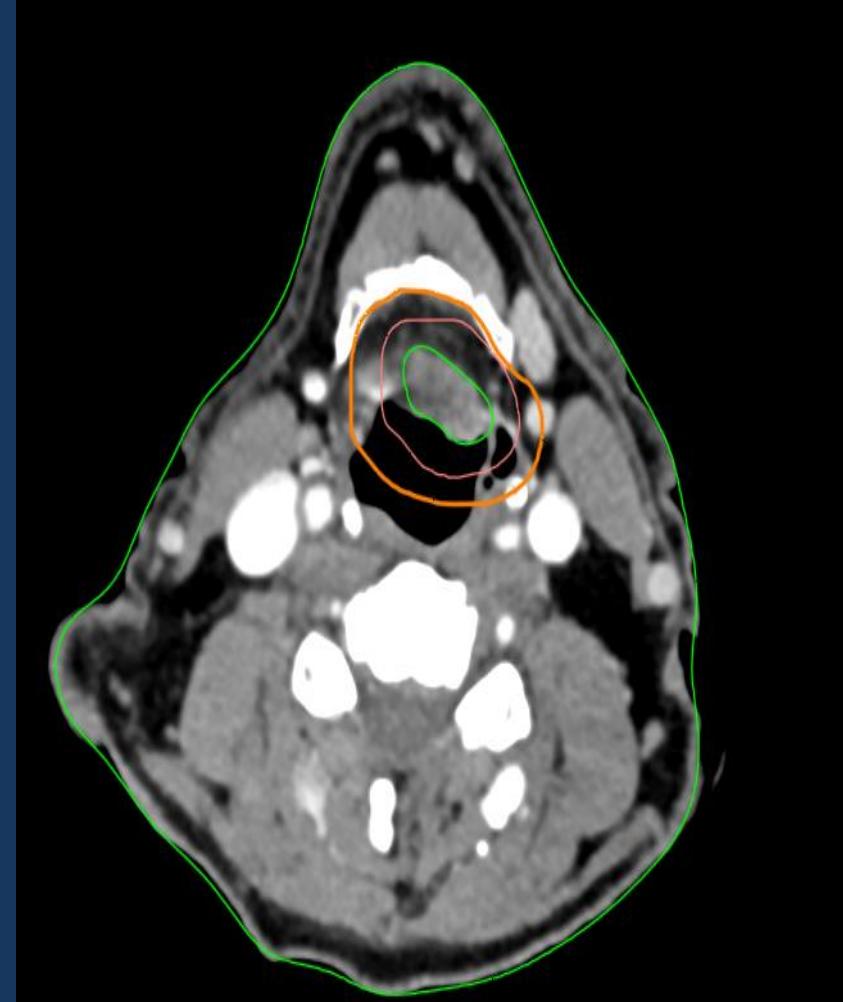
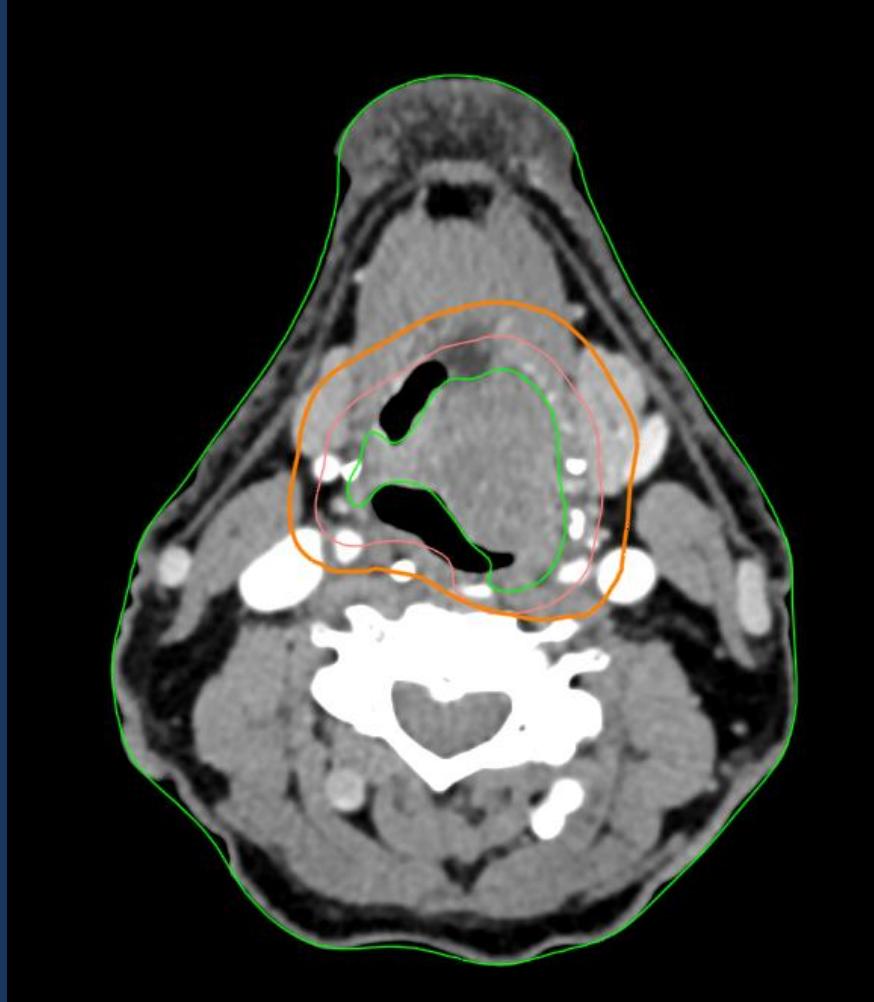
CTV66



