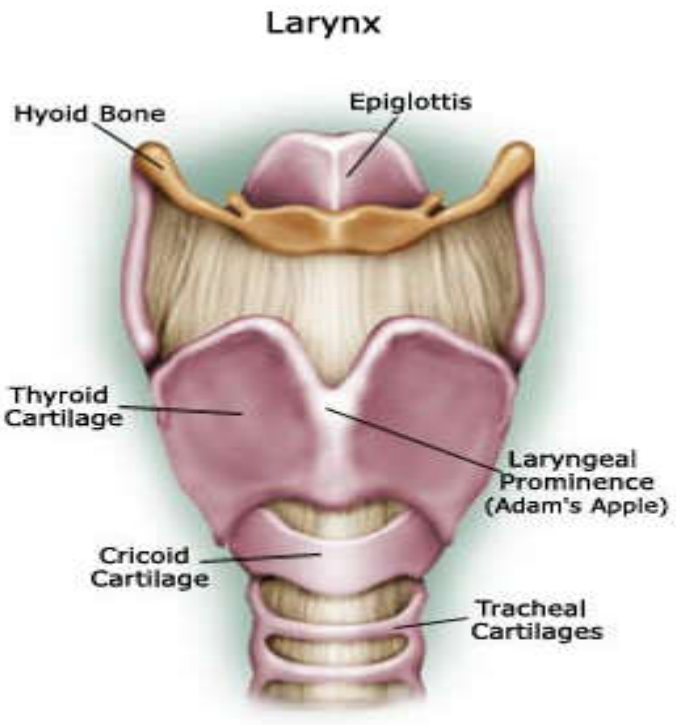
TUMORS OF THE LARYNX
For Undergraduate



Laryngeal Masses

Tumour-Like

Congential

Saccular cyst

Laryngeocele

Acquired

Traumatic

- Nodule
- Polyp
- INTUBATION GRANULOMA

·INFLAMMATORY

- REFLUX LARYNGITIS
- ·RIENKE'S OEDEMA
- ·VENTRICULAR PROLAPSE

·REACTIVE

- HYPERKERATOSIS
- LEUKOPLAKIA
- ERYTHOPLAKIA

Tumours

Benign

Epithelial

Papilloma

Multiple papilloma

CT:

Hamangioma

Chondroma

Malignant

PRIMARY

·SCC

·VERRUCOUS

·ADENOID CYS

·LYMPHOEPI

Sarcoma

Lymphoma

·SECONDARY

- ·HYPOPHARYN
- ·THYROID 2

·METASTATIC

Precancerous

Leukoplakia

Erythroplakia

Single papilloma

Larygeal keratosis

Benign Tumors of the Larynx

- Benign tumors of the larynx are relatively uncommon.
- Types:
  - **Epithelial**
    - Squamous epithelium
      - Papilloma,Recurrent respiratory papillomatosis
      - Keratinised papilloma
    - Glandular
      - Pleomorphic adenoma
      - Oncocytic tumour

– **Non-epithelial , Mesenchymal**

- Vascular
  - Haemangioma

    Infantile: subglottic. Adult: supraglottic.
  - Lymphangioma
- Cartilage and bone

  Chondroma Osteoma Giant cell tumour
- Muscle

  Leiomyoma Rhabdomyoma Angiomyoma Epithelioid leiomyoma
- Adipose: Lipoma
- Neural

