

# Pharyngeal and Laryngeal Tumors

JUH

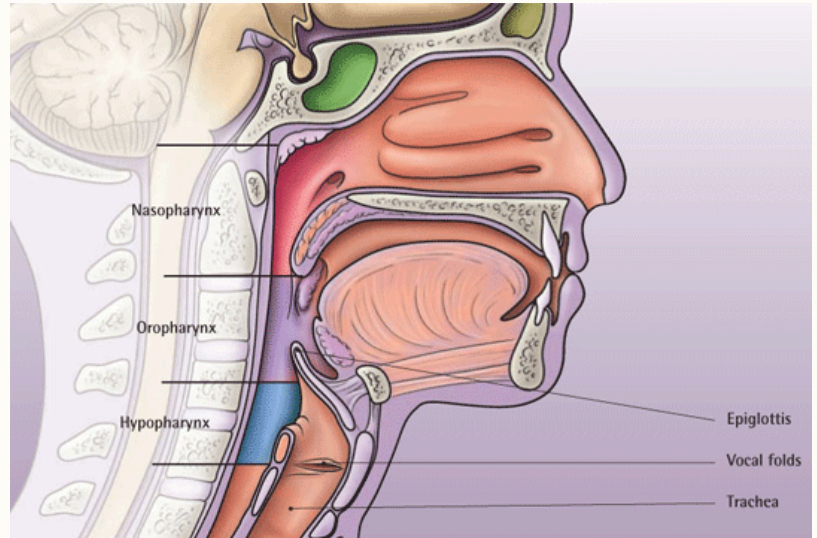
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# Pharynx

# Anatomy of the Pharynx

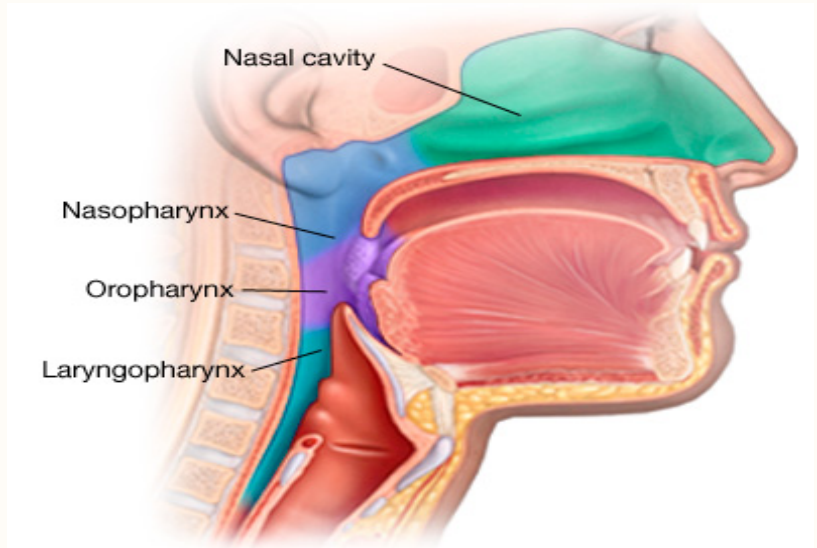
- ? Muscular tube, about 12 cm long
- ? Width: 3.5 cm at its base and narrows to 1.5 cm at pharyngo-esophageal junction
- ? Extends from the base of the skull to the cricoid cartilage at the beginning of the trachea



# Anatomy of the Pharynx

? Divisions:

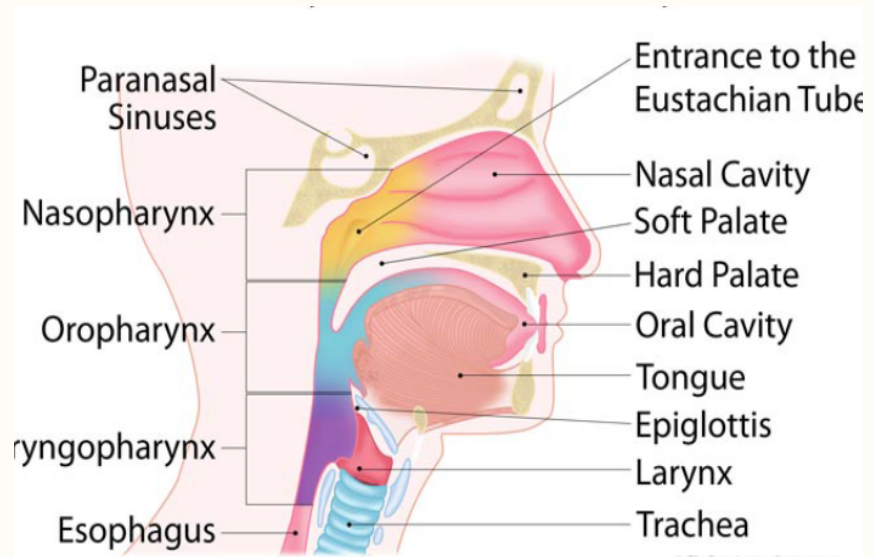
1. Nasopharynx
2. Oropharynx
3. Laryngopharynx (hypopharynx)



# Anatomy of the Pharynx

Communicates with seven cavities:

- Two nasal cavities
- Two tympanic cavities
- Mouth
- Larynx
- Esophagus

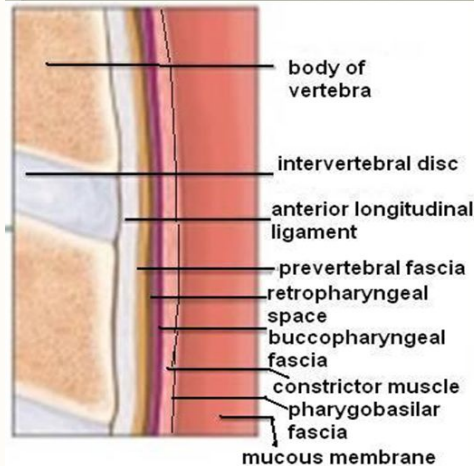


# Anatomy of the Pharynx

? Structure of the pharyngeal wall:

1. Mucous membrane
2. Pharyngeal aponeurosis (pharyngobasilar fascia)
3. Muscular coat
4. Buccopharyngeal fascia

## Pharyngeal Wall Histology



# Anatomy of the Pharynx

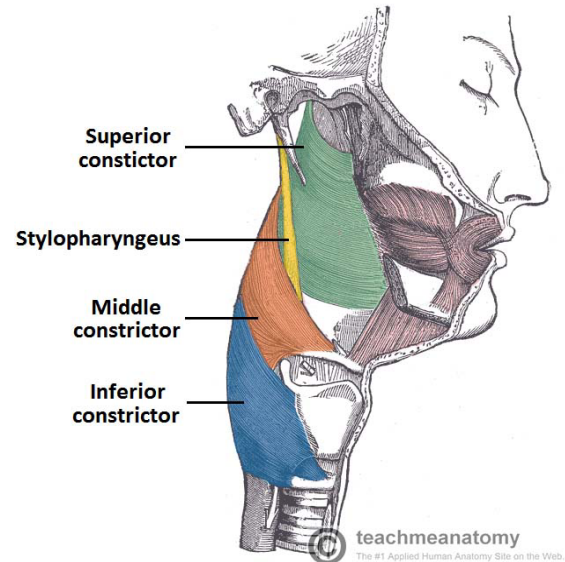
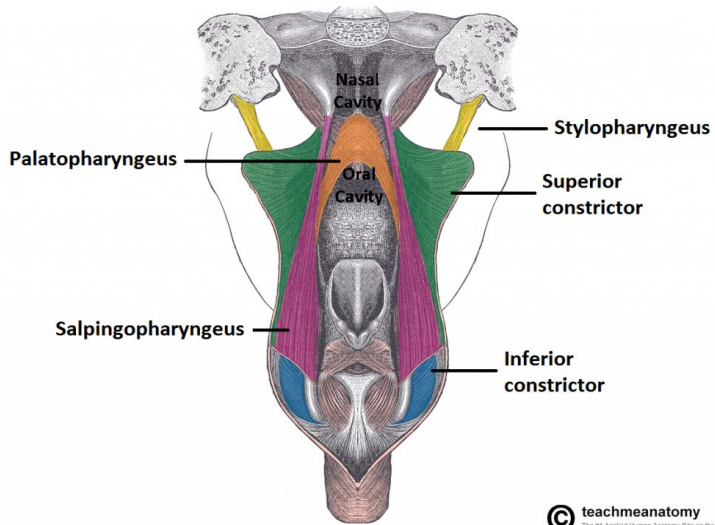
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## – Muscular Coat:

