

The background features decorative white line-art illustrations of leaves and branches in the corners. The top-left and top-right corners have clusters of several pointed leaves on a stem. The bottom-left and bottom-right corners have smaller clusters of leaves. In the center, there is a large heart-shaped leaf with a stem and several veins, and a smaller heart-shaped leaf with a stem and veins below it.

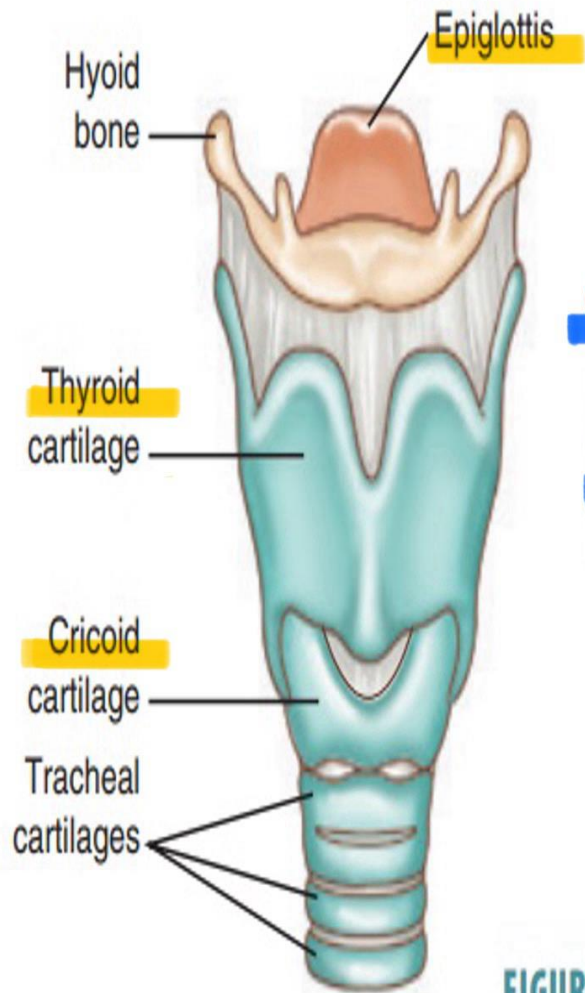
Laryngeal Cancer

MADE BY: RAZAN ZEYAD, ZAINA BASHABSHEH, SARA
AL-SAIFI

SUPERVISED BY: DR. HANI MOSLEH

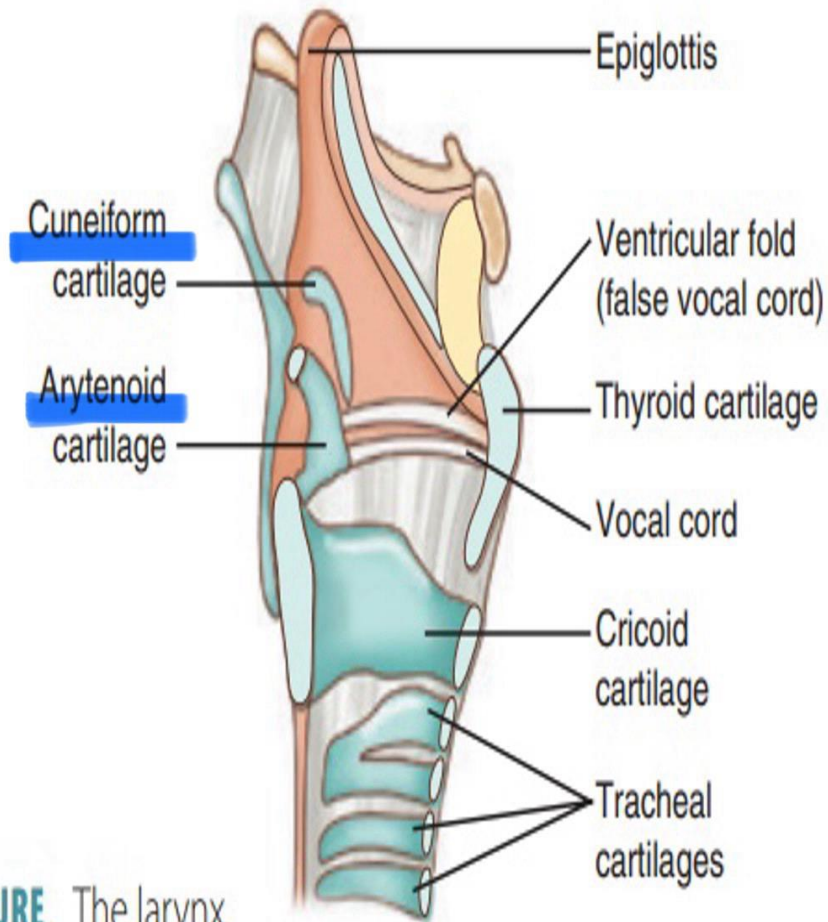
Anatomy of the Larynx



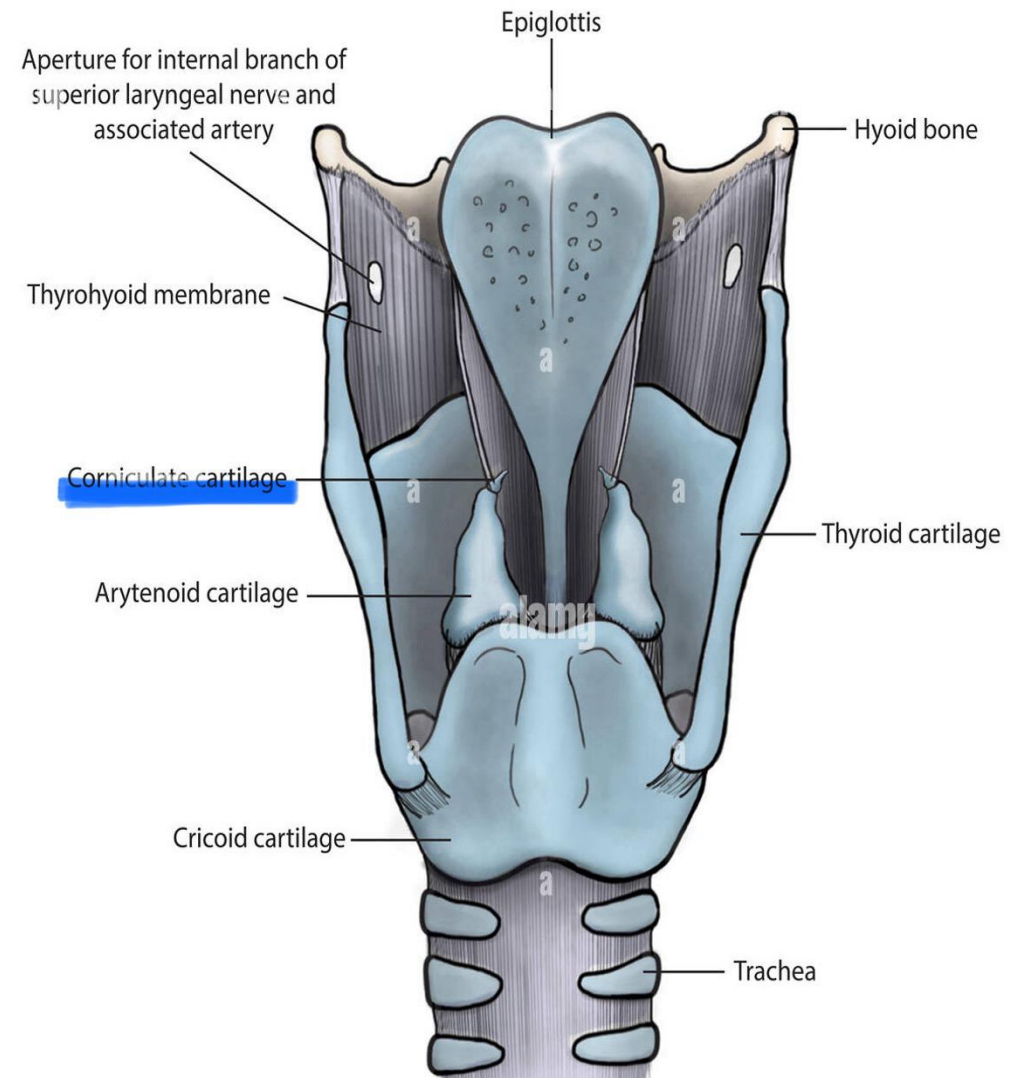


Larynx
(anterior view)

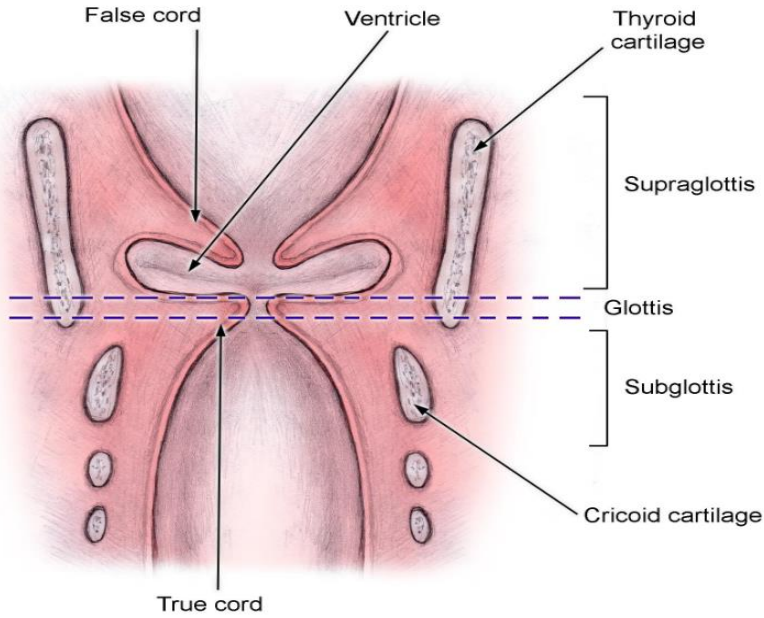
FIGURE The larynx.



Larynx
(sagittal view)