  Neurilemmoma Neurofibroma Schwannoma Paraganglioma (Chemodectoma) Granular cell

- Pseudotumours : Inflammatory -fibroblastic Amyloid Laryngeal cysts

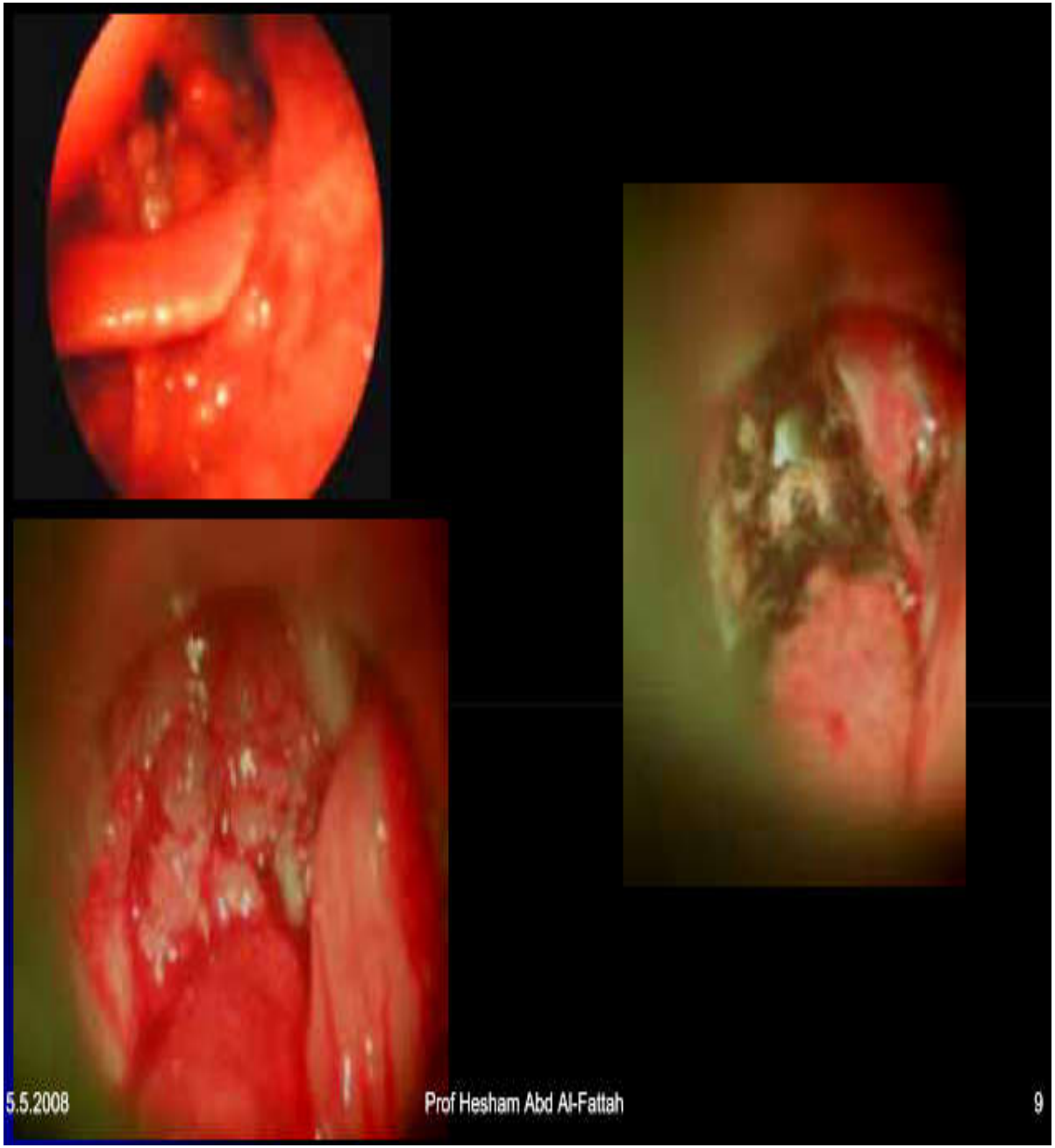
Single Papilloma of the Larynx

- **Incidence**
  - Adults (30-50 years) , males
  - True neoplasm
  - No recurrence if completely removed
  - Turn malignant 5%
- **Pathology:**
  - **Site:** The free edge of the of 2/3 of vocal cord is the commonest site.
  - Solitary, Sessile or pedunculated mass move up and down with expiration and inspiration.
  - Pink to deep red in colour
  - With warty papilliferous surface and variable size

- **Microscopically:**
  - A cord of vascular C.T., covered by hyperplastic stratified squamous epithelium.
  - Cell are well differentiated , orderly arranged with some mitotic figure
  - Intact BM
  - Keratosis frequently seen especially in recurrent cases
  - Loss of polarity in basal cell layer indicate early malignant changes
- **Clinical picture**
  - Dysphonia, stridor if large
  - Unilateral single whitish warty like mamillated

Management

- MLS: remove the whole lesion
- Biopsy



Multiple Papilloma of the Larynx

- **Pathology**
  - **Recurrent respiratory papillomatosis; juvenile multiple papillomatosis; viral papillomatosis**
  - Not true neoplasm; viral infection by HPV
  - Children 5-15 years
  - Similar to squamous papilloma, sessile, smaller, multiple
  - Recurrent in same or different areas, regress after puberty
  - Does NOT turn malignant