**Two** layers of muscles with **three** muscles in each layer:

- (a) Internal layer (Longitudinal muscles): contains stylopharyngeus, salpingopharyngeus and palatopharyngeus muscles.
  
- (b) External layer (Circular): contains superior, middle and inferior constrictor muscles.

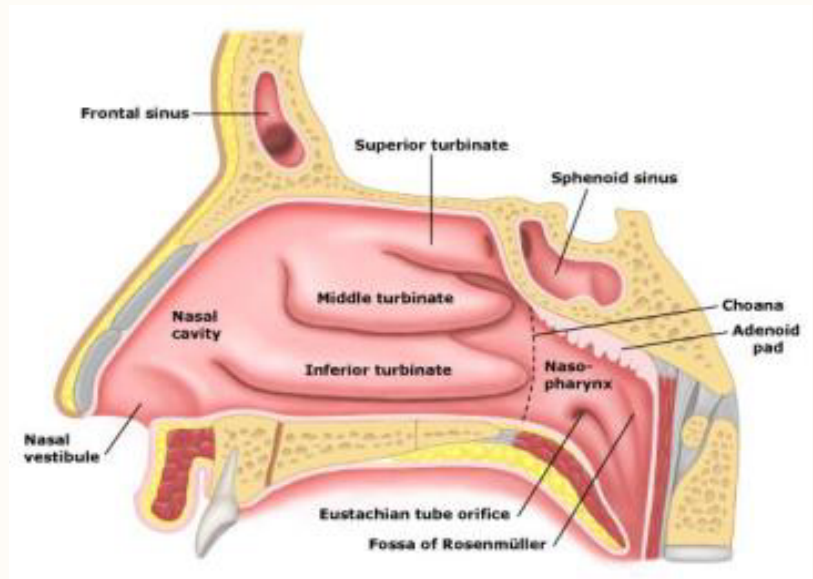
# Anatomy of the Pharynx





# 1- Nasopharynx

- Roof: Occiput and sphenoid
- Floor: Soft palate
- Posterior Wall: Arch of the atlas vertebra
- Anterior Wall: Posterior nasal choanae and posterior border of the nasal septum
- Lateral Wall: Openings of Eustachian tubes



# Nasopharyngeal Angiofibroma



Figura 8. Peça cirúrgica.



Figura 6. Nódulo recidivado no mesmo local anterior.

# Nasopharyngeal Angiofibroma

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Features:

- ❓ A benign tumor but locally invasive and destroys the adjacent structures.
- ❓ Made up of vascular and fibrous tissues: the ratio of the two components may vary.
- ❓ Almost exclusively in males in the age group of 10-20 years.

# Nasopharyngeal Angiofibroma

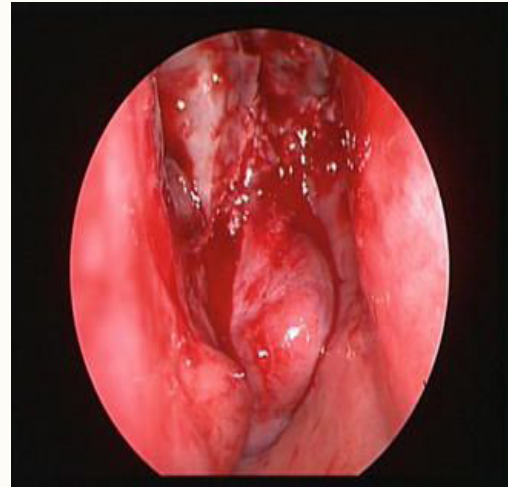
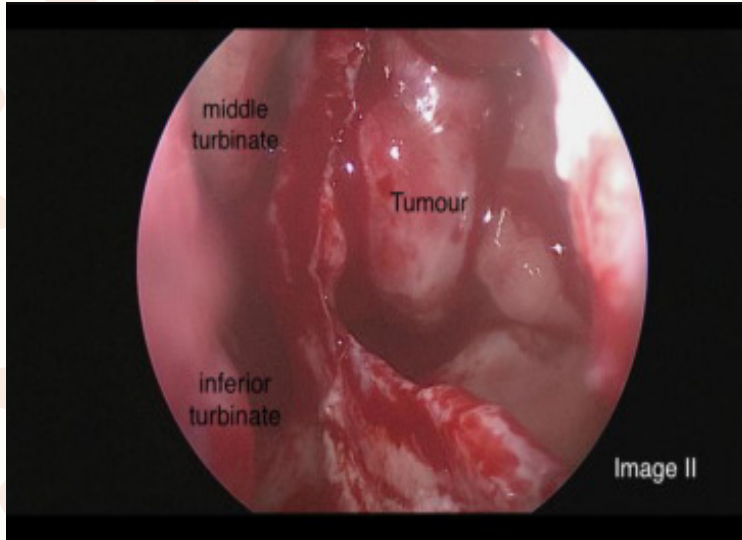
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- Features:

- ❓ The **most common presentation** is **recurrent epistaxis**. Patients may be markedly anemic due to repeated blood loss.
- ❓ Progressive nasal obstruction due to mass in the postnasal space.
- ❓ **Conductive hearing loss and serous otitis media due to obstruction of Eustachian tube.**
- ❓ Other clinical features like **broadening of nasal bridge, swelling of cheek...**

# Nasopharyngeal Angiofibroma

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# Staging

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Staging →

Stage	Extension
T1	To the nose
T2	Para pharyngeal space
T3	Orbit/sinuses
T4	Intra-cranial extension

# Nasopharyngeal Angiofibroma

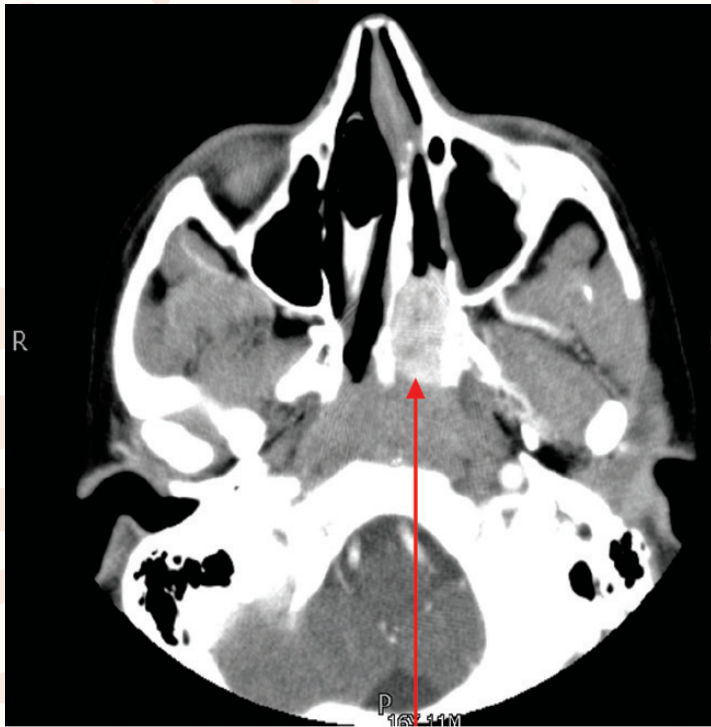
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## - Investigations:

*Angio*

[-] CT scan of the head with contrast: (the investigation of choice):

- - It shows the extent of tumor, bony destruction or displacements.
- - Anterior bowing of the posterior wall of maxillary sinus (the antral sign).