Larynx
posterior

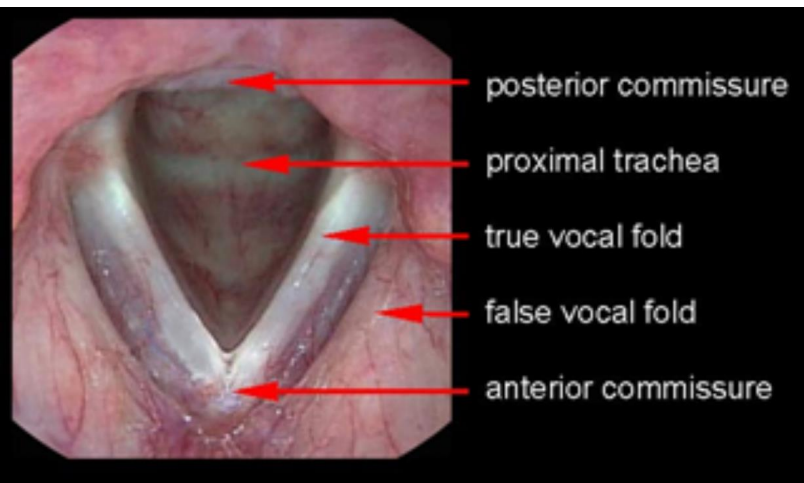


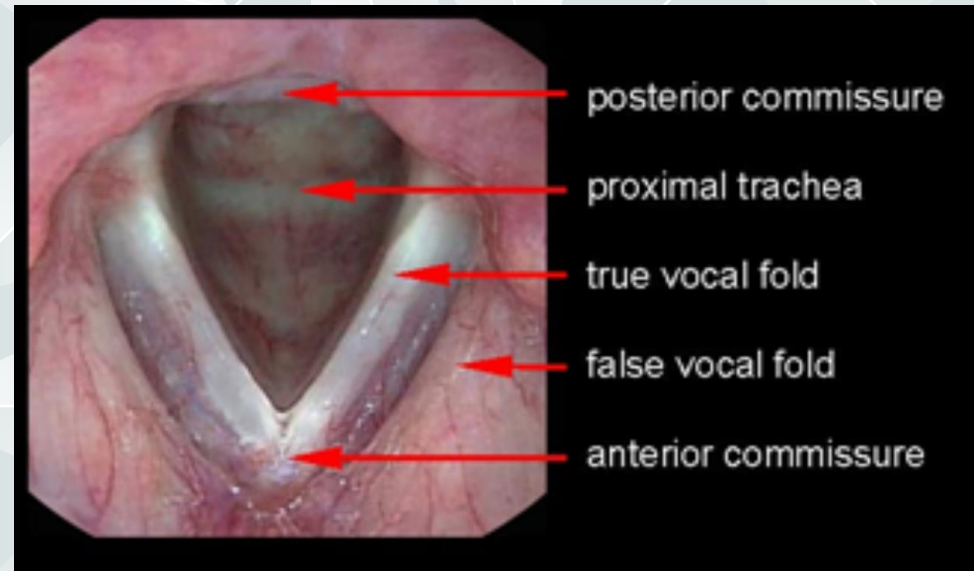
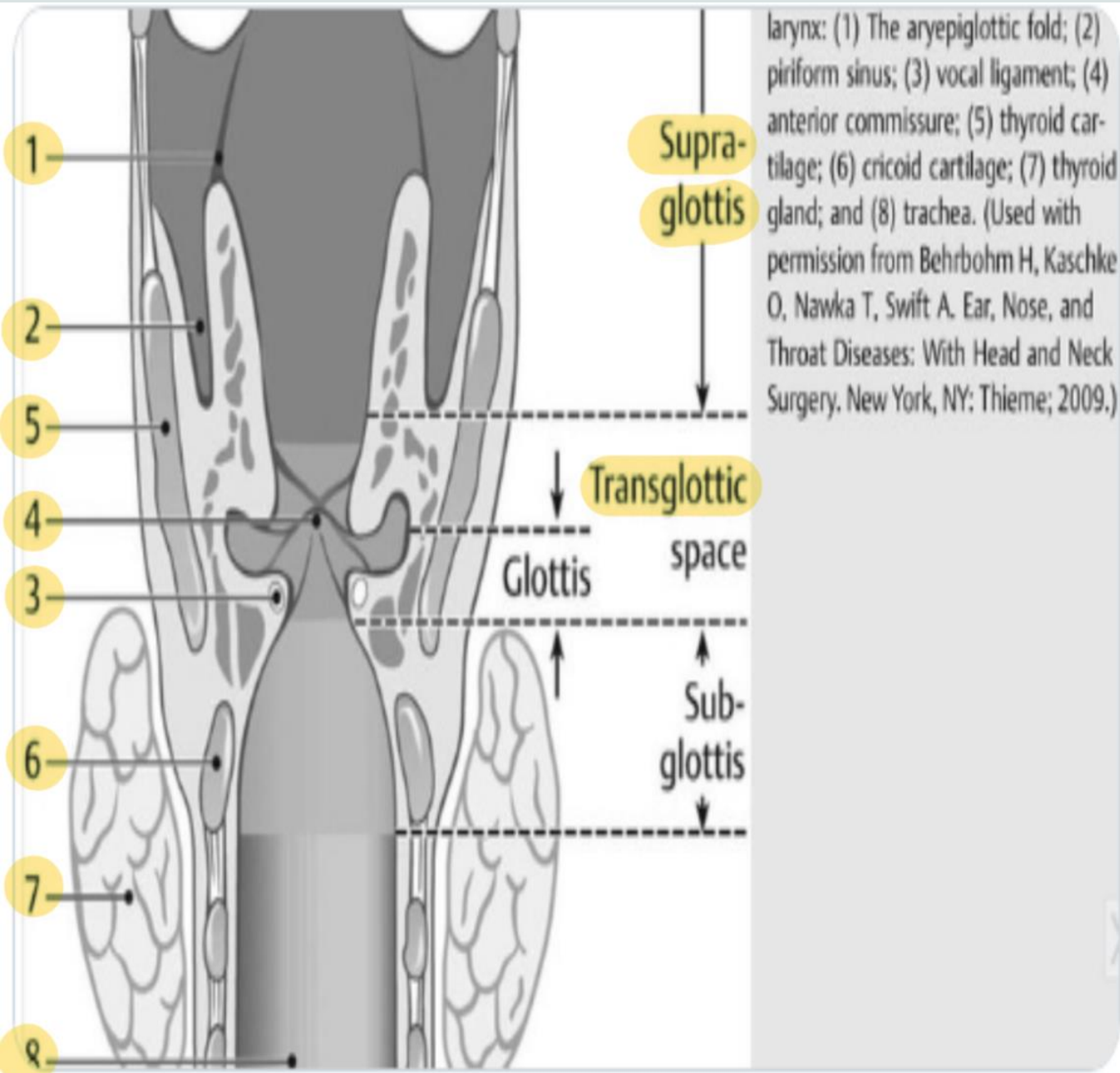
Laryngeal Subsites

Supraglottis: It consists of the epiglottis (lingual and laryngeal surface), aryepiglottic folds (laryngeal surface only), arytenoids, and ventricular bands (false vocal cords). The lower limit of the supraglottis is a horizontal plane passing through the lateral margin of the ventricle and its union with the upper surface of the true vocal cord.

Glottis: The glottis is composed of the true vocal cords in addition to anterior and posterior commissures. The upper limit of the glottis is marked by a line drawn through the larynx ventricle to its lower limit which is a horizontal plane 1 cm below the upper limit of the glottis.

Subglottis: It extends from the lower border of the glottis to the lower border of the cricoid cartilage





Laryngeal Spaces

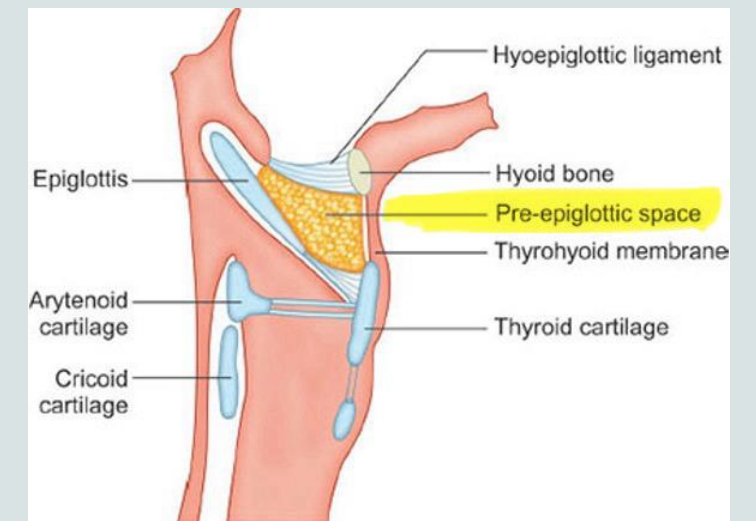
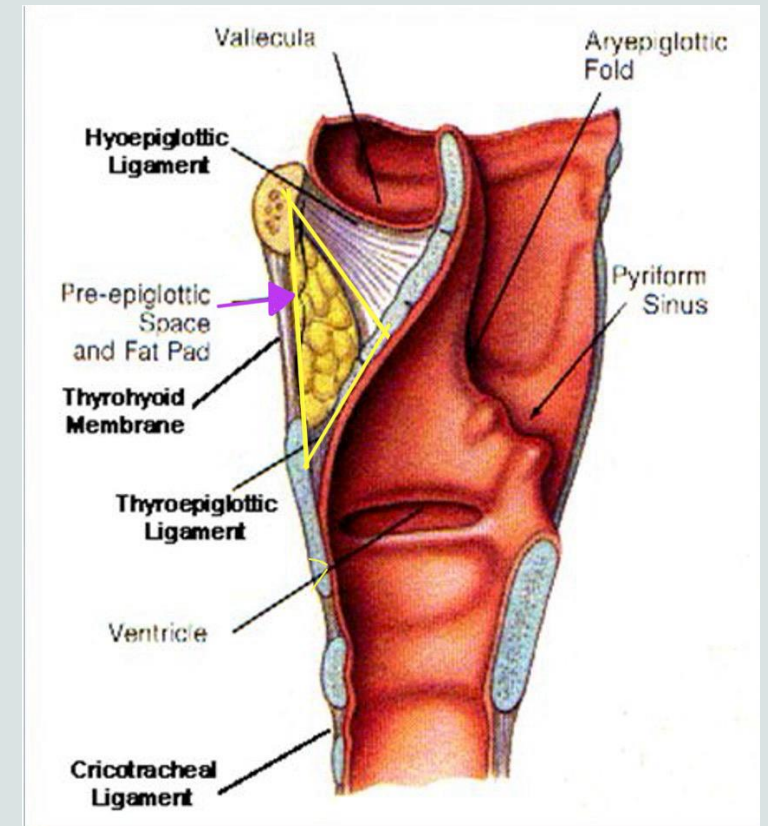
1) PRE EPIGLOTTIC SPACE (SPACE OF BOYER)

Boundaries:

- Superior → hyoepiglottic ligament
- Inferior → thyroepiglottic ligament
- Posterior → epiglottis
- Anterior → thyrohyoid membrane & thyroid cartilage

Content: fat, areolar tissue, blood vessels, lymphatic and mucosal glands.

Continues laterally with paraglottic space deep to quadrangular membrane

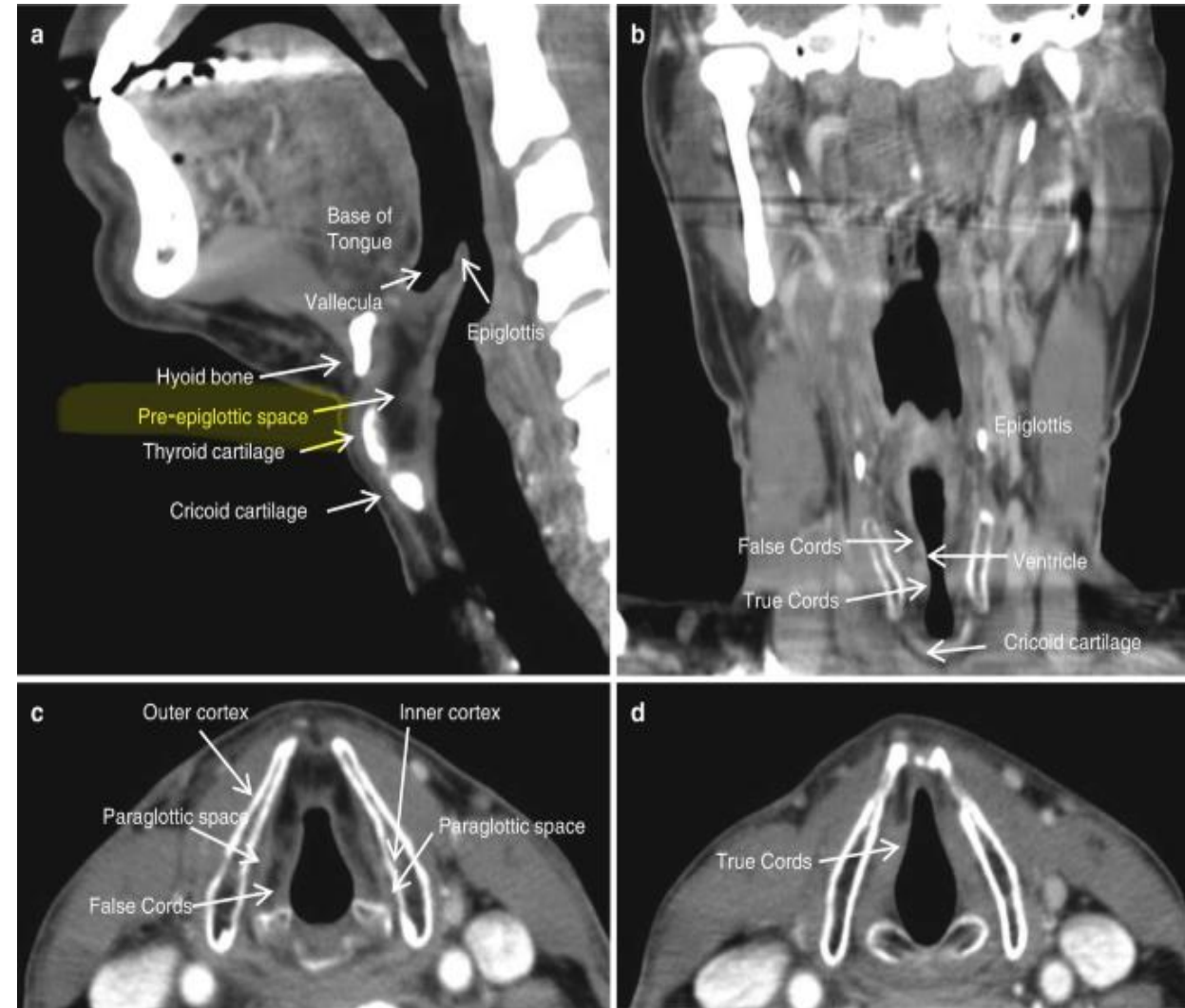




Clinical Importance!

This area is rich in lymphatics which drain from the supraglottic larynx to cervical nodes. As such, the PES is at high risk of involvement of oropharyngeal and supraglottic laryngeal carcinomas. Additionally, it is important in staging as invasion of the PES automatically raises the TNM staging to T3

In oropharyngeal and supraglottic laryngeal carcinomas, PES involvement necessitates more aggressive surgical treatments with higher morbidity such as supraglottic or total laryngectomy, in contrast to more conservative treatment such as local resection or radiation therapy which may be considered when the PES is not involved.