CTVp2



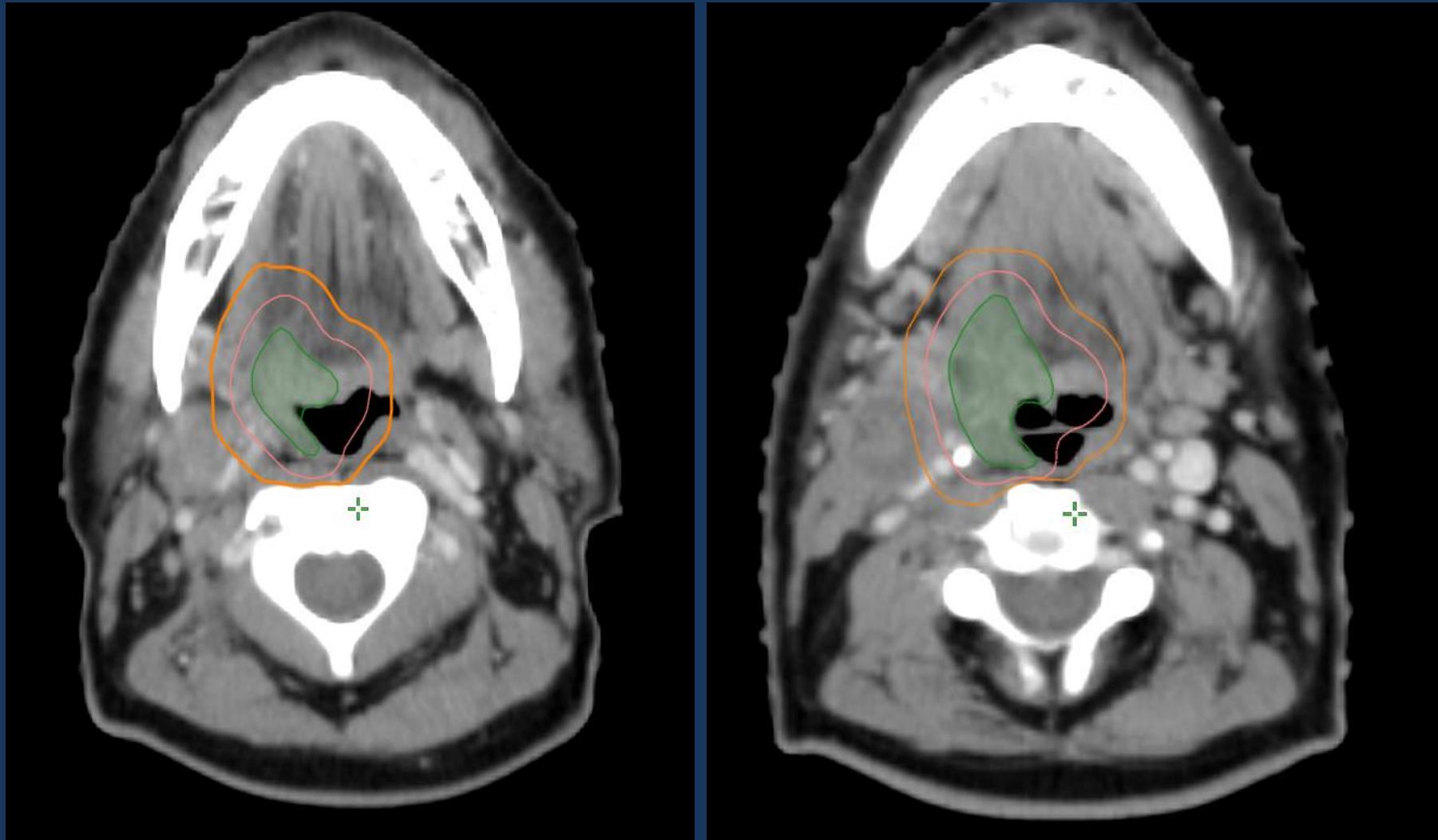
CTVp2



CTVp2



CTVp2



Ca Oropharynx – P16 Negative

Nodal Category (AJCC/UICC 8th ed.)	Levels to be included in CTV-N-LR	
	Ipsilateral Neck	Contralateral Neck ¹
N0-1 (in level II, III, or IV)	(Ib) ² , II, III, IVa ³ , +VIIa for posterior pharyngeal wall tumor	II, III, IVa, +VIIa for posterior pharyngeal wall tumor
N2a-b	Ib, II, III, IVa ³ , Va,b, +VIIa, +VIIb ⁴	II, III, IVa, +VIIa for posterior pharyngeal wall tumor
N2c	According to N category on each side of the neck	According to N category on each side of the neck
N3	Ib, II, III, IVa, Va,b, +VIIa, +VIIb ⁴	II, III, IVa, +VIIa for posterior pharyngeal wall tumor