**JNA: Juvenile Nasopharyngeal Angiofibroma.**  
**CT: Computed tomography.**

**Figure-1:** Stage I JNA; axial post-contrast CT showing angiofibroma in the nasal cavity.



Antral sign



# Nasopharyngeal Angiofibroma

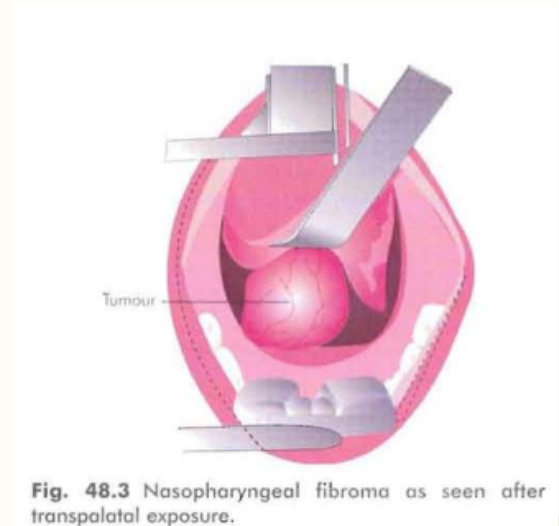
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## - Investigations:

- ? X-rays of paranasal sinuses and base of skull may show displacement of nasal septum, opacification of sinuses, erosions into adjacent bones
- ? NO BIOPSY → Life threatening bleeding
- ? MRI: When soft tissue extensions are present intracranially, in the infratemporal fossa or into the orbit.
- ? Carotid angiography: shows extension of the tumor, its vascularity and feeding vessels. It is done when embolization is planned before operation.

# Nasopharyngeal Angiofibroma

- Treatment:
- Embolization followed by surgical excision (many approaches)
- Reducing vascularity pre-op is important because blood loss can reach 2 liters



# Nasopharyngeal Angiofibroma

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– Treatment:

– Radiotherapy:

? If associated with intra-cranial extension

? In case of recurrence

Hormonal: primary or adjuvant (Diethylstilbestrol and flutamide)

Chemotherapy: **recurrent** and **residual** lesions; doxorubicin, vincristine and dacarbazine in combination

# Other benign nasopharyngeal tumors

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- 1. **Teratomas:** Congenital tumors, seen at birth. Six times more common in females. Various types include, a dermoid with skin appendages, also called a hairy polyp, true teratoma having elements of all the three germ layers.
- 2. **Pleomorphic adenoma.**
- 3. **Chordoma:** Derived from the notochord.
- 4. **Hamartoma:** Malformed normal tissue, e.g. haemangioma.
- 5. **Choristoma:** Mass of normal tissues at an abnormal site.
- 6. **Paraganglioma**

# Nasopharyngeal Carcinoma (NPC)

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– Features:

- Age group: mostly seen in the fifth to seventh decade
- Males 3 times more prone than females

# Nasopharyngeal Carcinoma (NPC)

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- Risk factors:

☐ Genetic (higher in Chinese)

☐ EBV Infection

☐ Environmental: Air pollution, alcohol, smoking, nitrosamines from dry salted fish, smoke from burning of wood

# Nasopharyngeal Carcinoma (NPC)

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- Origin:

- ❓ The most common site of origin is fossa of Rosenmüller in the lateral wall of nasopharynx.
- ❓ It can spread into the cranium through foramen lacerum and cause involvement of various cranial nerves.
- ❓ Lymph node involvement is common because of rich lymphatic network in the nasopharynx.

# Nasopharyngeal Carcinoma (NPC)

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- Pathology:

? 85% Squamous cell carcinoma

? 10% Lymphoma

? 5% Rhabdomyosarcoma



# Nasopharyngeal Carcinoma (NPC)

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WHO classification of NPC:

1. Non-keratinized: early mets but responsive to chemotherapy
2. Keratinized : late mets and non-responsive to chemotherapy
3. Lympho-epithelioma : associated with EBV and poorly differentiated

# Nasopharyngeal Carcinoma (NPC)

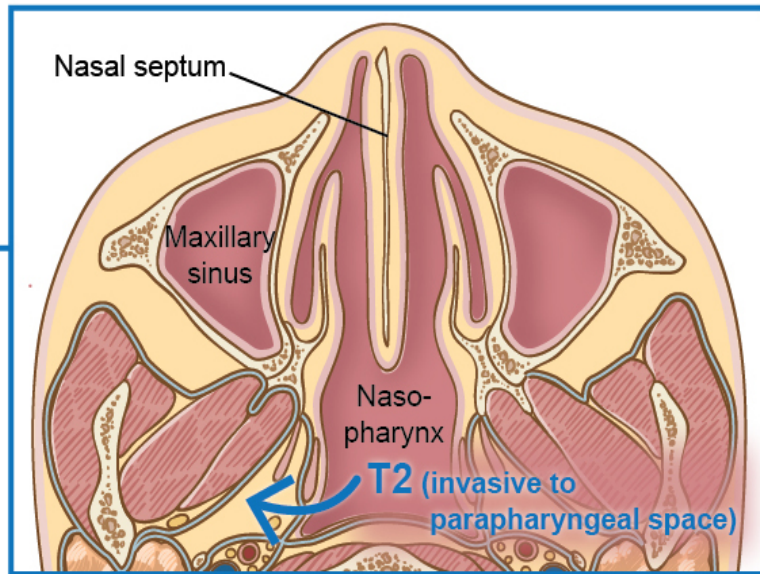
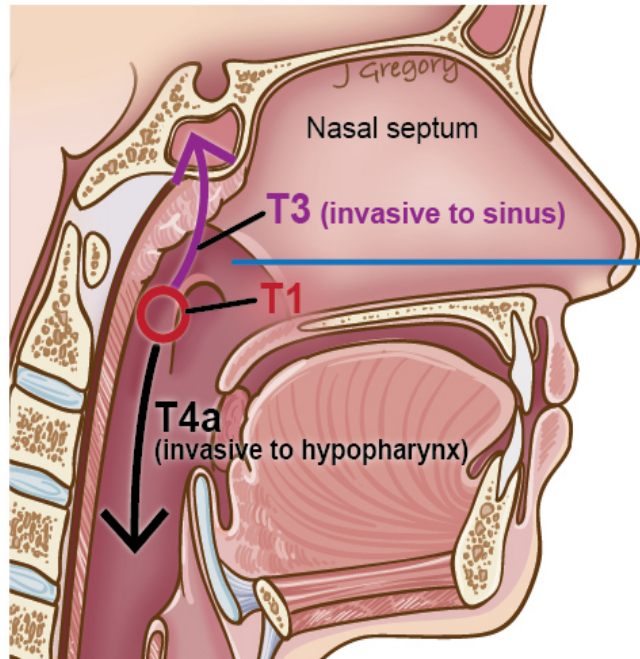
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– Signs and symptoms:

1. Nasal: Obstruction, discharge, nasal speech and epistaxis
2. Otic: Earache, hearing loss, tinnitus and dizziness. Most common presentation is otitis media with effusion.
3. Ophthalmoneurologic: Cranial nerve palsies (CN VI is the most common)
4. Cervical nodal metastasis: Very common, this may be the **only** manifestation
5. Distant metastasis: To bone, lung, liver...
6. Other: Weight loss, headache ...