2) PARAGLOTTIC SPACE

Lies at the level of glottis

Boundaries:

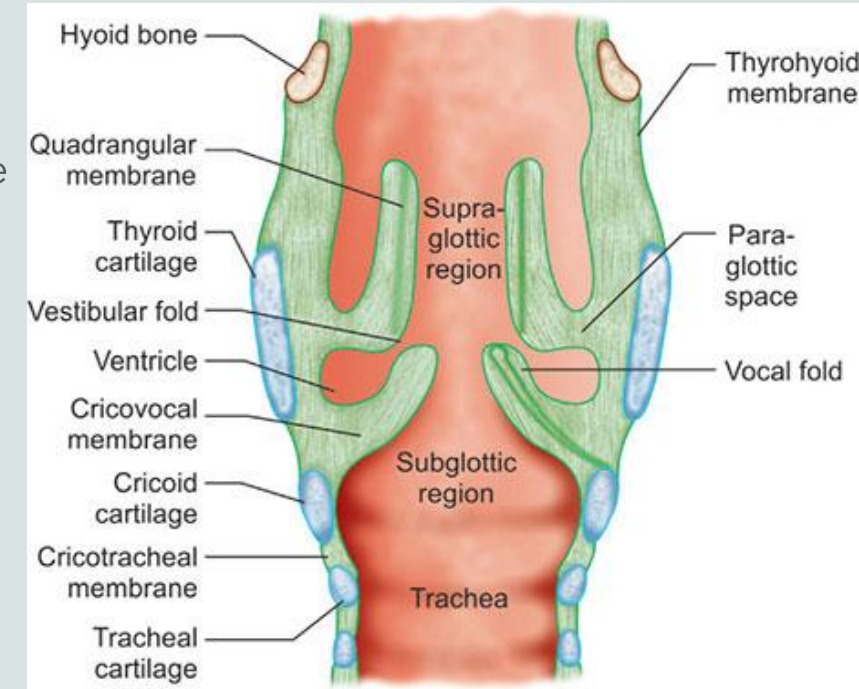
- Superior → separated from supraglottis by quadrangular membrane
- Inferior → conus elasticus (cricothyroid membrane)
- Lateral → thyroid cartilage
- Posterior → mucosa of pyriform fossa .

Content: thyroarytenoid muscle

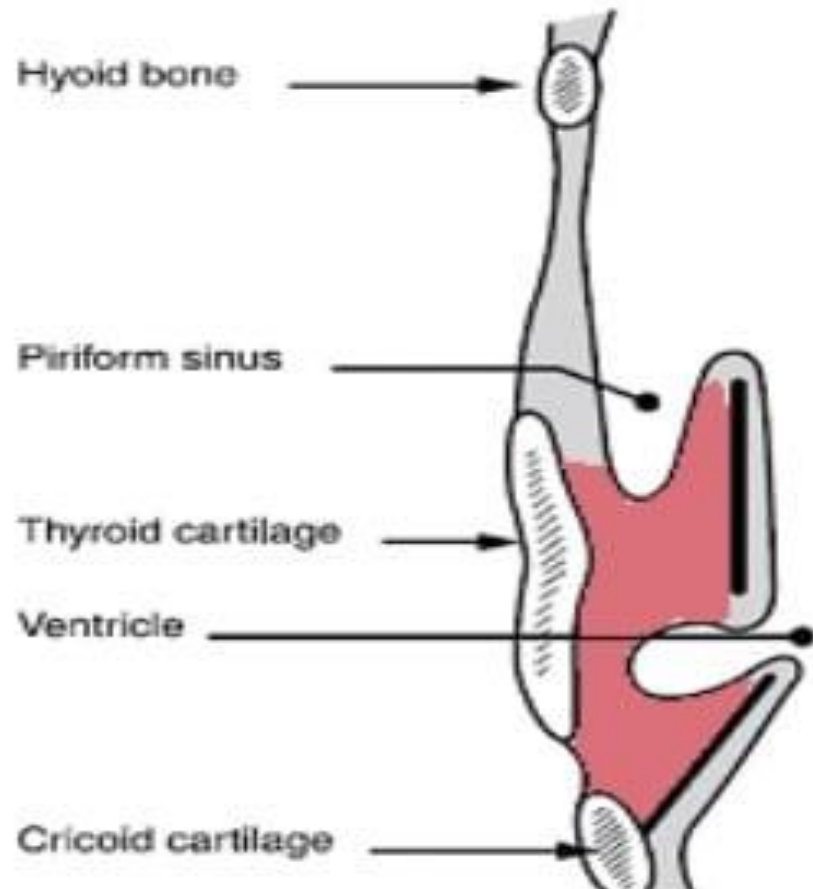
Inferolaterally it is continuous with cartilaginous defect between cricoid & thyroid cartilage

Paraglottic involvement in glottic CA → fixity of cord

❖ *Clinical importance: also important in extension of laryngeal cancer, since it communicates with pre-epiglottic area superiorly and with extra-laryngeal region inferiorly.*



PARAGLOTTIC SPACE



- Adipose tissue, internal laryngeal nerve, laryngeal saccule
- Lat. – thyroid cartilage & thyrohyoid membrane
- Superomed. – quadrangular membrane
- Inferomed. - conus elasticus
- Superiorly continuous with pre – epiglottic space

Nerve + Blood Supply and Lymphatic Drainage

MOTOR SUPPLY All the intrinsic laryngeal muscles are supplied by recurrent laryngeal nerves except cricothyroid muscle is supplied by external laryngeal nerve

SENSORY SUPPLY A) Internal laryngeal nerve above the vocal cords.
B) Recurrent laryngeal nerve below the vocal cords.

- Left recurrent laryngeal nerve hooks around ligamentum arteriosum
- Right hooks around the 1st part of subclavian artery

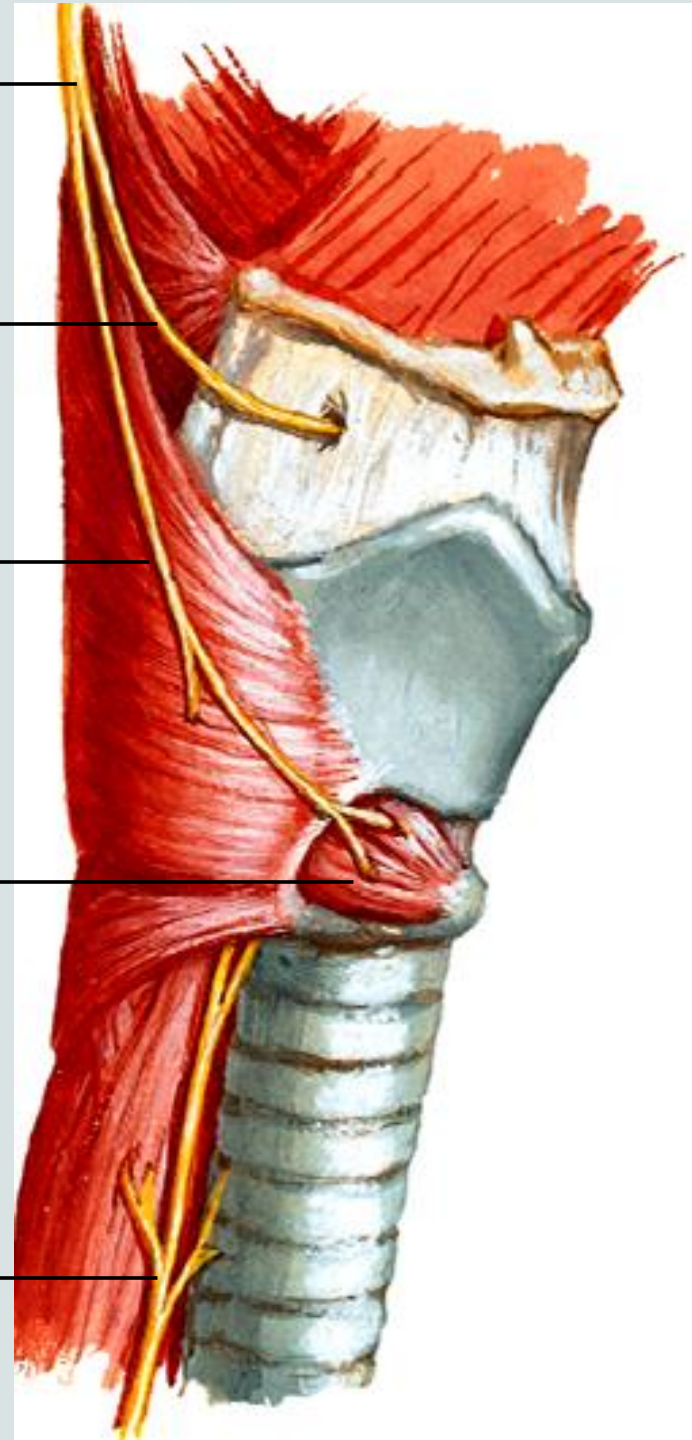
Superior Laryngeal N

Internal Laryngeal N

External Laryngeal N

Cricothyroid M

Recurrent Laryngeal N





ARTERIAL SUPPLY

- Superior laryngeal A from superior thyroid A
- Inferior laryngeal A from inferior thyroid A

VENOUS DRAINAGE

- Superior laryngeal vein drains into IJV
- Rest → mid thyroid vein

LYMPHATIC DRAINAGE

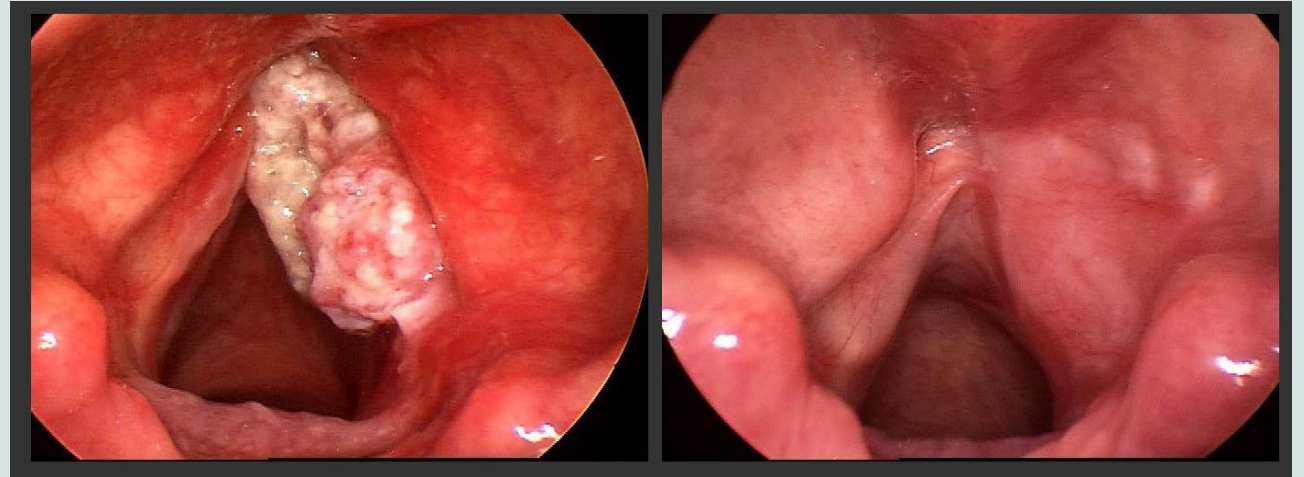
- Above vocal cord: upper deep cervical node
- Below vocal cord: lower deep cervical node through pre/para tracheal node & prelaryngeal node
- Vocal fold: no lymphatics

Laryngeal Cancer

Laryngeal cancer is the second most common neoplasm of the upper aerodigestive tract after oral cavity carcinoma.

Most of these tumors are squamous cell carcinomas, accounting for 85 to 95% of all neoplasms of the larynx.

There are multiple treatment modalities and for this to be successful, it must be appropriately selected by personalizing the patient's approach. It is based primarily on the clinical stage of the patient, their desires, the patient's medical conditions, and the prognosis of survival





Risk Factors

- 1** *Tobacco Use*
Smoking cigarettes, cigars, pipes or using chewing tobacco greatly increases the risk of laryngeal cancer. The risk is proportional to the intensity and duration of consumption and the risk decreases after cessation of intake.
- 2** *Alcohol Use*
Drinking more than one alcoholic drink per day can also raise the risk, especially when combined with tobacco use. The risk is proportional to the intensity and duration of consumption and the risk decreases after cessation of intake.
- 3** *Gender*
Men are 4-5 times more likely to develop laryngeal cancer than women.
- 4** *Age*
More than half of people with laryngeal cancer are age 65 or older when the disease is found.
- 5** *Inherited Syndromes*
Certain rare inherited genetic disorders can also increase the risk of developing laryngeal cancer.
- 6** *Race*
Laryngeal cancer is more common in African Americans and Caucasians compared to Latinos and Asians



Cont.