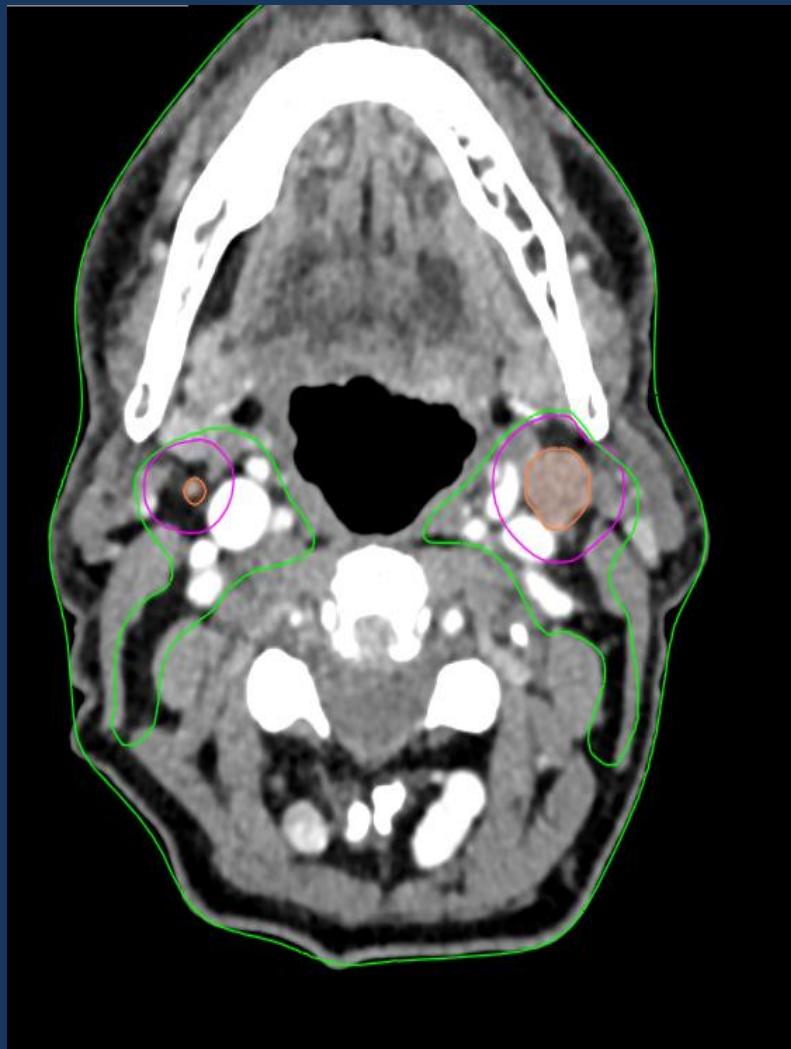
CTV n2-60Gy

Right	Left
Level II	Level II

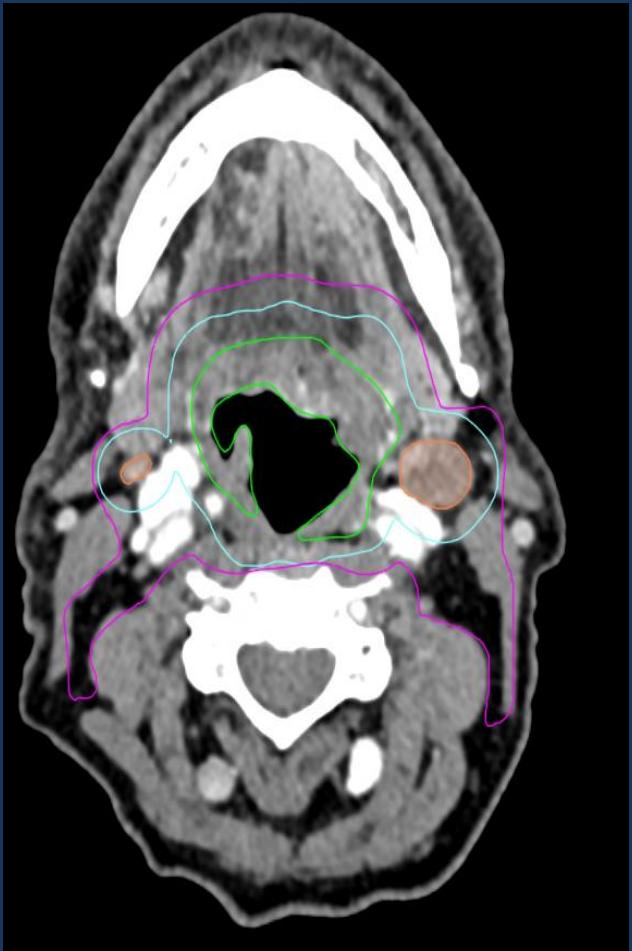
CTV n3-54 Gy