## TNM grading of nasopharyngeal carcinoma:-

Category	Description
T	Primary tumor
T1	Tumor confined to nasopharynx, oropharynx, or nasal fossa
T2	Tumor extends to parapharyngeal space
T3	Tumor invades bony structures of skull base or paranasal sinuses
T4	Tumor with intracranial extension or involvement of cranial nerves, masticator space, orbit, or hypopharynx
N	Regional lymph nodes
N1	Retropharyngeal lymph node either unilateral or bilateral
N2	Unilateral metastasis in lymph nodes, $\leq 6$ cm in greatest dimension, above supraclavicular fossa
N3	Bilateral metastasis in lymph nodes, $\leq 6$ cm in greatest dimension, above supraclavicular fossa
N4	Metastasis in lymph nodes $> 6$ cm in dimension or in the supraclavicular fossa
M	Distant metastasis
M0	No distant metastasis
M1	Distant metastasis



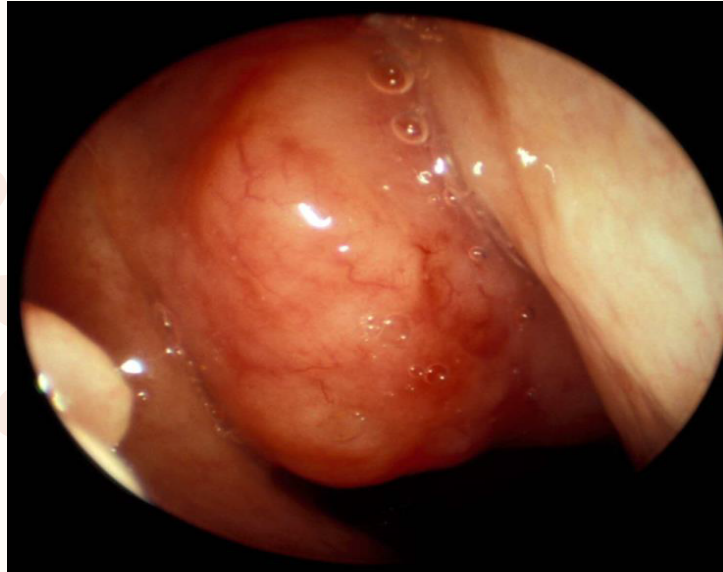
# Nasopharyngeal Carcinoma (NPC)

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- **Investigations:**
- Examination of postnasal space by nasopharyngoscope is the most important
- Skull X-ray or CT: demonstrate erosion of bone at the base of skull and the extent of tumor
- MRI: for intracranial extension
- Biopsy is essential to show the exact histology of the malignancy.

# Nasopharyngeal Carcinoma(NPC)

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# Nasopharyngeal Carcinoma (NPC)

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- Treatment:

- ? Radiotherapy is the treatment of choice with or without chemotherapy
- ? Unresectable at diagnosis because of their location which is why the role of the surgery in NPC is limited to biopsy.
- ? Radical neck dissection is required for persistent nodes when primary site has been controlled.

# Lymphoepithelioma

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- ? Poorly differentiated
- ? Characterized by prominent infiltration of lymphocytes in the area involved
- ? It has a high tendency to metastasize
- ? Responsive to radiotherapy
- ? Most cases are associated with Epstein-Barr virus infection.



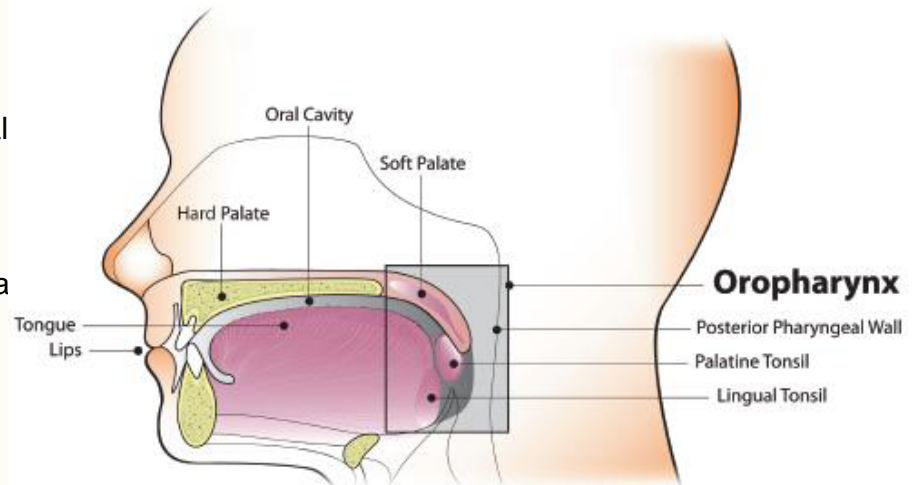
# Other malignant nasopharyngeal tumors

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1. Lymphomas: Non-Hodgkin's type is more common than Hodgkin's. Almost all are B-cell type.
2. Rhabdomyosarcoma: Commonly seen in Children.
3. Plasmacytoma: It may be solitary or part of generalized multiple myelomatosis.
4. Chordoma (from remnant of notochord).
5. Adenoid cystic carcinoma (from minor salivary glands).
6. Melanoma (rare).

# Oropharynx

- **Roof:** Soft palate
- **Posterior Wall:** 2<sup>nd</sup> and 3<sup>rd</sup> cervical vertebrae
- **Anterior Wall:** Tongue base, lingual tonsils and valleculae
- **Lateral Wall:** Palatine tonsils (+Ant&Post Pillars)



# Benign oropharyngeal tumors

Far less common than the malignant

## Papilloma :

- ❑ It arises from the tonsil, soft palate or pillars.
- ❑ Often asymptomatic, it may be discovered accidentally by the patient or the physician.
- ❑ When large, it causes local irritation in the throat.
- ❑ Treatment is surgical excision.



# Benign oropharyngeal tumors

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## Hemangioma:

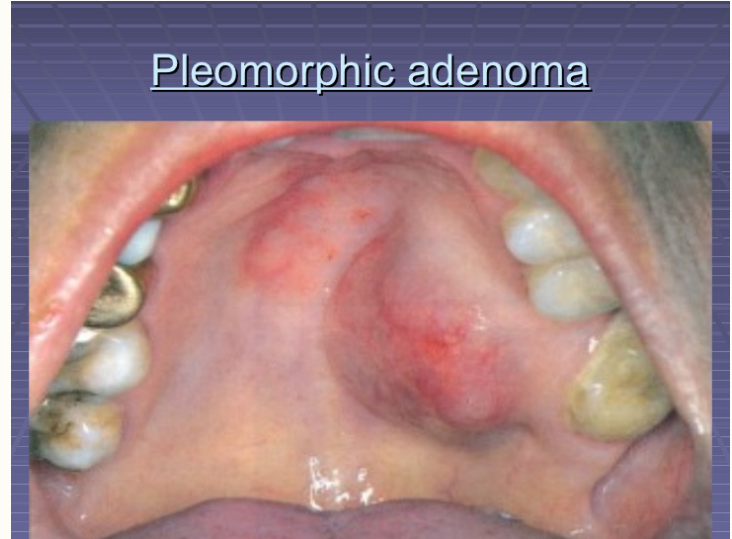
- ❓ It may be of capillary or cavernous type.
- ❓ It is treated only if it is increasing in size or giving symptoms of bleeding and dysphagia.
- ❓ Treatment is diathermy coagulation or injection of sclerosing agents.