7 HPV

Most frequently with subtypes 16 and 18. It has been detected in 21% of advanced laryngeal cancers, most commonly detected in women compared to men.

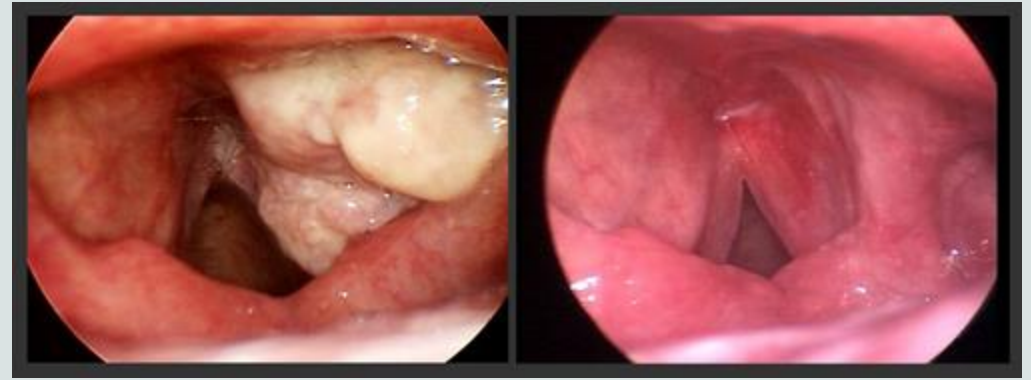
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Occupational Exposures

Exposure to certain chemicals and materials at work can raise the risk of laryngeal cancer.

❖ An increased intake of fruits and vegetables is associated with a lower risk of head and neck cancer in all subtypes, which means that this could be a protective factor for laryngeal cancer

Epidemiology



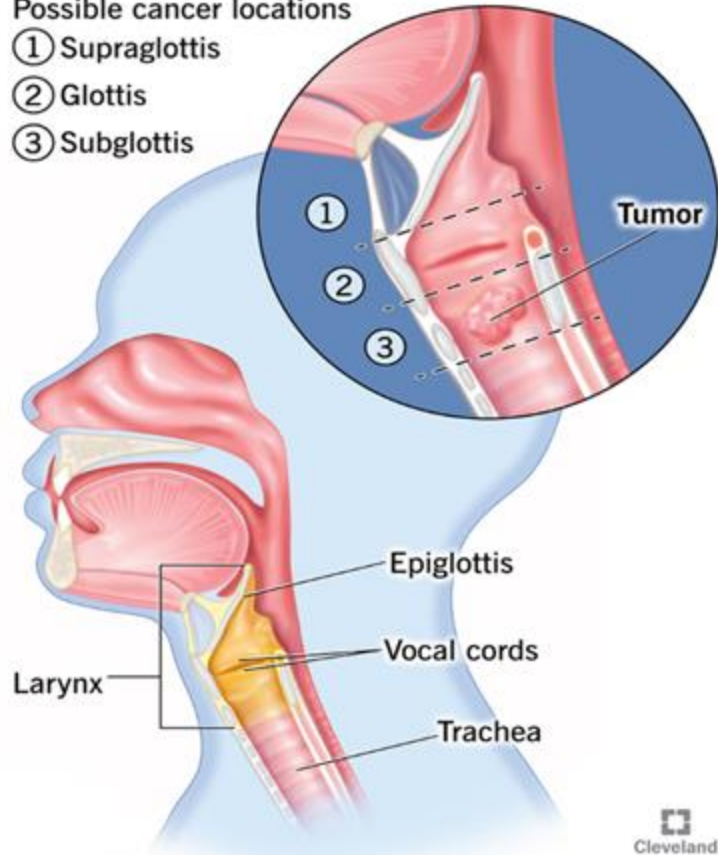
- In the 1950s, the male-to-female ratio in patients with laryngeal cancer was 15:1.
- This number had changed to 5:1 by the year 2000, and the proportion of women afflicted by the disease is projected to increase in years to come.
- These changes are likely a reflection of shifts in smoking patterns, with women smoking more in recent years.
- Laryngeal cancer most commonly affects men middle-aged or older. The peak incidence is in those aged 50-60 years.



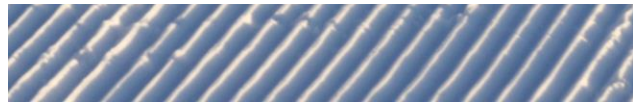
Laryngeal Cancer

Possible cancer locations

- ① Supraglottis
- ② Glottis
- ③ Subglottis

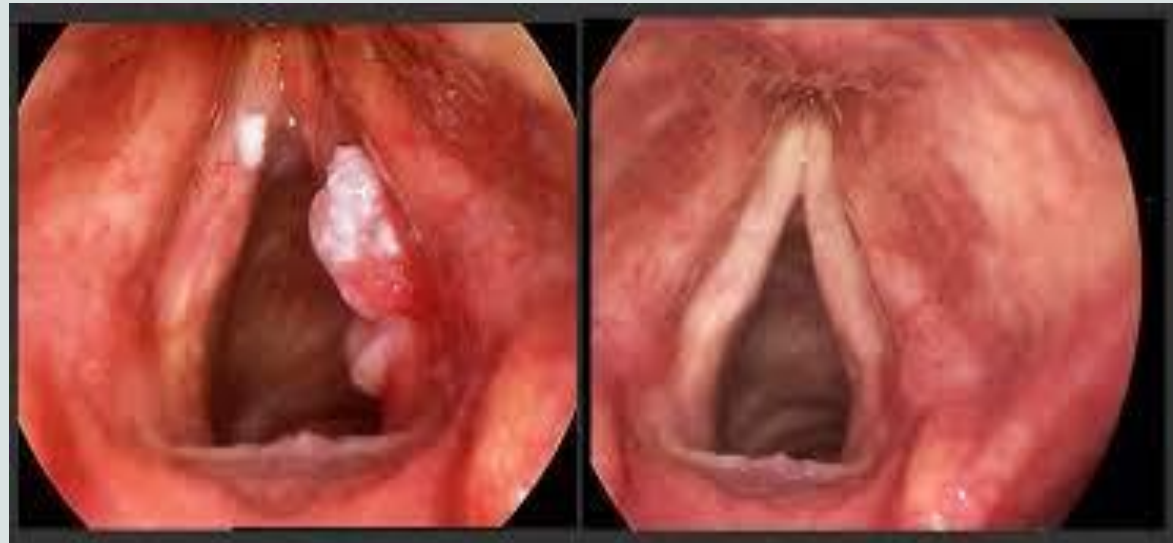


Cleveland
Clinic
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Laryngeal Cancer Subtypes

- glottic cancer: 59%
- supraglottic cancer: 40%
- subglottic cancer: 1%
- *most subglottic masses are extension from glottic carcinoma



Histologic Subtypes

- Squamous cell carcinoma (85-90% common)
- Verrucous carcinoma (<1%)
- Chondrosarcoma
- Fibrosarcoma
- Minor salivary carcinoma
- Adenocarcinoma
- Oat cell carcinoma
- Giant cell and spindle cell carcinoma, etc



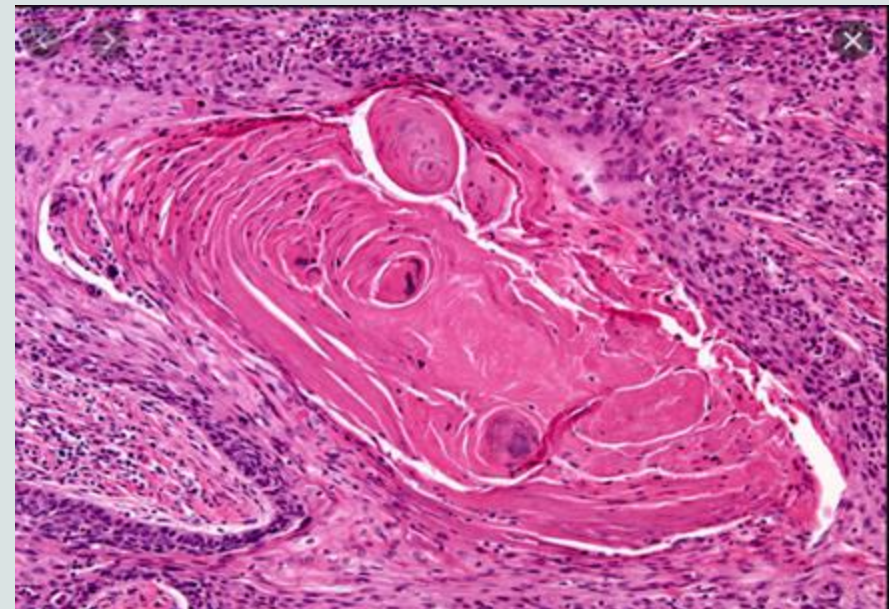
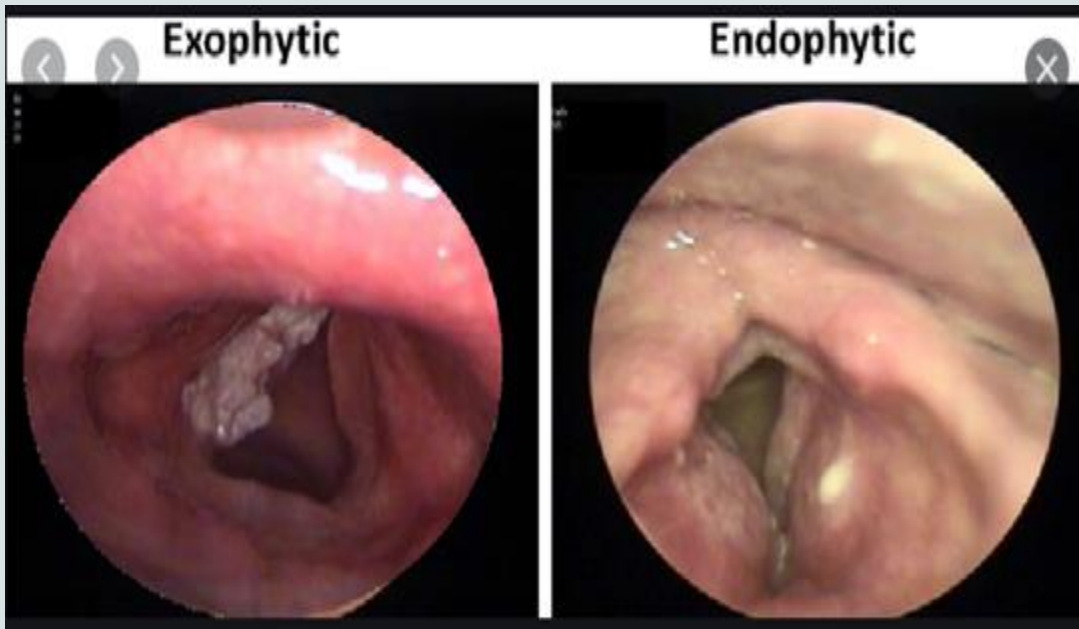
Pathology of SCC

MACROSCOPICALLY

- Exophytic
- Endophytic

MICROSCOPICALLY

- It is characterized by the presence of "prickle" cells and keratin whorls.



Laryngeal Cancer Spread

- Laryngeal squamous cell cancer has characteristic patterns of spread depending on the site of origin.
- Local spread is along tissue planes, while lymphatic spread is guided initially by the boundaries between embryological anlagen (arches III-VI).
- There is no true anatomical barrier to check spread between the supra- and subglottis.
- Lymphatic spread of glottic cancer is less common than at other subsites due to the lack of submucosal lymphatics in this area.
- Spread to the lymphatics by squamous cell glottic carcinoma, when it occurs, is to levels II, III, IV, and VI.

PRIMARY SITE	PART OF PRIMARY SITE	LOOK FOR INVOLVEMENT OF
SUPRAGLOTTIS	Epiglottis	Pre-epiglottic space
	Epiglottic petiole	Anterior commissure
	Intralaryngeal mucosa, false cords	Paraglottic space
	All	Vocal fold
		Laryngeal cartilage
GLOTTIS	Anterior cord	Anterior commissure/contralateral membrane
	Posterior cord	Thyroid cartilage and cricothyroid membrane
	All	Arytenoid cartilage/cricoarytenoid joint/posterior commissure
		Paraglottic space
		Supraglottic/subglottic spread
SUBGLOTTIS		Trachea Thyroid gland Cervical esophagus

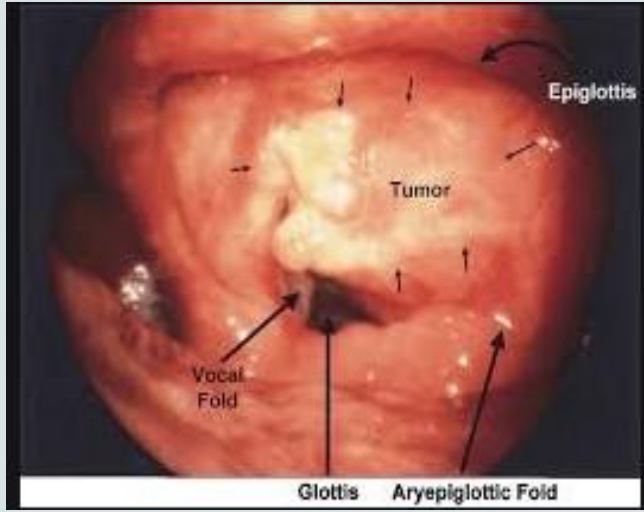


Cont.