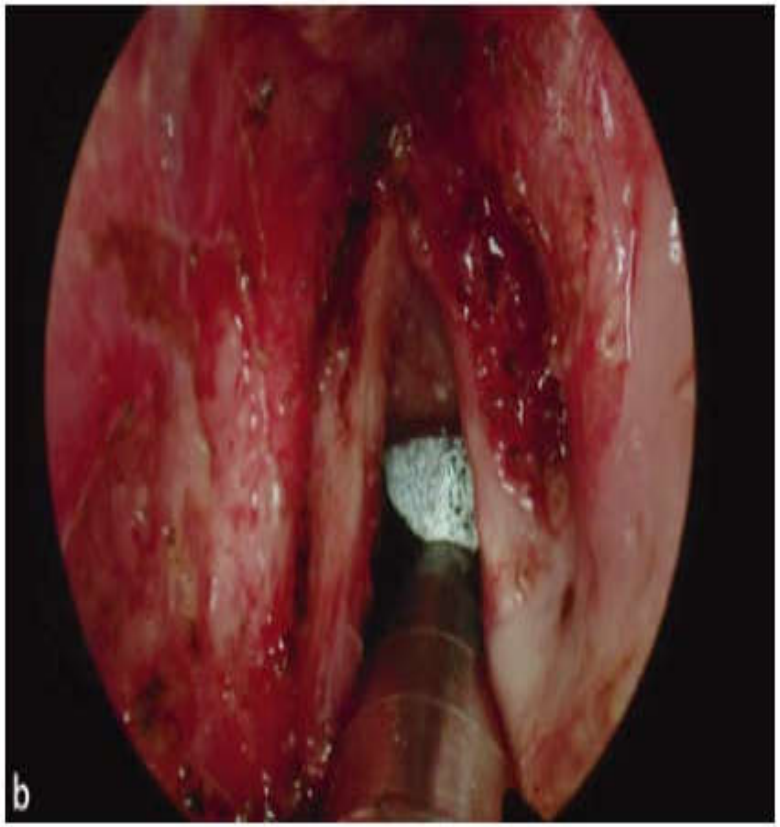
- it may be due to :
  - Viral infection with Human papilloma virus especially types 6 and 11. (most accepted) evidences :
    - Detection of HPV DNA incorporated in cellular DNA of papilloma cells , also detection of intracellular viral DNA in mucosa adjacent to papilloma
    - Similar to cutaneous warts (viral etiology)
    - Wart have been noticed on fingers of mothers nursing a child with tracheostomy

- In some patient disease transmitted at delivary from mother with vaginal warts
- Tendency for sponatenous regression at any age and relapse may occur
- Increased incidence of tracheobronchial involvement and even external tracheostomy wound in patient with :
  - Trachostomy
  - Repeated endoscopic procedures
  - Long duration of the disease

- Autoimmune disturbance or hormonal imbalance. Papillomas usually regress during puberty.

- **Clinical picture**
  - Stridor, dyspnea
  - Dysphonia
  - NPL-scope: multiple, sessile, warty like, pinkish granulations on vocal cords, supraglottic, subglottic, trachea, bronchi

- **Management**
  - Removal by MLS, crosurgery, laser
  - Medical: estrogen, interferon, autogenous vaccines
  - Severe stridor: tracheostomy, Risk of implantation at tracheal site