# Benign oropharyngeal tumors

## Pleomorphic Adenoma

- ? It is mostly seen submucosally on the hard or soft palate.
- ? It is potentially malignant and should be excised totally.



# Benign oropharyngeal tumors

## Mucous Cyst:

- ? It is usually seen in the **vallecula**. It is yellow in appearance and may be pedunculated or sessile.
- ? When large, it causes foreign body sensation in the throat.
- ? Treatment is **surgical excision**, if **pedunculated**, or **incision and drainage with removal of its cyst wall**

Others: **Lipoma, Fibroma & Neuroma**



Mucous cyst

# Malignant oropharyngeal tumors

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– The common sites of malignancy in the oropharynx are:

1. Posterior one-third (or base) of tongue.
2. Tonsil and tonsillar fossa.
3. Faucial palatine arch, i.e. soft palate and anterior pillar.
4. Posterior and lateral pharyngeal wall.

# Malignant oropharyngeal tumors

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Histologically:

Squamous cell carcinoma

Lymphoepithelioma

Adenocarcinoma

Lymphomas

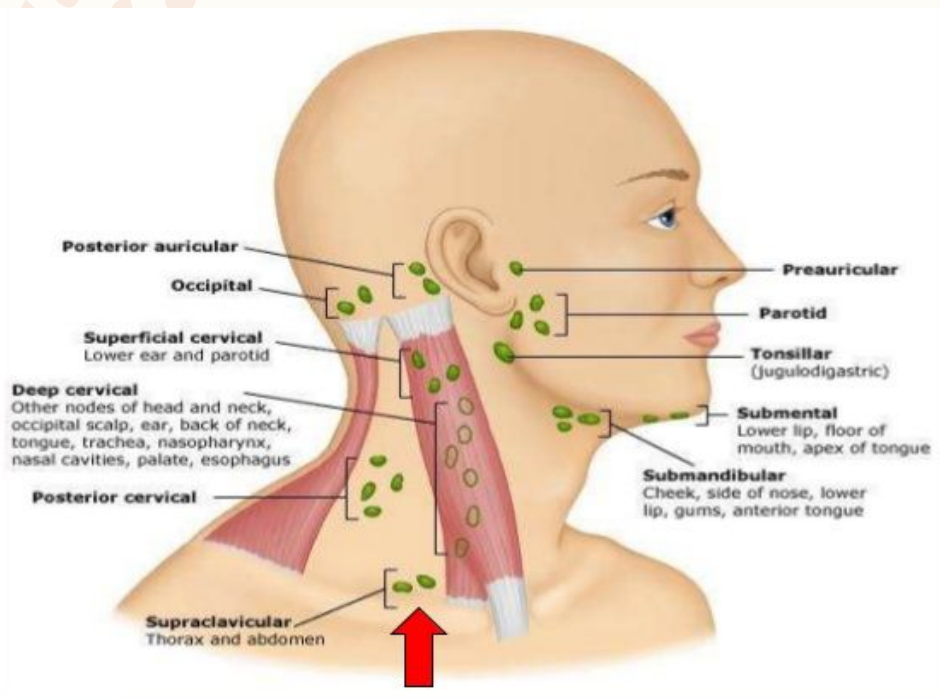


# Oropharyngeal cancers

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## - Spread

1. Local Lesions are deeply infiltrative and spread to the rest of tongue musculature, epiglottis and pre-epiglottic space, tonsil and its pillars, and hypopharynx.
2. Lymphatic. 50-70% of the cases show cervical metastases either unilateral or bilateral at the time of initial consultation. **Jugulodigastric nodes are the first to be involved** .
3. Distant metastases. Bones, liver, lung may be involved.



# Oropharyngeal cancers

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- Diagnosis:
- Lesions can be seen on indirect laryngoscopy but palpation of the tumor should never be omitted (under anesthesia)
- CT scan is recommended for tumor and nodal staging.
- Biopsy is essential to know its histology.

# Carcinoma of tonsils and tonsillar fossa

- ? Unilateral enlargement of the tonsils with ulceration
- ? Persistent sore throat, dysphagia, otalgia or lump in the neck are the presenting symptoms.
- ? Later on, mouth bleeding and trismus
- ? 50% of the cases are associated with lymphadenopathy.
- ? Any person with unilateral enlargement of the tonsils must undergo tonsillectomy then send for histology.
- ? Treatment: T1 and T2 →radiotherapy ,T3 and T4 →commando surgery



Fig. 52.2 Squamous cell carcinoma involving tonsil, pillar and soft palate.

# Carcinoma of the base of the tongue

- ? Earlier symptoms of sore-throat, feeling of lump in the throat and slight discomfort on swallowing.
- ? Late features are referred otalgia, dysphagia, mouth bleeding and dysphonia.
- ? Spread quickly through out of the tongue due to the absence of septation.
- ? In 70% of the cases, it is associated with bilateral lymphadenopathy.
- ? Diagnosis: deep palpation
- ? Tx: total glossectomy



Fig. 52.1 An exophytic growth at the base of tongue.

# Others

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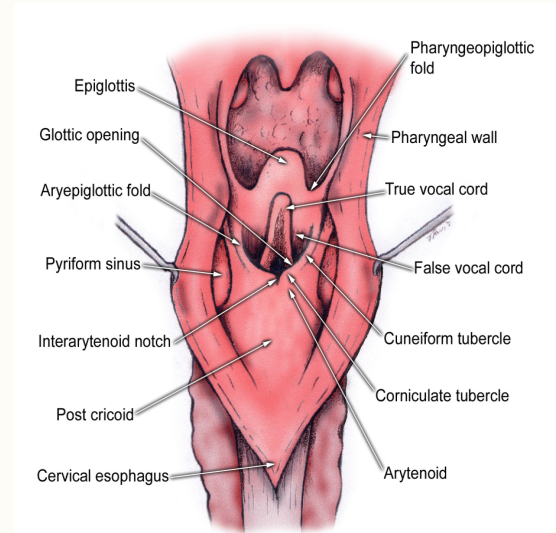
- Post pharyngeal wall tumors
- Parapharyngeal tumors
- DDx. Stygia/ Eagle's Syndrome

# Laryngopharynx

Extends from the hyoid bone to the lower border of the cricoid cartilage

Divided into:

- Pyriform fossa
- Post cricoid
- Posterior pharyngeal wall



# Tumors of the Hypopharynx

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- Male-to-female 3:1
- Older than 40
- RF: Smoking/ Alcohol



# Tumors of the hypopharynx

## 1) Piriform fossa carcinoma (50-60%):

- Can present either through fixing the vocal cords due to invasion (hoarseness) or through the thyroid cartilage and thyrohyoid membrane by (palpable neck mass).
- 70% will have palpable LN



# Tumors of the hypopharynx

## 2) Postcricoid area tumors (40%):

- ❑ Usually spread down to the esophagus through submucosal spread
- ❑ Usually presents with dysphagia.
- ❑ Palpable L.Ns in 20% of cases only.
- ❑ It is common in young females (25-35 years).



## 3) Posterior pharyngeal wall tumors:

Very rare less than 5%

# Tumors of the hypopharynx

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## Symptoms:

Sore throat, dysphagia , otalgia, drooling of saliva, ulceration or vocal cord paralysis.