- The most common site for distant hematogenous metastasis is the lung.
- The mediastinum is the most common site for distant lymphatic metastases.
- The incidence of distant metastasis varies according to the site of the primary tumor (the rate is 3.1% to 8.8% in glottic SCC and 3.7% to 15% in supraglottic SCC. 14.3% of subglottic SCCs developed distant metastases).



Clinical Presentation



Glottic cancer

- Hoarseness is the earliest symptom; hoarseness >3 weeks should be evaluated by otolaryngologist
- Progressive dyspnea and stridor
- Hemoptysis indicates large tumor
- Referred otalgia is a sinister sign indicating deeper invasion

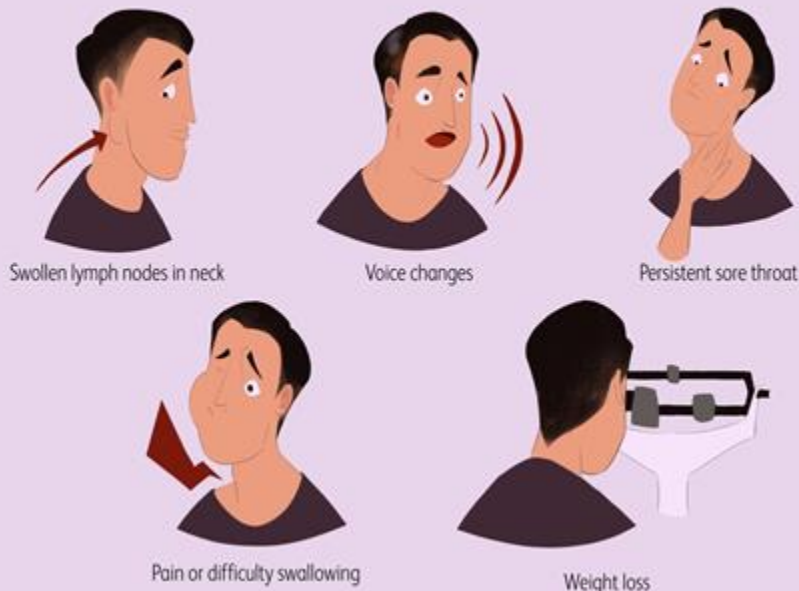
Supraglottic cancer

- Globus or foreign body sensation, parasthesia
- If exophytic, hemoptysis may occur
- Asymptomatic
- Cervical lymphadenopathy at first presentation
- Odynophagia, referred otalgia

Subglottic cancer

- Globus or foreign body sensation
- Progressive dyspnea and stridor

Throat Cancer Symptoms



Diagnosis

HISTORY

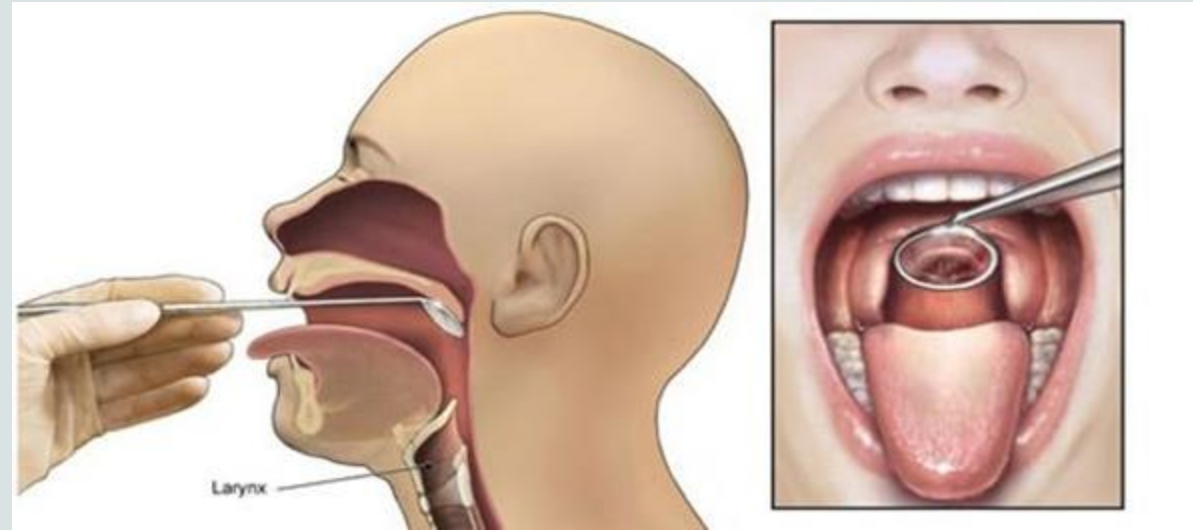
CLINICAL EXAMINATION

- Good neck exam looking for cervical lymphadenopathy and broadening of the laryngeal prominence is required
- The base of the tongue should be palpated for masses as well
- Restricted laryngeal crepitus may be a sign of post-cricoid or retropharyngeal invasion
- Indirect laryngoscopy (not used regularly these days)
- Fiber-optic nasolaryngoscopy (standard for laryngeal assessment)



INDIRECT LARYNGOSCOPY

can be done in the doctor's office. The doctor uses a light source and a small hand mirror held at the back of the throat to look at the throat, larynx, and vocal cords



FLEXIBLE/FIBEROPTIC LARYNGOSCOPY

usually done by an ear, nose and throat (ENT) surgeon in the doctor's office.

- The surgeon sprays an anesthetic on the back of the nose and throat just before the test. This helps open up the sinuses and prevents gagging.
- A flexible laryngoscope is inserted through the nose and down to the throat so the surgeon can look at the larynx



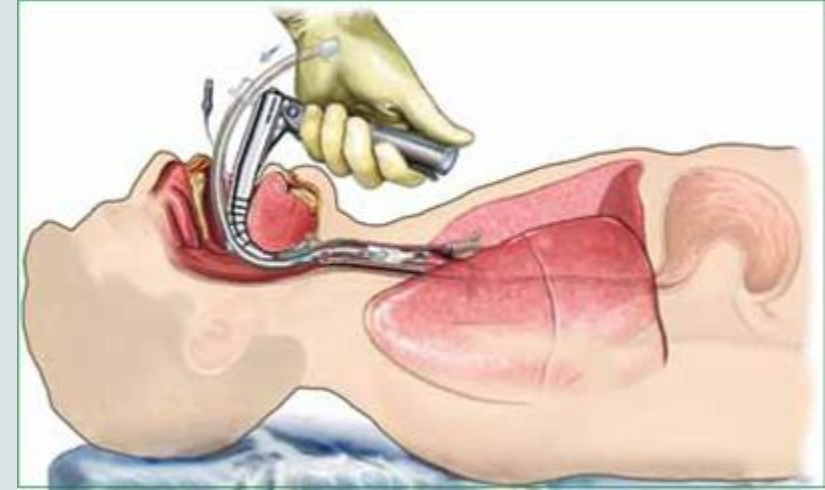
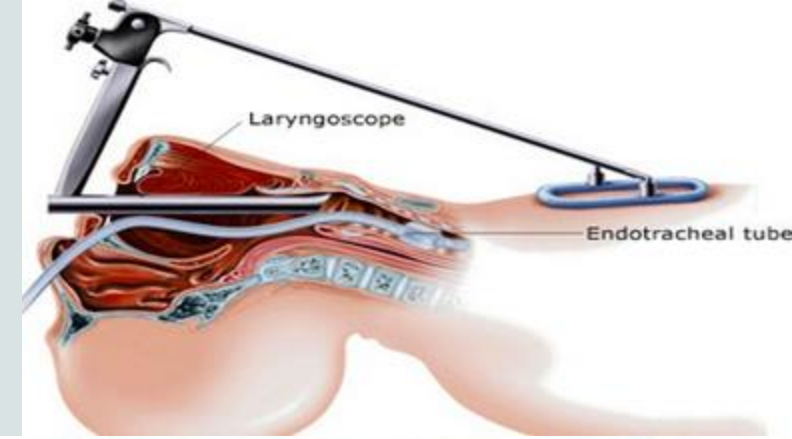
DIRECT LARYNGOSCOPY

Done by an ENT surgeon in the operating room using a general anesthetic.

A direct laryngoscopy is usually done to collect a biopsy sample if a laryngeal tumor is seen during an indirect or flexible laryngoscopy. The surgeon inserts a rigid laryngoscope into the mouth to look at the larynx and remove a sample of tissue for biopsy.

Direct laryngoscopy allows the clinician to examine the larynx in greater detail, palpate the larynx, and obtain a biopsy for histologic analysis.

Maintenance of a secure airway at all times is the paramount concern, and for severely compromised airways, a tracheostomy under local anesthetic may be necessary.



LARYNGOSTROBOSCOPY (OR VIDEOSTROBOSCOPY)

used to examine the vocal cords during speech—a camera is attached to a laryngoscope, and flashing lights are used to slow down the image of the cords moving.

A laryngostroboscopy may be done to diagnose laryngeal cancer. It may also be done to assess speech before, during, and after treatment

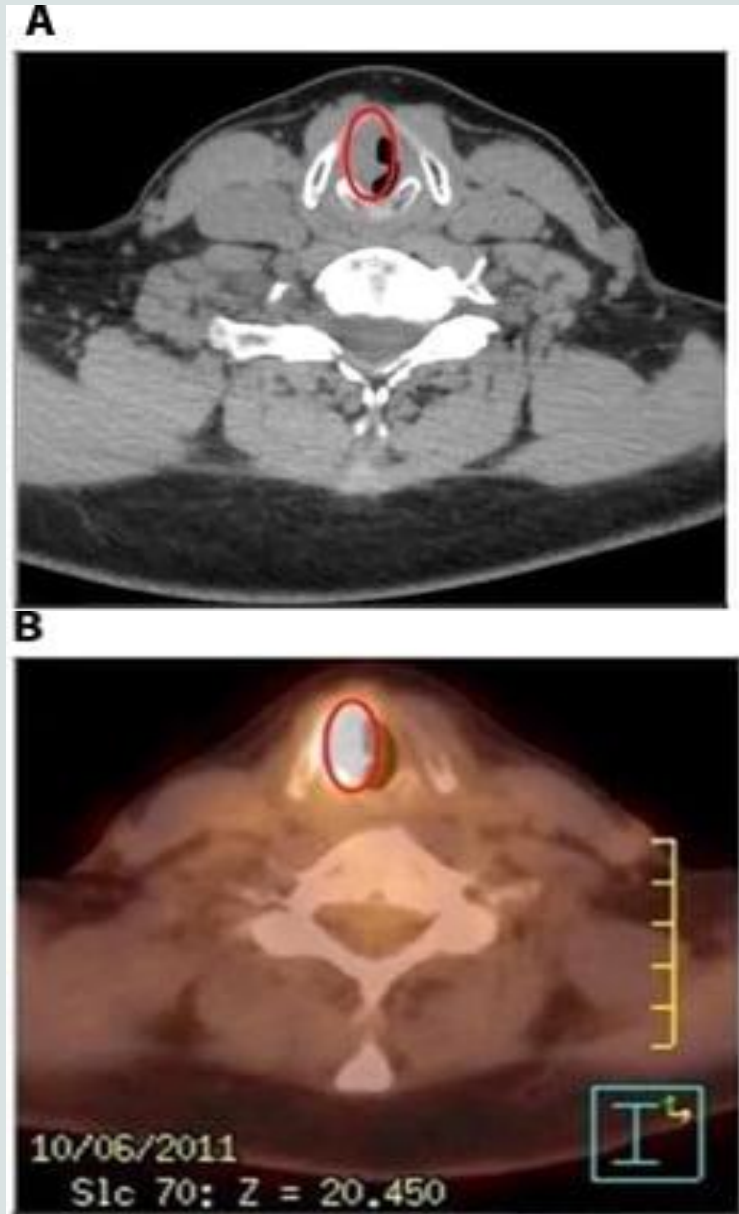
The sensitivity and specificity of videostroboscopy in predicting the invasive nature of lesions based on absence or mucosal reduction were 96.8% and 92.8%, respectively.