Right	Left
Level III,IV& Va	Level III,IV& Va

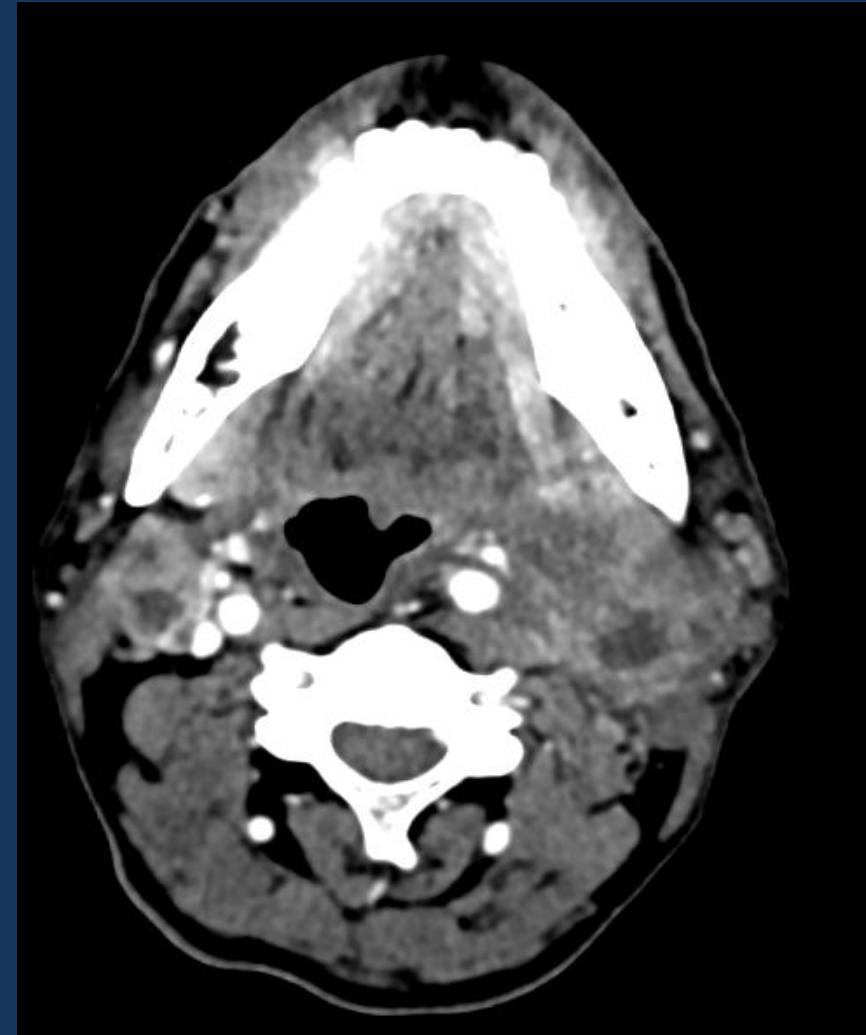
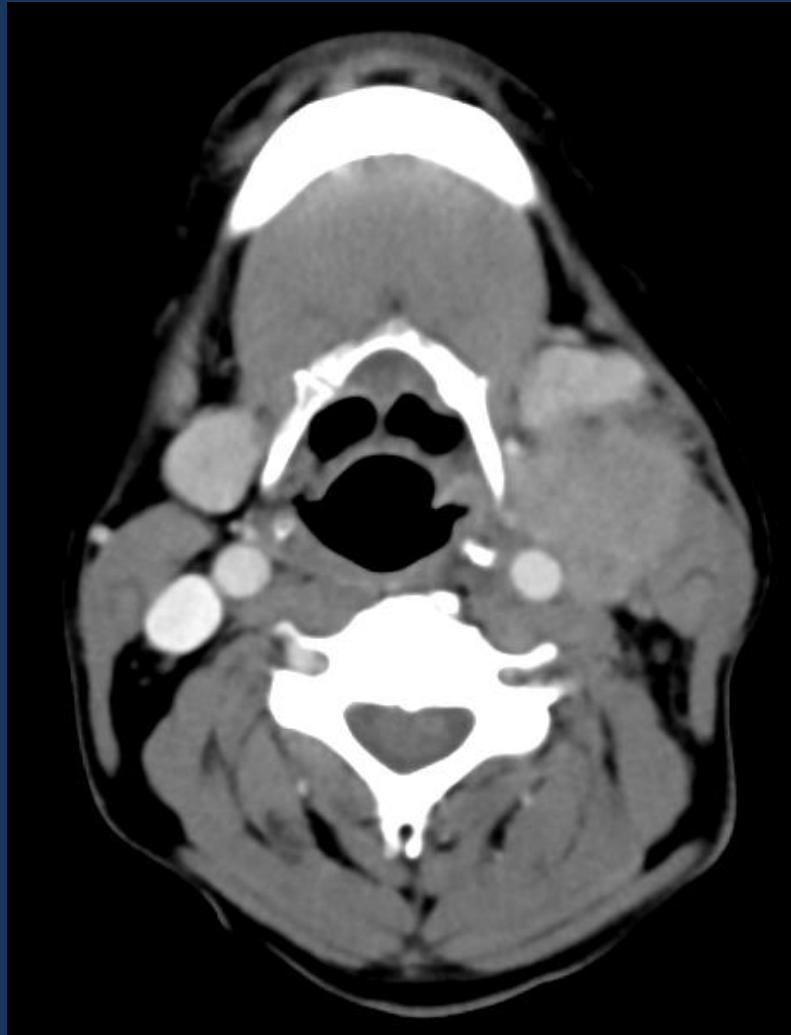
CTVn2