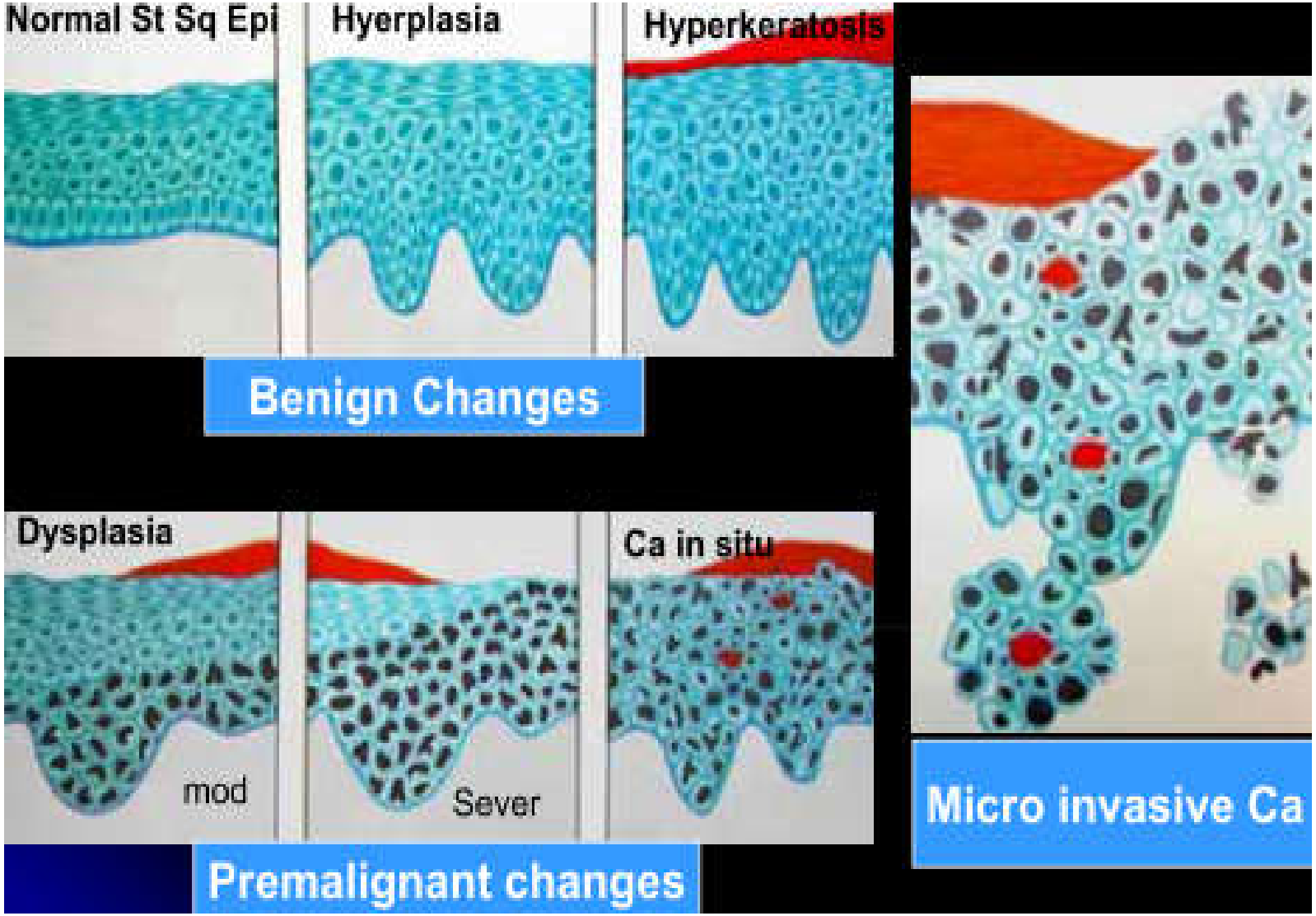


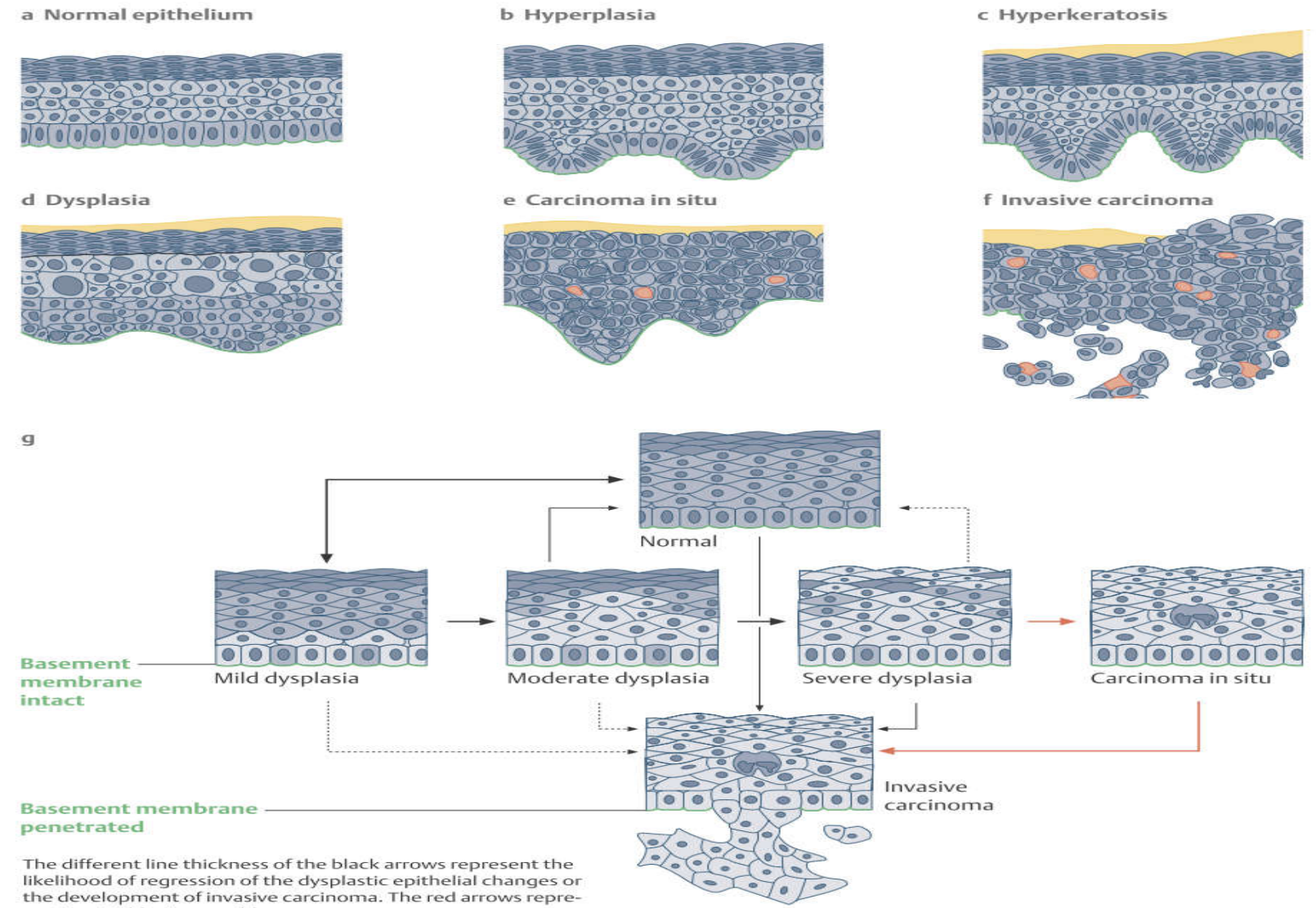
a Squamous papillomas involving glottis and supraglottis. **b** After CO_2 laser excision