BIOPSY

- endoscopic biopsy – tissue samples are removed from the larynx during a direct laryngoscopy
- fine needle aspiration (FNA)



Imaging



It is recommended to perform imaging studies that support staging, such as computed axial tomography, which is a very useful resource for assessing affection of bone structures.

Positron emission tomography combined with computed tomography is useful in evaluating recurrences and can identify areas of local and nodular recurrence and distant metastases

Nuclear magnetic resonance surpasses computerized axial tomography in the detection when cartilaginous and soft tissues are affected.

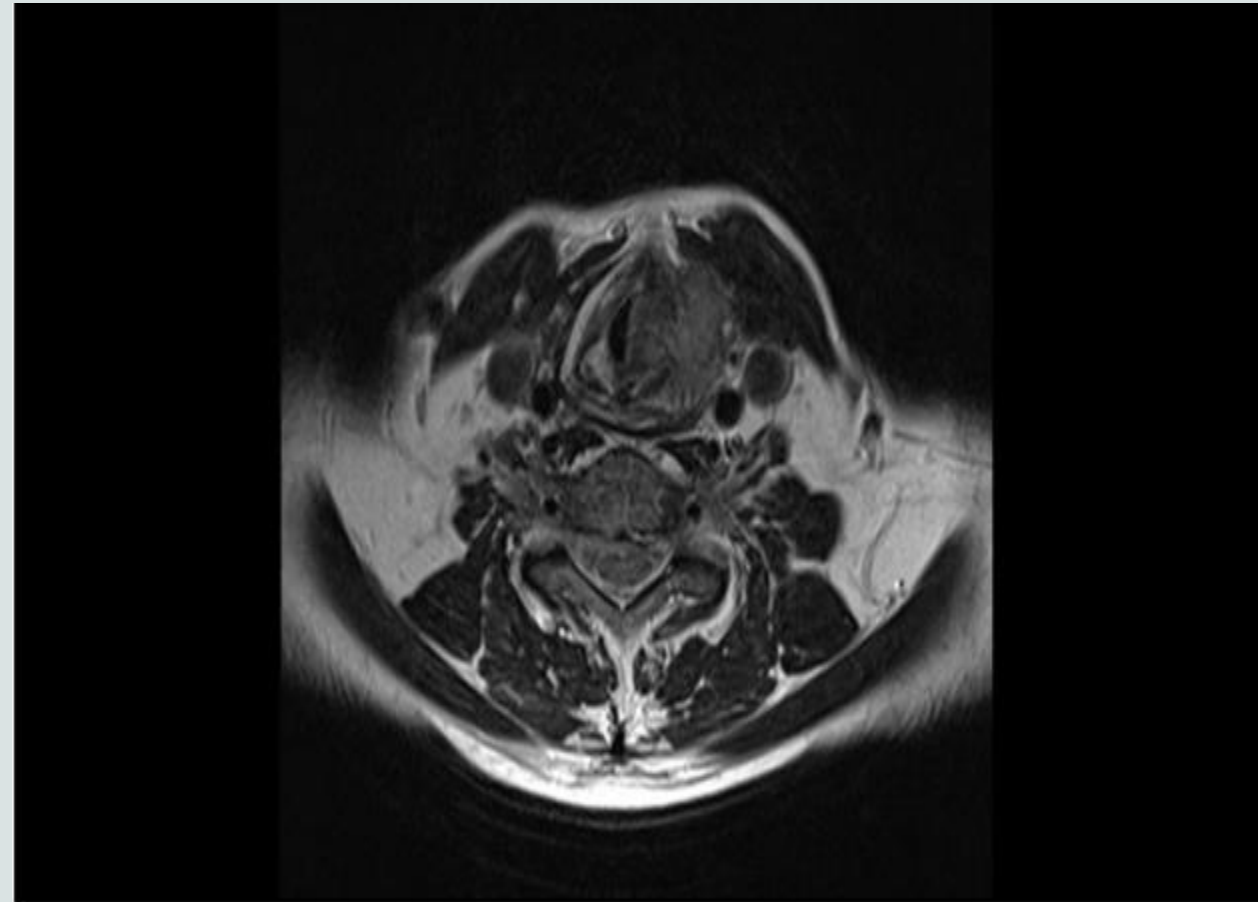
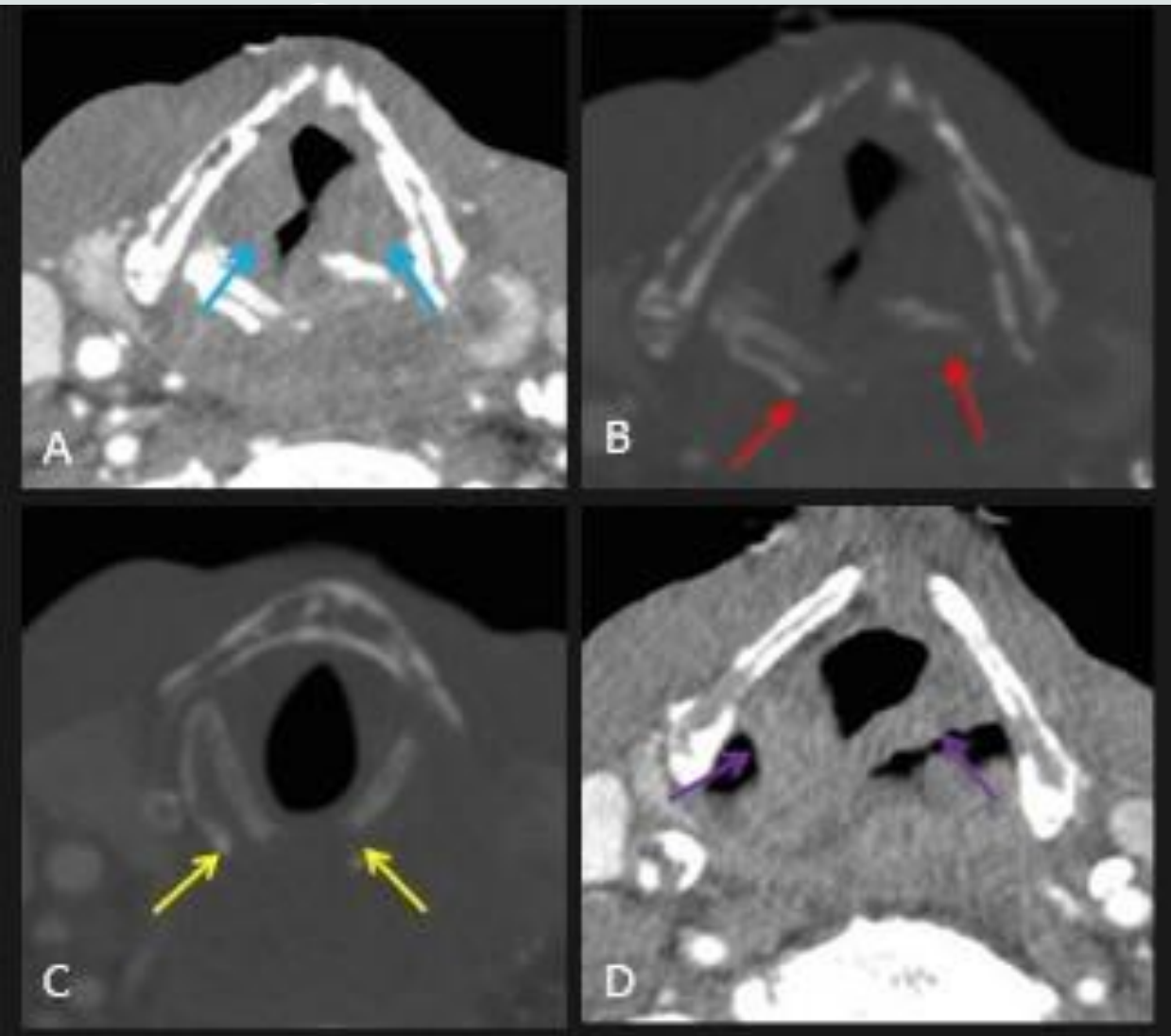


Fig. 3: T2w axial - T4 glottic tumor with infiltration of thyroid cartilage on the left side

© MRI department, Center for Radiology and Magnetic Resonance Imaging, Clinical Center of Serbia - Belgrade/RS

Staging and Management



Staging

The staging of laryngeal cancer is crucial for determining prognosis and guiding treatment decisions.

The 2 main systems doctors use to stage cancer of the larynx, according to AJCC UICC 8th edition, are

- TNM system
- Number classification system, which uses the TNM system to divide cancers into stages.

Different sites of the larynx are involved, and the site involved influences the presentation, patterns of spread, and treatment options.



1) TNM

Tumor (T) describes the size of the tumor and how far it's grown in the nearby area

T Category	T Criteria
TX	Primary tumor cannot be assessed
Tis	Carcinoma in situ

From this point onwards, each subdivision of the larynx (supraglottis/glottis/subglottis) maintains its own staging system.



Supraglottis

T Category	T Criteria
T1	Tumor limited to one subsite of supraglottis with <u>normal vocal cord mobility</u>
T2	Tumor invades mucosa of more than one adjacent subsite of supraglottis or glottis or region outside the supraglottis (eg, mucosa of base of tongue, vallecula, medial wall of pyriform sinus) <u>without fixation of the larynx</u>
T3	Tumor <u>limited to larynx</u> with <u>vocal cord fixation</u> and/or invades any of the following: postcricoid area, preepiglottic space, paraglottic space, and/or inner cortex of thyroid cartilage
T4	<ol style="list-style-type: none">Moderately advanced: Tumor invades through the outer cortex of the thyroid cartilage and/or <u>invades tissues beyond the larynx</u> (eg, trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus).Very advanced: Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures.



Glottis

T Category	T Criteria
T1	Tumor limited to the vocal cord(s) (may involve anterior or posterior commissure) with normal mobility a. Limited to one vocal cord b. Involves both vocal cords
T2	Tumor extends to supraglottis and/or subglottis, and/or with impaired vocal cord mobility
T3	Tumor limited to the larynx with vocal cord fixation and/or invasion of paraglottic space and/or inner cortex of the thyroid cartilage
T4	a. Moderately advanced: Tumor invades through the outer cortex of the thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, cricoid cartilage, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus). b. Very advanced: Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures.



Subglottis

T Category	T Criteria
T1	Tumor limited to the subglottis
T2	Tumor extends to vocal cord(s) with normal or impaired mobility
T3	Tumor limited to larynx with vocal cord fixation and/or invasion of paraglottic space and/or inner cortex of the thyroid cartilage
T4	<ul style="list-style-type: none">a. Moderately advanced: Tumor invades cricoid or thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus).b. Very advanced: Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures.

Node (N) describes whether cancer has spread to the regional lymph nodes

ENE stands for extranodal extension ie cancer growth from within the lymph node (LN) outward into the perinodal tissues

N Category	N Criteria
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or smaller in greatest dimension and ENE(-)
N2	Metastasis in a single ipsilateral node, larger than 3 cm but not larger than 6 cm in greatest dimension and ENE(-); OR Metastases in multiple ipsilateral lymph nodes, none larger than 6 cm in greatest dimension and ENE(-); OR Metastases in bilateral or contralateral lymph nodes, none larger than 6 cm in greatest dimension and ENE(-)
N3	a. Metastasis in a lymph node, larger than 6 cm in greatest dimension and ENE(-) b. Metastasis in any lymph node(s) with clinically overt ENE(+)



Metastasis (M) describes whether the cancer has spread to a different part of the body.

M Category	M Criteria
M0	No distant metastasis
M1	Distant Metastasis

Laryngeal cancer most often metastasizes to the cervical lymph nodes regionally, and supraglottic + subglottic carcinomas are reported to metastasize more often lymphatically than glottic carcinomas due to scant lymphatic drainage of the vocal folds.

The most frequent site of distant metastasis, however, is the lung (followed by the liver and bones).



2) Prognostic Stage Groups

What's an easier way to remember which T/N/M corresponds with each stage?

Ground rule: as long as N and M are 0, stage number will correspond to tumor (T) stage number (eg; T1→Stage I, T2→Stage II, etc), but if...

- N1→Stage III for T1-T3
- N2→Stage IVa for T1-T4a
- N3→Stage IVb for T1-T4b
- M1→Stage IVc regardless of T or N

Stage	T	N	M
Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T1, 2, 3	N1	M0
Stage IVa	T4a	N0, N1	M0
	T1, 2, 3, 4a	N2	M0
Stage IVb	T4b	N0, N1, N2	M0
	Any T	N3	M0
Stage IVc	Any T	Any N	M1

Prognosis and Management

Early-stage disease is often highly treatable or curable in the supraglottis and glottis. Primary subglottic cancer portends a bleak prognosis and is also quite rare. In contrast, **advanced-stage** has a much poorer prognosis across all subsites, though the pattern is maintained in that glottic primaries often have the best outcome, followed by supraglottic and then subglottic primary tumors.