## - Investigations:

- Barium swallow
- Esophagoscopy
- CXR is essential

# Tumors of the hypopharynx

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## ? Treatment:

- 25% are untreatable when first seen due to:
  - 1- Advanced age >75
  - 2- Poor general health.
  - 3- Distant metastasis
  - 4- Massive neck LNs (fixed)>6 cm
  - 5- Inoperable local tumor (postcricoid tumor fixing the prevertebral fascia or with vocal cord palsy. Pyriform fossa tumor involving base of the tongue.)

# Tumors of the hypopharynx

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- **Pyriiform fossa Ca**

- Partial/ Total laryngectomy

- Radiotherapy is Ineffective

- **Postcricoid Ca**

- Total pharyngolaryngectomy with or without esophagectomy

- Small tumor (<5cm, no LN) -> Radiation

# Tumors of the hypopharynx

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*Repair of the pharynx is :*

- ❑ In cases of **partial** pharyngectomy: pectoralis major musculocutaneous flap
- ❑ In cases of **total** pharyngectomy: transposed stomach or free jejunal loop
- ❑ Palpable L.Ns should have **radical neck dissection.**
  
- ❑ **Prognosis:** 5 year survival after surgery is 30% and after radiotherapy is 10%



# Laryngeal Tumors

# The Anatomy of the Larynx

The larynx is divided into 3 anatomical regions:

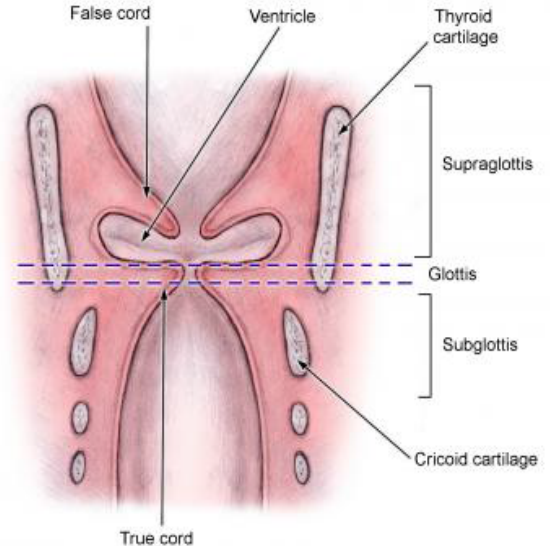
**1-The Supraglottis** region involves the (epiglottis, false vocal cords and the ventricles).

It is supplied by the **Superior laryngeal artery** and its lymphatic drainage passes through the Thyrohyoid membrane.

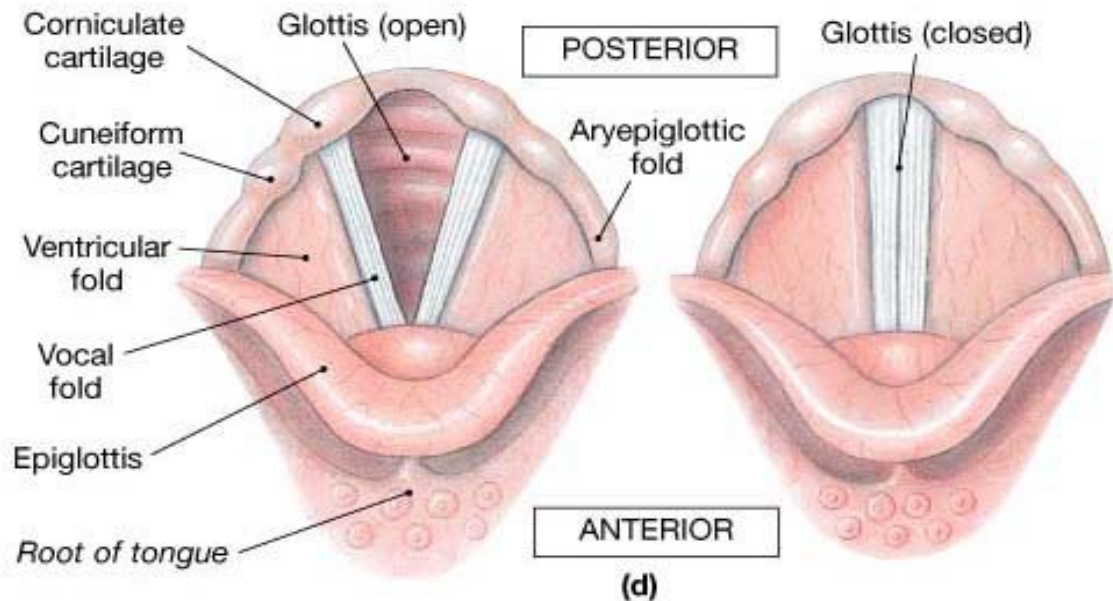
**2-The Glottis** region is area within 1 cm of the true vocal cords.

**3-The Subglottis** region extends from just below the true vocal cords to the cricoid cartilage.

Both the glottis and Subglottis are supplied by the **thyroid artery** and their lymphatic drainage passes inferiorly.







• **FIGURE 23-4** Anatomy of the Larynx. (d) Diagrammatic superior view of the larynx with the glottis open and closed.

# The Lymphatic drainage

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- ❓ The Supraglottis has a very rich lymphatics which pass through the thyrohyoid membrane to the deep upper cervical LNs (40% of Supraglottis tumors have associated L.N).
- ❓ The Subglottis drain into the Lower Cervical, Paratracheal and Mediastinal L.N
- ❓ The glottis is free of lymphatics so glottic tumors rarely Metastasize to cervical L.Ns (less than 5%).

# Epidemiology:

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- ? Benign tumors of the larynx are rare and cause persistent hoarseness.
- ? Malignant tumors of the larynx are virtually always **squamous cell carcinoma** (>95%).
- ? The distribution of the laryngeal cancer is: **40% supraglottis, 59% glottis** and 1% subglottic.
- ? It represents around 2.5% of all cancers in males , it's **5 times more common in males** than in females
- ? The peak age incidence is **55– 65 years**, but it can occur in young adults.

# Risk factors :

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- ? Tobacco: it's the principle risk factor as laryngeal cancer is rare in non-smokers.
- ? Alcohol: it has a synergistic effect with the tobacco.
- ? Industrial exposure: asbestos, woodworking products, mustard gas and petroleum products.
- ? Radiations
- ? Laryngeal keratosis: 3-4% progress into invasive cancer.

# Clinical presentation:

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## – **Supraglottic carcinoma:**