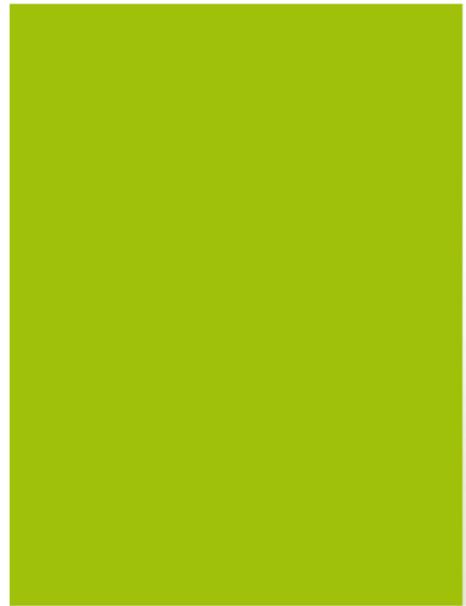


CTV 60



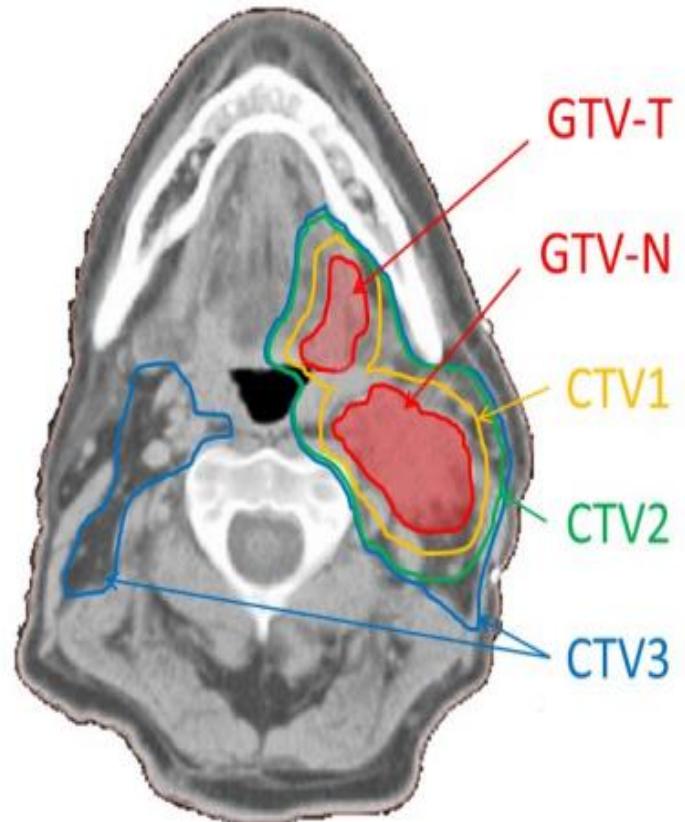
N3 node





CENTER FOR CLINICAL GUIDELINES | CANCER

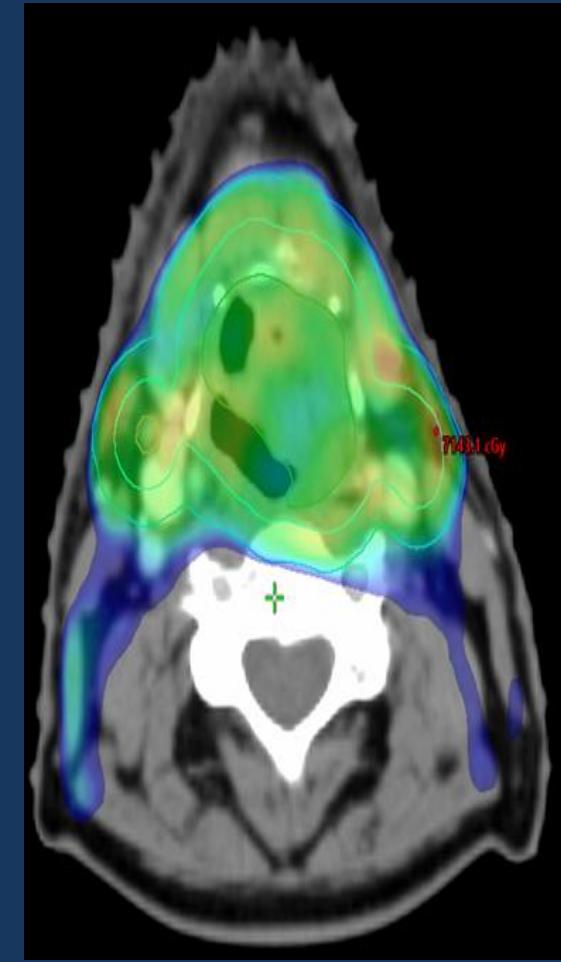