These generalizations apply only to laryngeal squamous cell carcinoma. Minor salivary gland carcinoma of the larynx, melanoma of the larynx, etc. are treated most often in clinical trials, as their rarity precludes definitive treatment recommendations.

Risk of recurrence is highest in the first 2 to 3 years after treatment. Patients are considered cured after being disease-free for 5 years, after which recurrences are rare and usually represent new primary malignancies. Close, regular follow-up (4-6 week intervals → every 2 months after the first year → every 3 months for 3rd and 4th years → annually) is crucial to maximize the chance for salvage. Follow-up includes careful clinical examination and repetition of any abnormal staging study, along with attention to any treatment-related toxic effect or complication

A) Early-Stage Cancer (I – II)

Single treatment modality → radiation therapy or surgery

The overall survival is equivalent when treated with radiation therapy or with surgery, so the treatment decision is made using patient factors (preference, anatomy that precludes endoscopic or robotic surgery, etc), as the secondary goal is to preserve a functional larynx. Radiation therapy may be selected to preserve the voice and to reserve surgery for salvaging failures.



Supraglottic

- Radiation therapy should be preferred because of the good results, preservation of the voice, and the possibility of surgical salvage in patients whose disease recurs locally.
- Supraglottic laryngectomy. Total laryngectomy may be reserved for patients unable to tolerate potential respiratory complications of surgery or the supraglottic laryngectomy.
*Bilateral neck dissection may be required with nodal involvement.

Glottic

- Radiation therapy.
- Endoscopic CO2 laser excision.
- Cordectomy for very carefully selected patients with limited and superficial T1 lesions.
- Partial or hemilaryngectomy or total laryngectomy, depending on anatomical considerations

Subglottic

- Lesions can be treated successfully by radiation therapy alone with preservation of normal voice.
- Surgery is reserved for failure of radiation therapy or for patients who cannot be easily assessed for radiation therapy or for whom follow-up is likely to be difficult.

Modality	Advantages	Disadvantages
Radiotherapy	Better voice outcomes Laryngeal preservation	Radical treatment Complications: mucositis, odynophagia, laryngeal edema, xerostomia, stricture + fibrosis, radionecrosis, hypothyroidism
Transoral endolaryngeal surgery	Single sitting Minimal absence from employment Certainty of removal of specimen Ability to assess margin Allows further laryngeal surgery or therapy	Affect voice quality Difficulty of access May need repeated operations

B) Locally-Advanced Laryngeal Cancer (III - IVa)

Multimodality therapy—combination of chemotherapy and radiation therapy with or without surgery, or surgery followed by radiation therapy

Advanced laryngeal cancers are often treated by combining radiation with concurrent chemotherapy for larynx preservation. If the larynx is nonfunctional, or if there is a high risk the larynx will be nonfunctional after nonsurgical treatment, then laryngectomy is the preferred treatment modality to prevent chronic aspiration and risk of pneumonia. Also, if the patient has T4 laryngeal cancer or T3 due to cartilage invasion, the oncologic outcomes are superior with primary laryngectomy compared to nonsurgical treatment.

- **Postoperative radiation therapy (PORT)** indicated for advanced T and N on surgical pathology (pT3-4, pN2-3), close margins (<5 mm), perineural invasion, lymphovascular space invasion, commitment of ≥ 2 LN, and extracapsular extension



C) Metastatic Laryngeal Cancer (IVc)

Treatment for laryngeal cancer becomes systemic (chemotherapy and/or immunotherapy) and largely palliative in nature

If a lesion is detected in the lung, primary cancer of the lung must be ruled out before treating for metastasis due to overlapping risk factors with laryngeal cancer, such as smoking.



T3 and nonbulky T4 → concurrent chemoradiation therapy can be considered for patients who would require total laryngectomy for control of disease

- **Total laryngectomy indication:**

- Advanced laryngeal cancer with extensive cartilage destruction and extra laryngeal spread.
- Involvement of posterior commissure with both arytenoids.
- Completion procedure after failed partial laryngectomy/irradiation.
- Severe aspiration following partial/near total laryngectomy.
- Massive nodal metastasis

Bulky T4 → surgery followed by postoperative radiation therapy (PORT) with or without concurrent chemotherapy

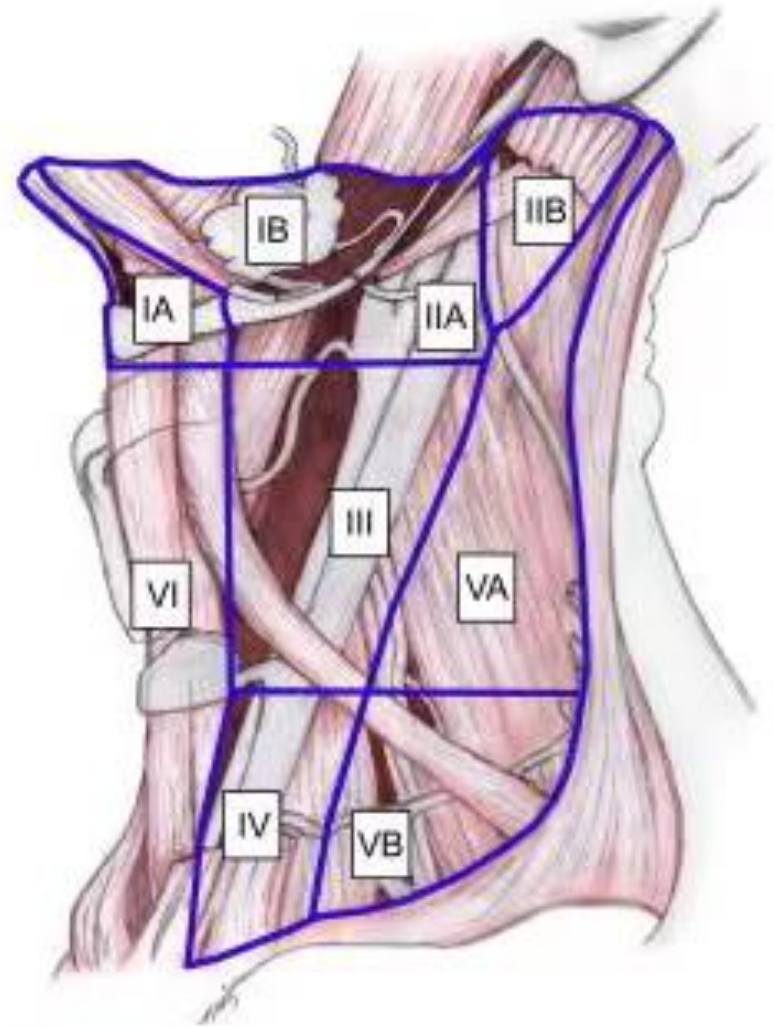
Subglottic → laryngectomy plus total thyroidectomy and bilateral tracheoesophageal node dissection usually followed by PORT with or without concurrent chemotherapy based on pathological risk factors

Patient not a surgery or chemotherapy candidate → definitive radiation therapy alone

Modality of Treatment	Advantage	Disadvantage
Open partial/subtotal laryngectomy	Good local and regional control Laryngeal preservation	For small T3 tumors only Expertise and more studies required
Total laryngectomy	Excellent local and regional control	Poor voice production and communication Bad psychological effects
Chemoradiotherapy	Organ preservation Less distant metastasis	Double local recurrence rate
Transoral endolaryngeal surgery	Good local and regional control Laryngeal preservation	Need radiotherapy or chemotherapy post surgery in very advanced stages Expertise and more studies required



Nodal Management



NO: subject of much controversy—elective neck dissection (ND) with the surgical resection of the carcinoma itself vs elective neck irradiation vs watchful waiting; the advantage of ND compared to neck irradiation is the subsequent histopathological examination of occult metastasis to initiate adjuvant therapy

N1

- Primary treatment by surgery: selective II-IV neck dissection, followed by chemoradiotherapy where appropriate; occult metastases at levels I and V are rarer and need to be dissected only for higher neck stages
- Primary treatment by chemoradiotherapy: treatment of the nodal metastases can also be performed by chemoradiotherapy followed by assessment of neck

N2-3

- Primary treatment by surgery: MRND should be performed with consideration of postoperative radiotherapy or chemoradiotherapy; supraomohyoid ND may be considered over MRND
- Primary treatment by chemoradiotherapy: further treatment is controversial; the options are neck dissection or treatment followed by PET scan.

Types of Neck Dissection

RADICAL ND

Removal of

- The 6 levels of LNs.
- Spinal accessory nerve .
- Internal jugular vein .
- Sternocleidomastoid

It has been replaced by more conservative procedures→

MODIFIED RADICAL ND

Excision of all LN routinely removed in a radical neck dissection with preservation of one or more of the 3 key nonlymphatic structures (SAN, IJV, SCM)

Variation in practice makes it advisable to name explicitly the structures spared in MRND (e.g. modified radical neck dissection with preservation of the spinal accessory nerve).

SELECTIVE ND

One or more lymph node groups normally removed in a radical neck dissection are preserved.

The page features decorative white line-art illustrations of leaves and branches in the corners. In the top-left and top-right, there are clusters of several pointed leaves on a stem. In the bottom-left and bottom-right, there are smaller clusters, including a large heart-shaped leaf with internal vein patterns and a small branch with two leaves.

Vocal Rehabilitation

AS LONG AS THERE'S AN ALTERNATIVE SOURCE OF VIBRATION IN THE PHARYNX, A PATIENT WHO UNDERWENT TOTAL LARYNGECTOMY CAN STILL RETAIN THE ABILITY TO SPEAK TO SOME EXTENT THROUGH THE FOLLOWING PROCEDURES.

Non-surgical Methods

ESOPHAGEAL SPEECH

some patients may learn to swallow air into the pharynx and upper esophagus. On regurgitating the air, a segment of the pharyngo-esophageal mucosa vibrates to produce sound, which is modified by the vocal tract into speech

- Pros: requires no surgical procedure, prosthesis, or cumbersome hand motions
- Cons: few patients are able to achieve usable esophageal speech, and fewer than one in five achieve speech acceptable for social interaction

ELECTROLARYNX

battery-powered external device applied to the soft tissue of the neck in the submandibular region, where muscle contraction and changes in facial muscle tension will cause rudiments of speech