	Adult solitary papilioma	Juvenile multiple papillomata
Age:	**Adults → 30 -50 years.**	**Children→5 -15 years.**
Aetiology:	**True benign tumour.**	**Human papilioma virus.**
Site:	**Commonly => anterior 2/3 of the vocal fold.**	**Anywhere in the larynx.**
Symptoms:	**Hoarseness of voice.**	**1- Stridor** **2-Hoarseness of voice**
Signs:	**Unilateral, single, pinkish, sessile, finely tabulated, wart-like mass.**	**Bilateral, multiple, pinkish, sessile, finely lobulated, wart-like masses.**
Treatment:	**Micro-laryngoscopic excision → by surgical instruments or laser surgery.**	**1- Repeated micro-la ryngoscopic excision → by surgical instruments or better laser surgery.** **2- Tracheostomy → when necessary.** **3- Anti-viral medications →as interferon and acyclovir are tried.**
Prognosis:	*** Recurrence → uncommon.** *** Malignant transformation → may occur.**	*** Recurrence → common but spontaneous regression usually occurs at puberty.** *** Malignant transformation → does not occur.**

Carcinogensis

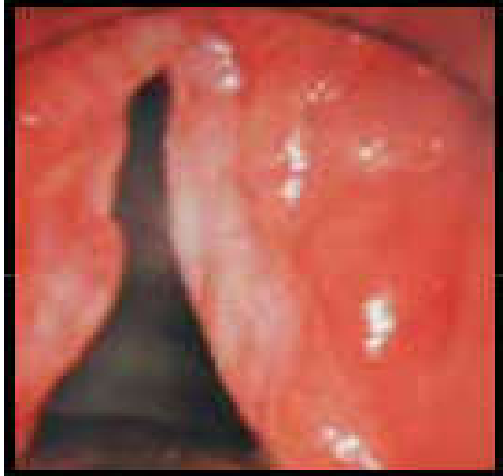
- Carcinogenesis in the upper aerodigestive tract is described as a **multistep process**. The exogenous agents cited above cause epithelial injury that evokes an epithelial response consisting of **(hyper**) regeneration (**hyperplasia**) and/or **hyperkeratosis**.
- With continued exposure to the noxious agents, there is a growing likelihood that foci of epithelial dysplasia will develop, spread, and eventually progress to carcinoma in situ.

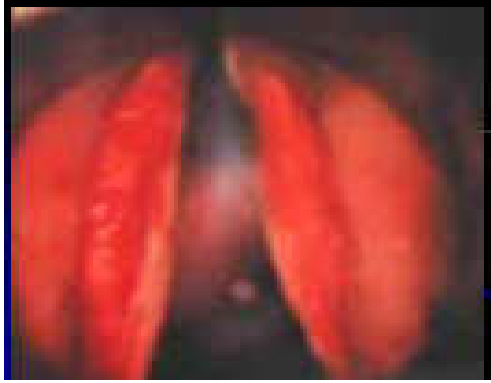

Normal St Sq Epi
Hyerplasia
Hyperkeratosis
Benign Changes
Micro invasive Ca
Dysplasia
mod
Sever
Ca in situ
Premalignant changes

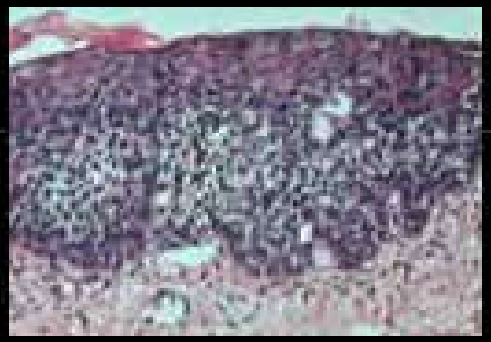

a Normal epithelium
b Hyperplasia
c Hyperkeratosis
d Dysplasia
e Carcinoma in situ
f Invasive carcinoma
g
Normal
Basement membrane intact
Mild dysplasia
Moderate dysplasia
Severe dysplasia
Carcinoma in situ
Invasive carcinoma
Basement membrane penetrated
The different line thickness of the black arrows represent the likelihood of regression of the dysplastic epithelial changes or the development of invasive carcinoma. The red arrows represent inevitable, irreversible processes.