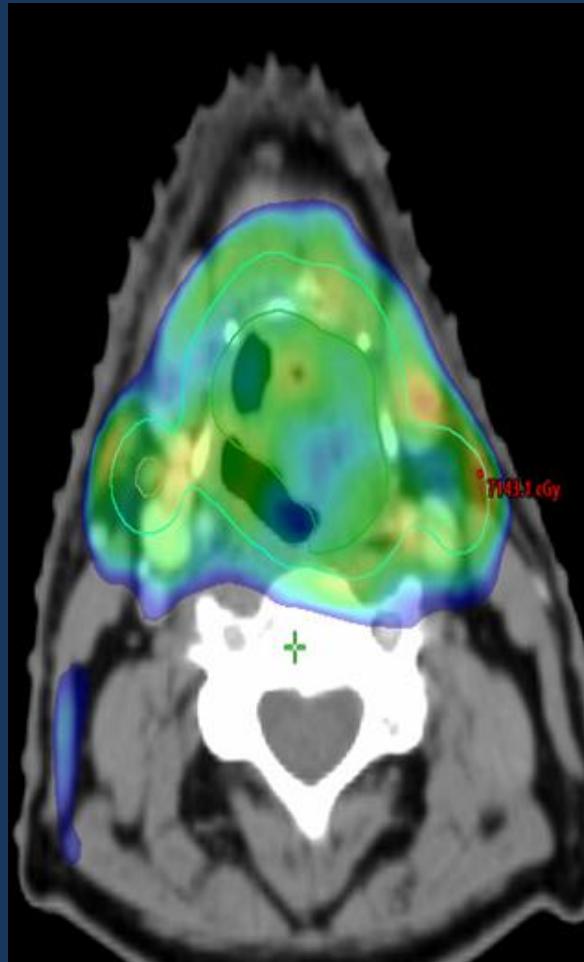
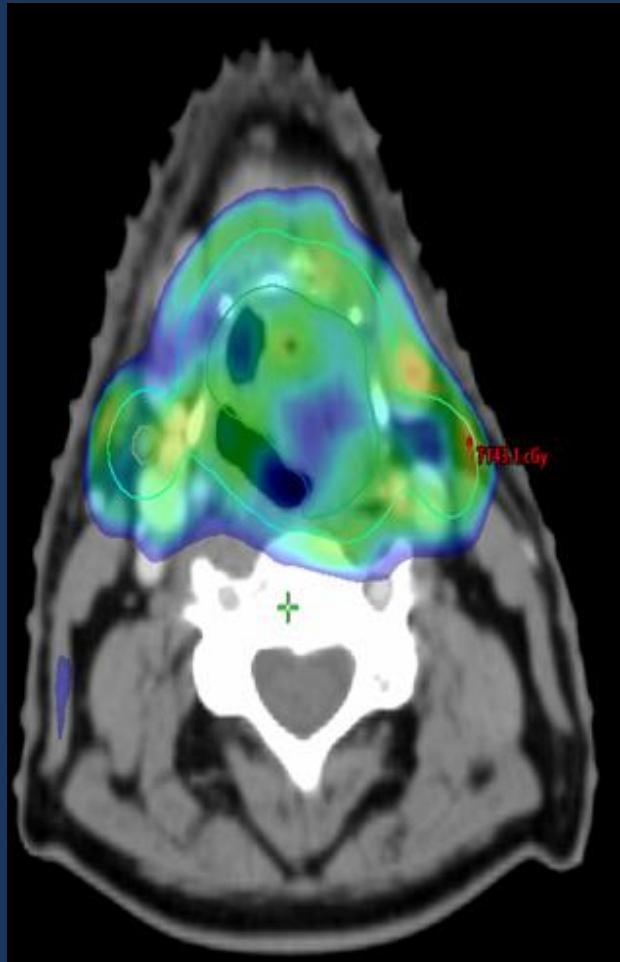
Radiotherapy Guidelines 2020
DAHANCA
Danish Head and Neck Cancer Group