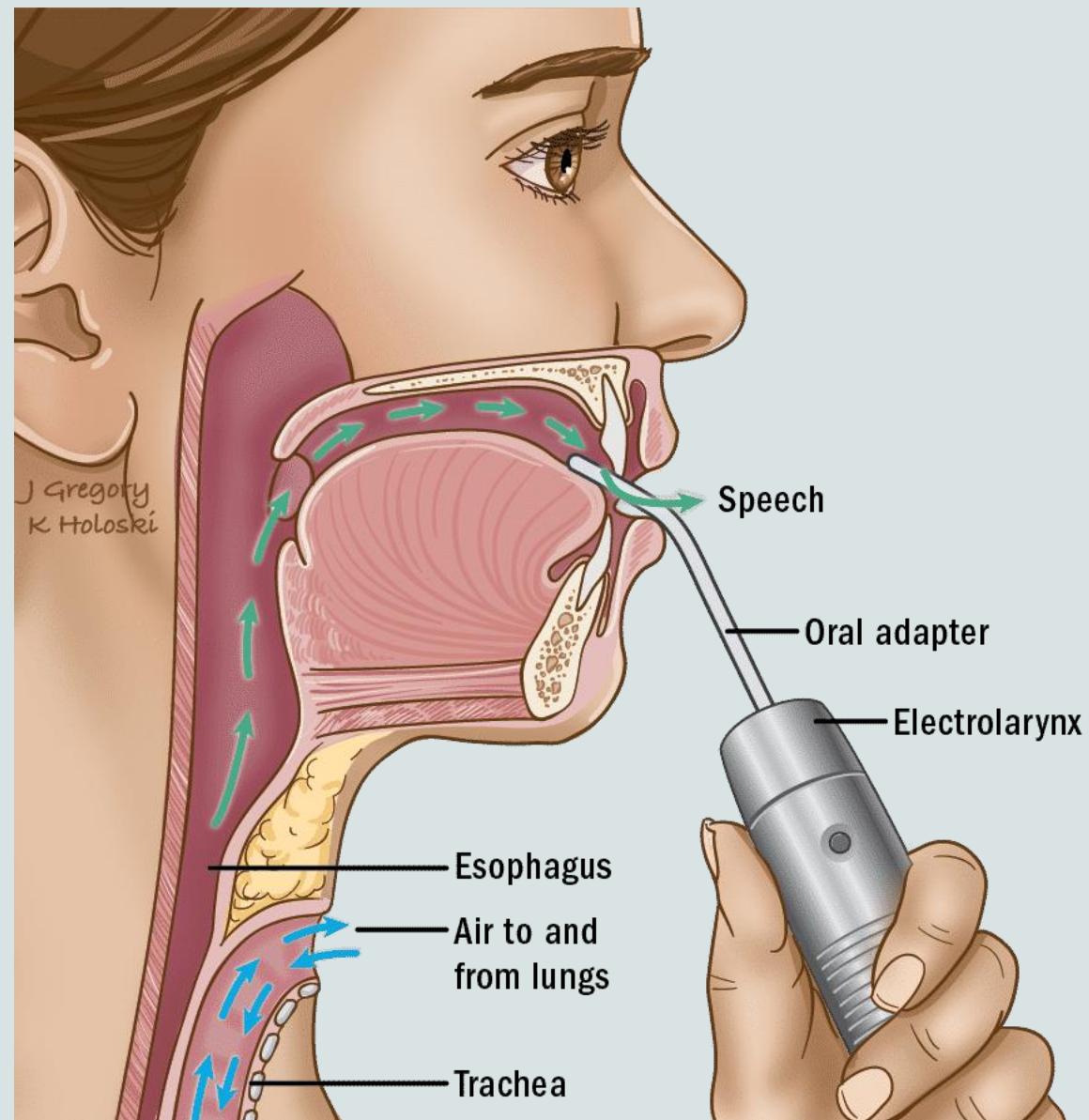
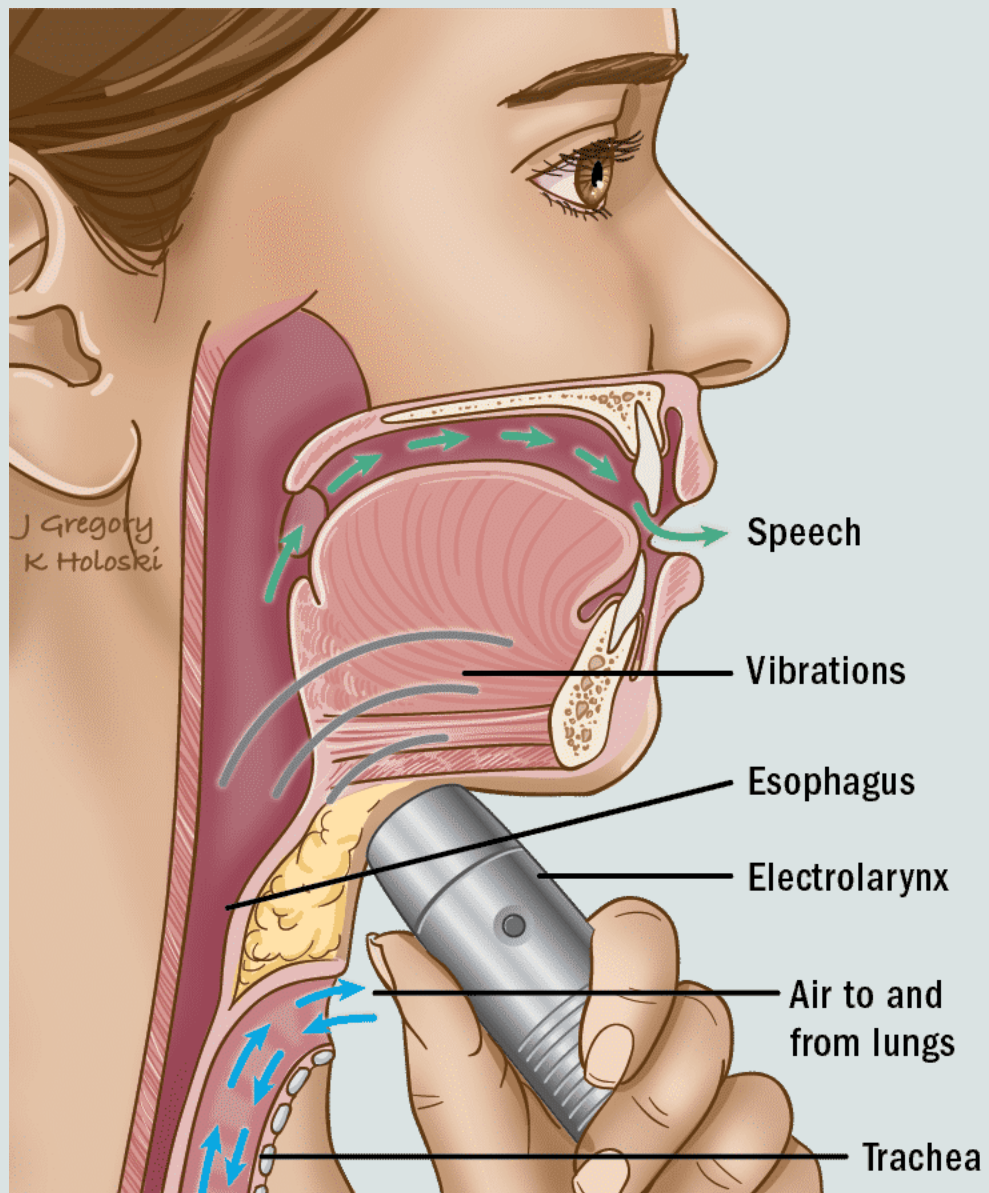
- Pros: avoidance of additional surgical procedures, ease of use
- Cons: mechanical quality of the voice, costly maintenance



Tore's Voice
Esophageal speech



Atos
Atos Medical Your voice



Surgical Methods

TRACHEOESOPHAGEAL SHUNTS (TEP)

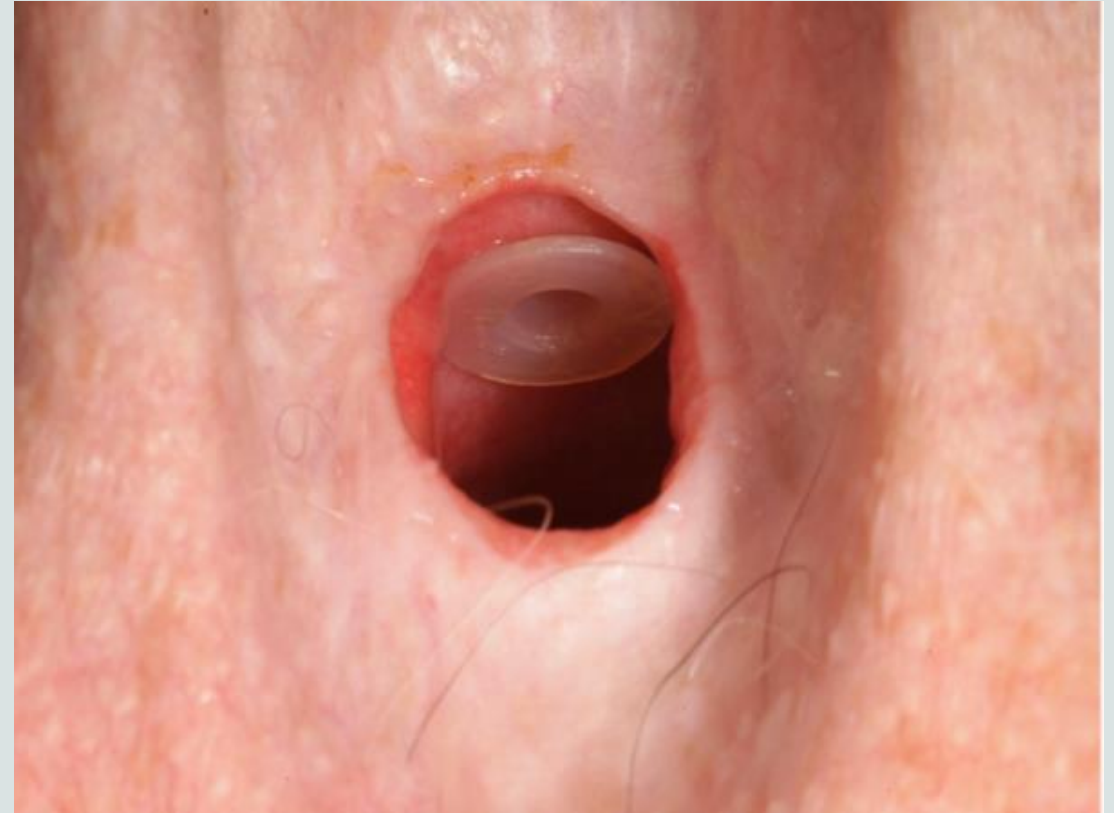
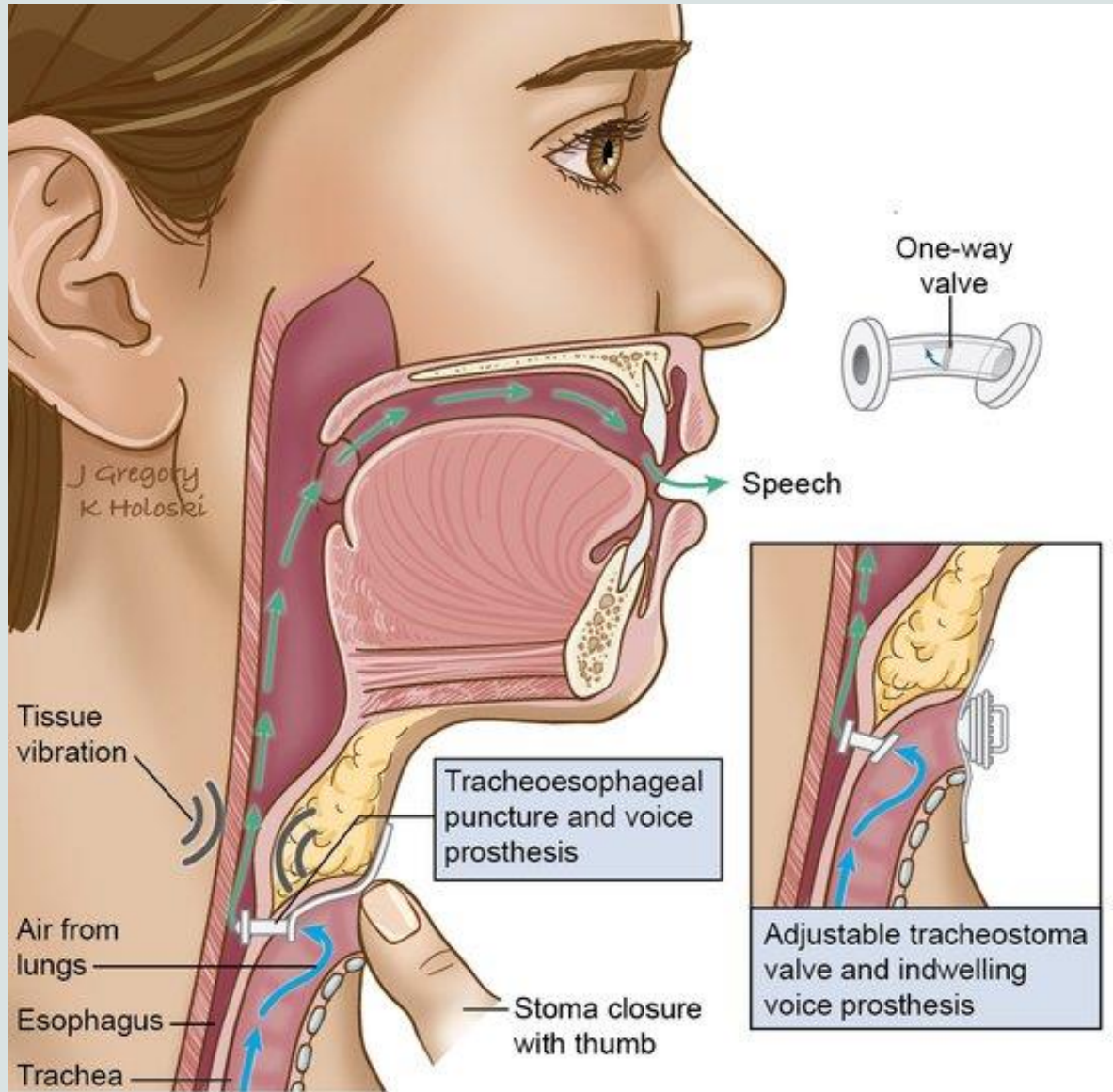
a small one-way silicone valve, known as Blom-Singer valve, may be inserted through the back wall of a tracheoesophageal fistula into the pharynx, serving as a one-way conduit for air into the esophagus while preventing aspiration. They can be created at the time of primary surgery, or later.

- Pros: rapid restoration of voice that is more natural sounding, minimal maintenance, reversible procedure
- Cons: not hands-free (thumb must cover the stoma), tracheitis, excessive secretions, wound healing problems, inaccurate sizing, puncture stenosis, leaks, fungal colonization, etc

NEOGLOTTIC RECONSTRUCTION

A neoglottis is created from the upper-tracheal rings to prevent postoperative stenosis and was also made to protrude into the esophagus, to prevent aspiration.

Abandoned due to increased risk of aspiration.





Thank you