HYPERPLASIA

DYSPLASIA







HYPERKERATOSIS

Laryngeal cancer

- Cancer = 2nd most common cause of death
- HNC = 6th cancer world wide
- HNC = of lowest 5-year survival
- HNC = 90% SCC
- Lx CA = 2% of body tumors
- Lx CA = 40% of HN tumors

- **Age:**

  occurs in old age (>40 , 60-70 years). However, it may affect younger age groups, particularly smokers.

- **Sex:**

  more common in males >females of a ratio of 8:1

- **Predisposing factors**: Chronic mucosal irritation:
  - Smoking , Ex-smoker (up to 20years):

➢90% of patients with larynx cancer have a history of heavy tobacco (take 10-20yr for a cell to turn into carcinoma insitu)

➢Burning cigarette produce 600 byproducts , 60 are carcinogenic , 26 affect reparatory tract

  - Alcohol:

The combination of smoking and alcohol use has synergistic carcinogenic effect on the larynx.

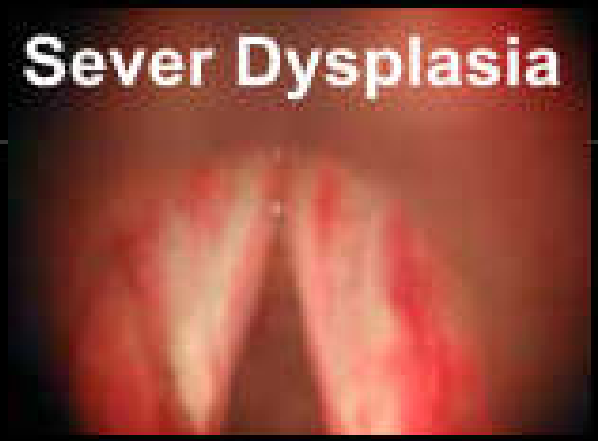
  - Chronic laryngitis:

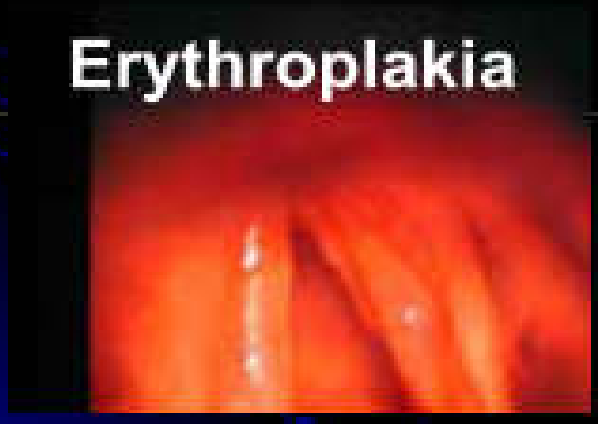
considered a predisposing factor based on the presence of the same risk factors.

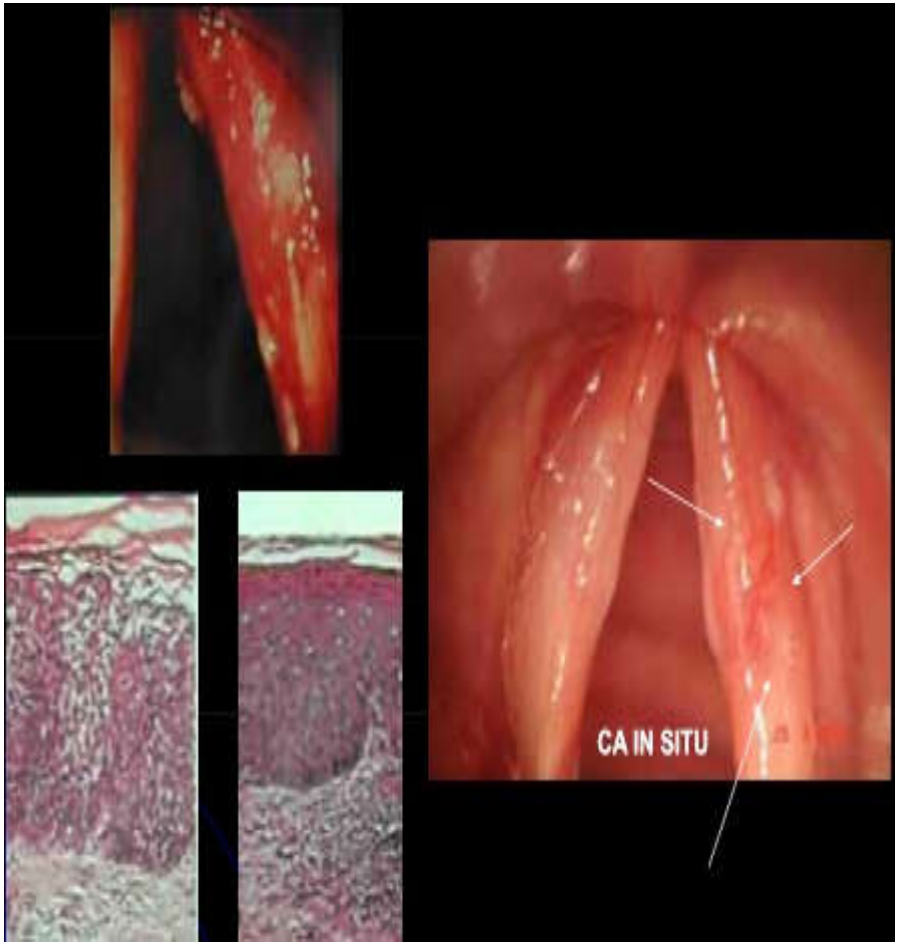
  - Neck irradiation
  - Exposure to asbestos, nickel , more common in wood workers.
  - GERD ????