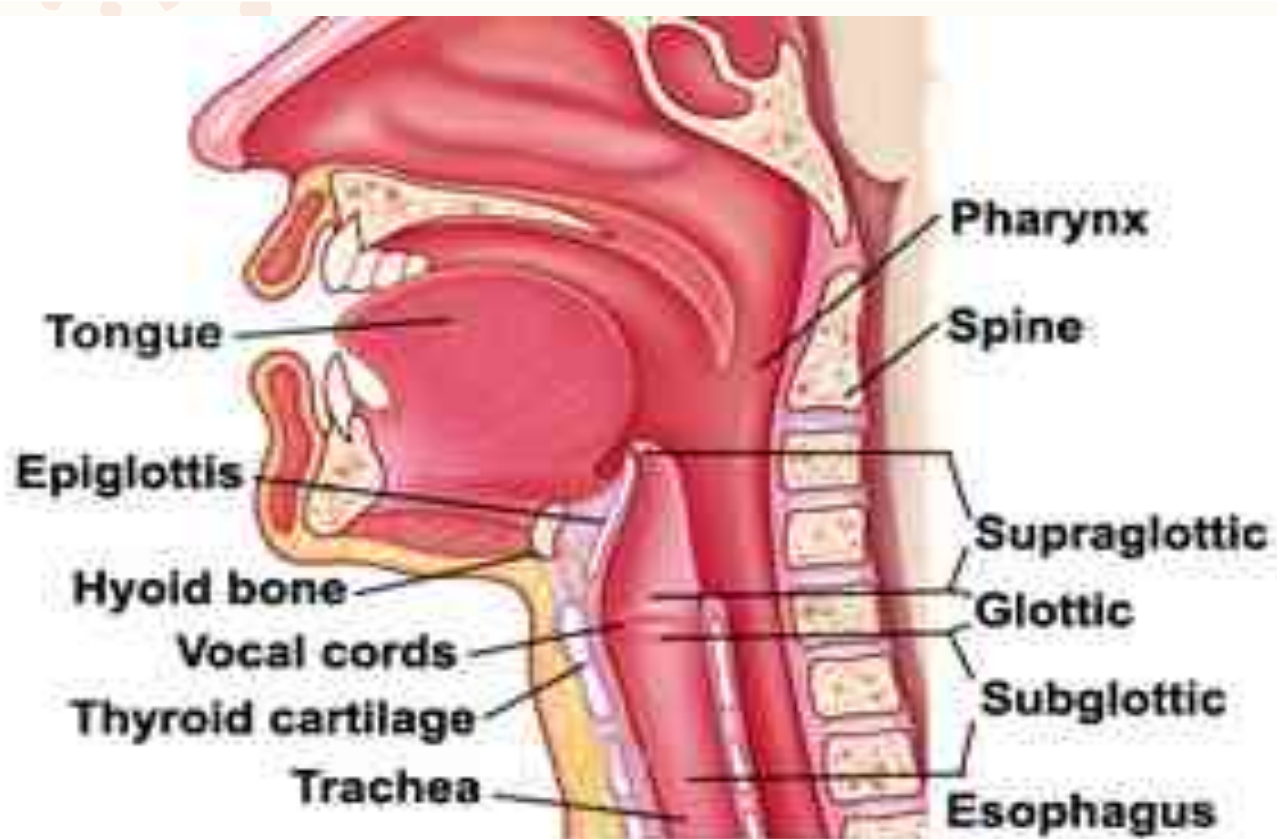
- Patients will present with **dysphagia, odynophagia, referred otalgia and muffled** voice.
- Cervical L.N metastasis occurs early .
- If the tumor extends to the glottis area they'll complain of hoarseness of the voice.

## – **Glottic carcinoma:**

- The prime symptom is **hoarseness of voice with stridor when advanced.**

## – **Subglottic carcinoma:**

- **Stridor and may even cause airway obstruction.**



# Clinical presentation:

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- ❓ Patients may also present with a neck mass because of the extra-laryngeal spread or Lymph nodes metastasis.
- ❓ Distant metastasis is rare

# Diagnosis

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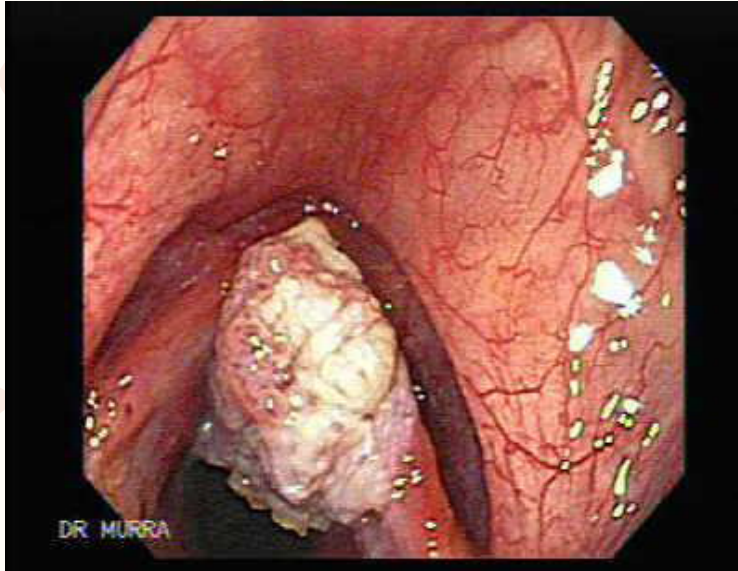
? The larynx should be assessed by the **indirect laryngoscope** or the **flexible laryngoscope** .

? If a mass is found then a **Biopsy** must be taken by the **direct laryngoscope** under general anesthesia.

? Ct/ MRI

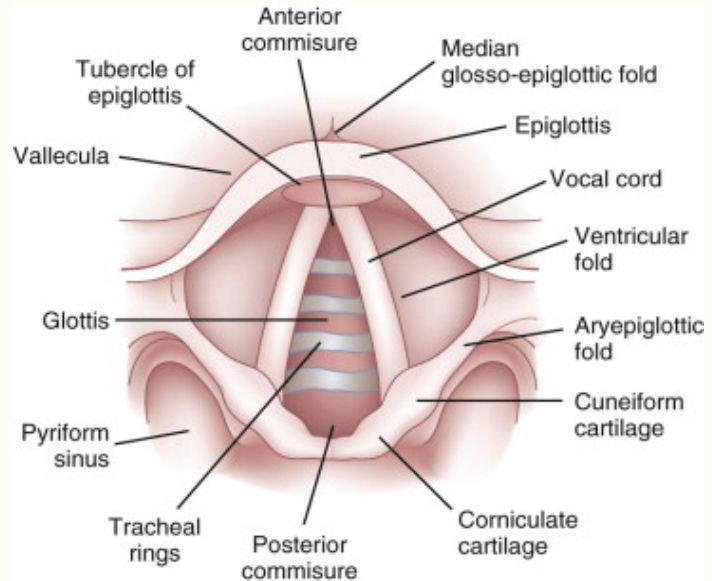


# Laryngeal Carcinoma



# Factors associated with the spread of the tumor

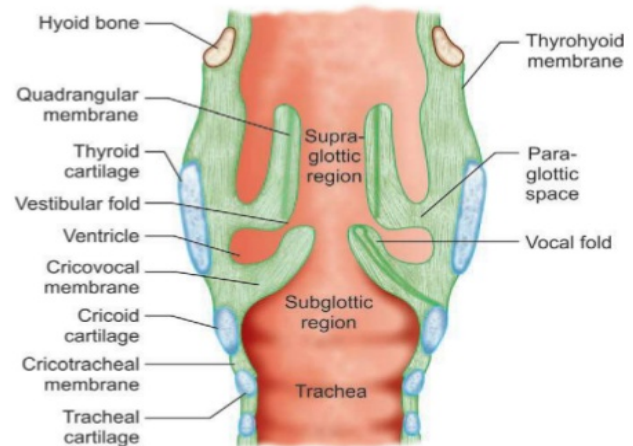
- • The anterior commissure tendon extends from the thyroid notch to the insertion of the vocal cords there so the tumor will spread to the thyroid cartilage, the supraglottic and the subglottic areas.
- • The pre-epiglottic space (in front of epiglottis) once involved the tumor will spread inferiorly to the anterior commissure or anteriorly to the thyrohyoid membrane.



# Factors associated with the spread of the tumor

- • The paraglottic space (lateral to the ventricles) once involved the tumor can spread to all laryngeal regions and even extralaryngeal regions.
- • The epiglottic cartilage contain numerous pits so the tumor involving this area can spread to the pre-epiglottic space then it can reach the anterior commissure.