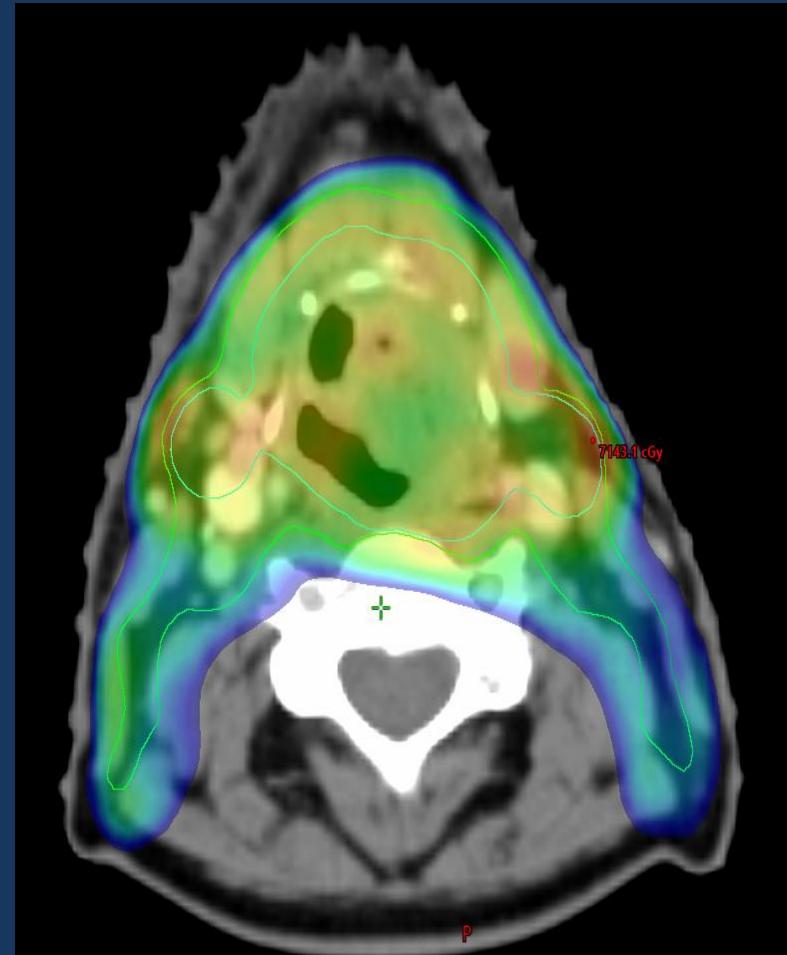
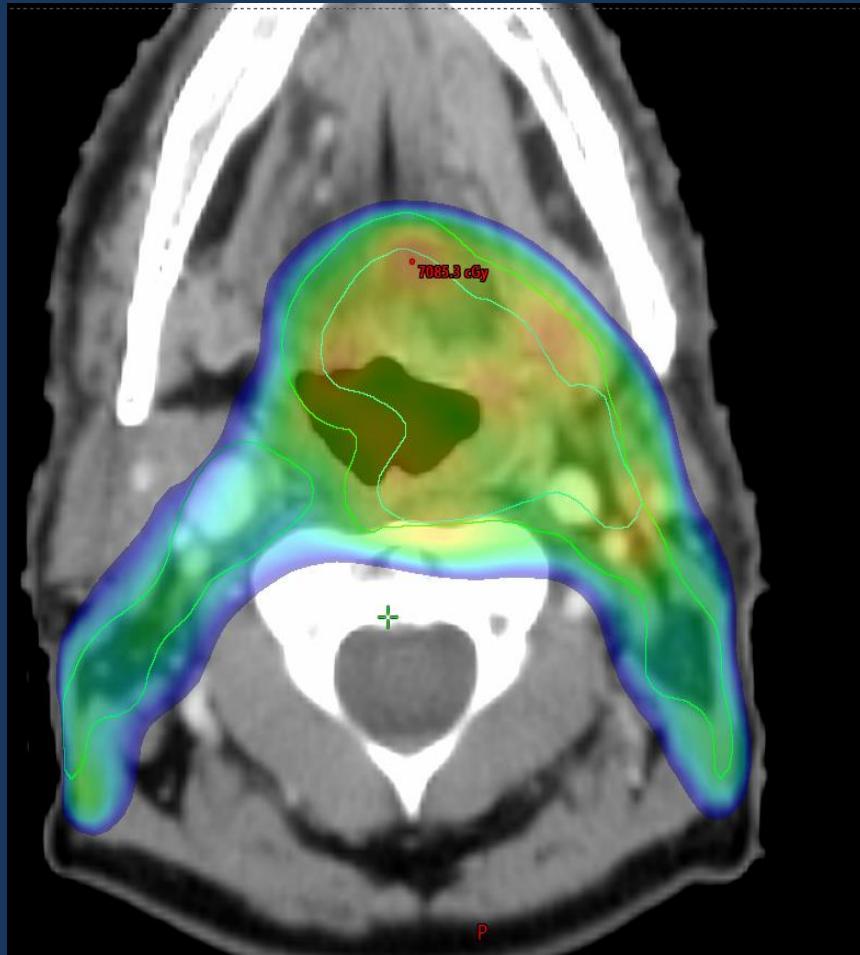
66Gy