- Precancerous conditions:
  - Leukoplakia: 50%
  - Laryngeal keratosis with severe dysplasia.
  - Single papilloma in adults.

Precancerous lesions







Severe dysplasia

CIS

I. According to its Location

Supraglottic

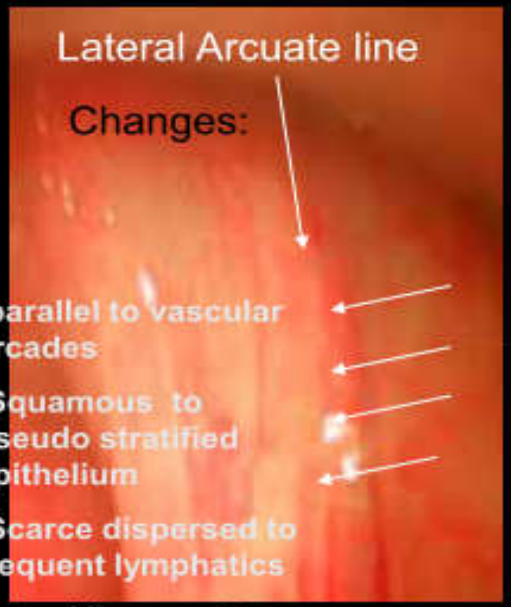
Glottic

Subglottic

Transglottic

Glottic — Lateral, Medial

Arcuate Line



Cord Vasculature

Classification: Regional

- Supraglottic larynx : arise from buccopharyngeal anlaoge (hypobranchial eminence) and arches III and IV
- The glottis and subglottis derivd from pulmonary anlage (laryngotracheal groove) and arch V
- The multiple arch derivation arise into horizontal segmentation of laryngeal structures in supraglottis, glottis and subglottis

- Significance:
  - The lymphatic drainage , vascular and nerve supply follow these anatomical boundaries:
    - Supraglottic : drain in superior and middle cervical LN
    - Glottis and subglottis: drain to juglo-omohyoid and inferior deep cervical LN
  - Surface lymphatics freely connect between the sides
  - Deep submucosal lymphatic remain in compartment according vertical and horizontal segmentation
  - Spread of cancer larynx respect this anatomic compartmentation

- Glottic: 60%
  - Vocal cords
  - Early presentation
  - No LN
- Supraglottic: 35%
  - Subdivided into :
    - ✓**Marginal zone:** laryngeal surface of suprahyoid epiglottis , AE fold ,Arytenoids
    - ✓**Supraglottic excluding marginal zone :** infrahyoid epiglottis , Ventricle, VB,
  - Late presentation : silent area
  - Rich lymphatic: 30-50% LN

- Subglottic: 5%
  - Starts glottic
  - Dyspnea, stridor rapidly
  - LN 10-20%
- **Transglottic carcinoma**
  - These represent tumours that crossed the laryngeal ventricle in a vertical plane, involving the supraglottis and the glottis, with possible involvement of the subglottis.