CORONAL SECTION OF LARYNX

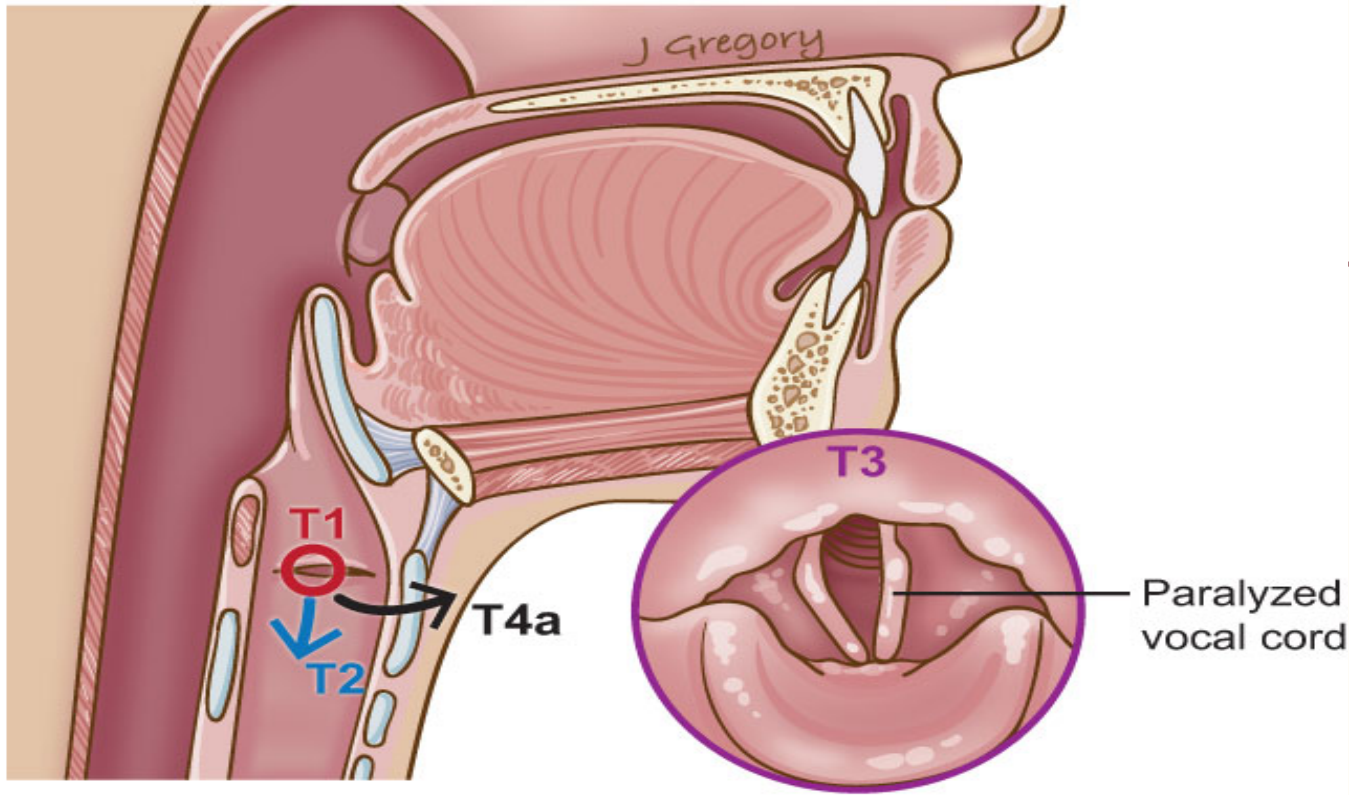


# Staging: TNM Classification

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- The 2002 AJCC classification for laryngeal tumors is determined by the following 3 main factors:
  - • Number of sub sites involved
  - • Vocal fold mobility
  - • Presence of cervical or distant metastases

<b>T : tumor</b>	
T1	Tumor confined to one region (glottis, supraglottis, subglottis) with mobile vocal cords.
T2	Tumor confined to two regions with mobile vocal cords.
T3	Tumor limited to the larynx with fixation of the vocal cords.
T4	Extra-laryngeal spread (oropharynx, soft tissue of the neck or thyroid cartilage).
<b>N: Lymph Nodes</b>	
N1	Metastasis is in a single ipsilateral lymph node, 3 cm or less.
N2	<ul style="list-style-type: none"> <li>• Metastasis is in a single ipsilateral lymph node, 3-6 cm.</li> <li>• Metastasis is in multiple ipsilateral lymph nodes, none more than 6 cm.</li> <li>• Metastasis is in bilateral or contralateral lymph nodes, none more than 6 cm.</li> </ul>
N3	LN > 6 cm.
<b>M: Distant Metastasis</b>	
<ul style="list-style-type: none"> <li>• MX: Distant metastasis cannot be assessed.</li> <li>• M0: No distant metastasis.</li> <li>• M1: Distant metastasis.</li> </ul>	



# Treatment

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❓ Goal of treatment is to remove the tumor and prevent recurrence while maintaining laryngeal function.

❓ NOTE : Any positive neck L.Ns should be treated by radical neck dissection.

<b>Supraglottic tumor</b>	
Stage 1 &2	can be equally treated with radiation or supraglottic larygectomy ( 5-year survival of 85%.)
Stage 3	total larygectomy.
stage 4	total laryngectomy followed by radiation
<b>Glottic</b>	
Stage 1 &2	Radiation with 5-year survival of 90% and 75% respectively.
Stage 3	Total laryngectomy with 5-year survival of 60%.
stage 4	total laryngectomy followed by radiation with 5-year survival of 40%
<b>Subglottic</b>	
Stage 1 &2	Radiation therapy or surgery
Stage 3	combination of surgery, radiation and chemotherapy.
stage 4	surgery and radiation.



# Prognosis

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- In general supraglottic tumors have poorer prognosis in comparison with the glottic tumors due to:
  - 1- Rich lymphatic supply of the supraglottic area.
  - 2- Late presentation and detection (wide area).
  - 3- More difficult to manage.

# Treatment

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- Partial laryngectomy VS total laryngectomy :
- The advantage of partial laryngectomy is that the voice is preserved and there is no permanent
- stoma as following total laryngectomy but the complications are much more in partial
- laryngectomy ( laryngoesophageal fistula, laryngeal chondritis, dysphagia and aspiration )

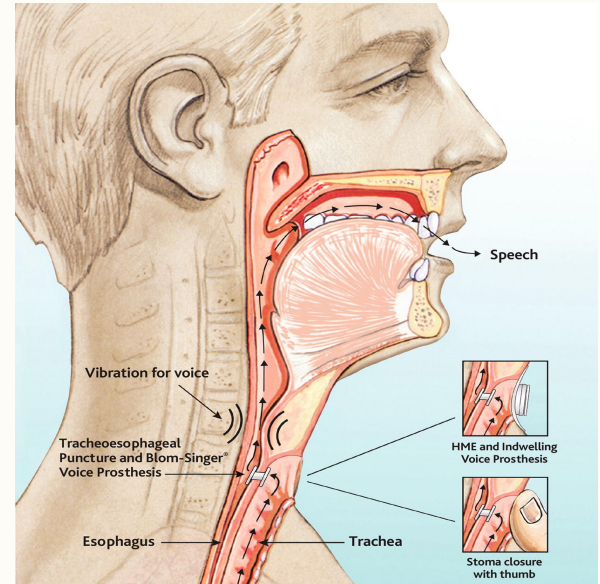
# Voice after Total Laryngectomy:

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- • **Esophageal voice**: the patient is trained to use his pharynx and esophagus to talk where he swallows air and speak without larynx or vocal cords.
- • **Electrical laryngeal voice**: the patient presses a button of an electrical larynx instead of his natural larynx and talk.

# Voice after Total Laryngectomy:

- Voice prosthesis: an artificial fistula is made between the trachea and the esophagus with a one way valve to divert air from the trachea to esophagus with expiration to talk.





***THANK YOU***