6468cGy

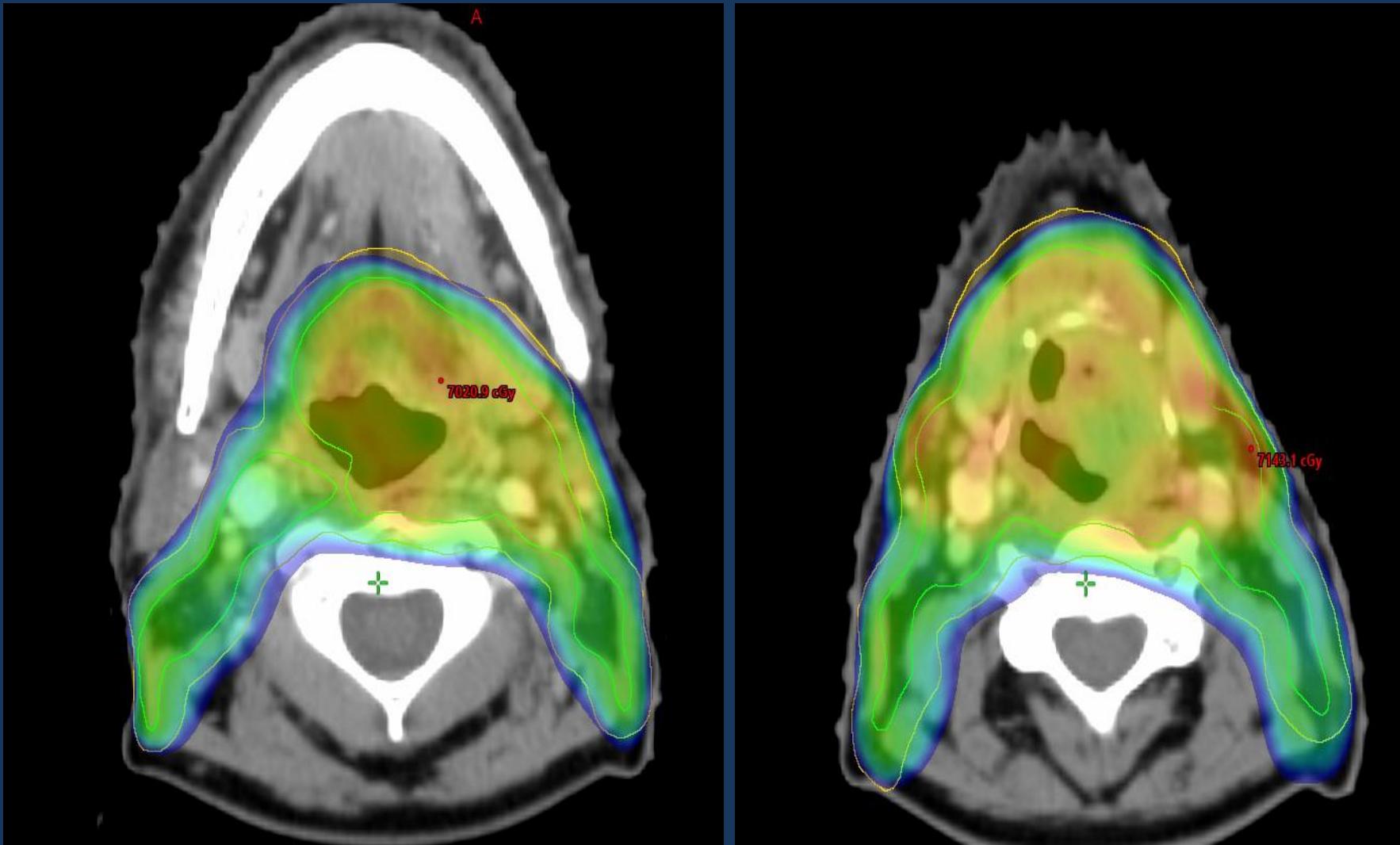
6270cGy

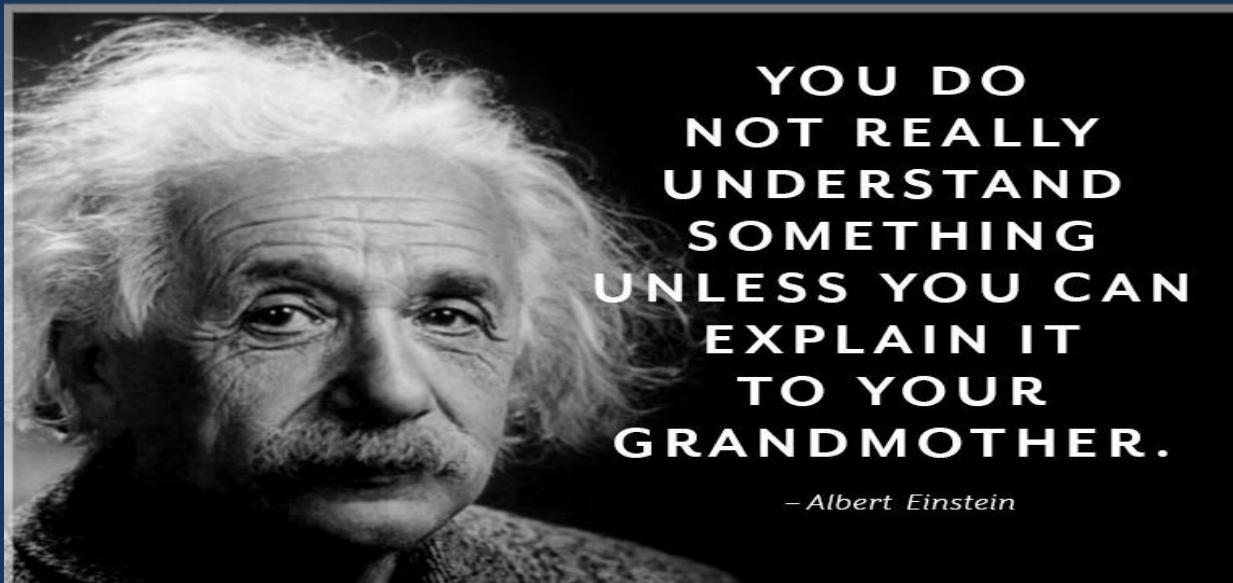


CTV60-5880cGy



CTV60-5700cGy





YOU DO
NOT REALLY
UNDERSTAND
SOMETHING
UNLESS YOU CAN
EXPLAIN IT
TO YOUR
GRANDMOTHER.

– Albert Einstein

Thank you
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