Pathology

- **Macroscopic**
  - Cauliflower mass (supraglottic).
  - Malignant ulcer(commonly glottic and subglottic)
- **Microscopic**
  - 90-95% SCC
  - Border's calssification :
    - Grade I: 75-100% well differentiated.
    - Grade II: 50-75% well differentiated.
    - Grade III: 25-50% well differentiated.
    - Grade IV: 0-25% well differentiated.


ii. Fungating (exophytic)


i. Ulcerating (everted edges)


iii. Infiltrating (submucosal

- Undifferentiated carcinomas, well-differentiated verrucous carcinomas, and other rare entities.
- Other malignant tumours may :
  - Metastasize to the larynx (secondary)—malignant melanoma, hypernephroma—and general
  - or systemic malignancies may manifest themselves in the larynx—non-Hodgkin's lymphoma

Tumour Behaviour (Spread & Destruction)

Guarded by:

1. Host Defenses → a. Age
b. Systemic disease
c. Inflammatory Reaction

2. Tumour

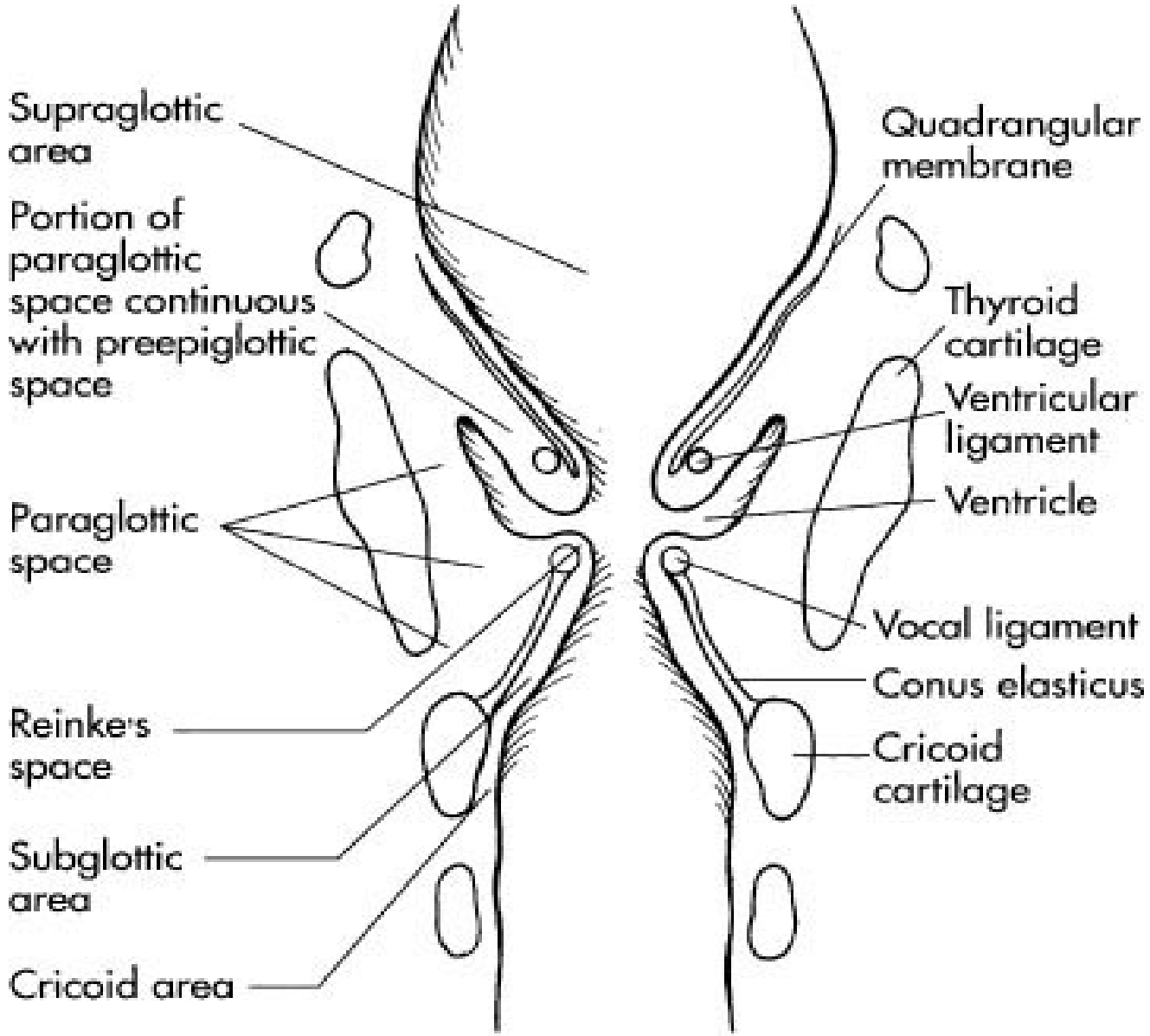
- **a. Differentiation**
- **b. Size > 4 cm**
- **c. Thickness >1.5 cm**
- **d. Location** → a. Embryological
  b. Anatomical
  i. Lymphatics
  ii. Barriers → •Ligaments •Cartilages
  iii. Preformed Pathways
  iv. Silent or Not
- **e. Margins** (Pushing/Infiltrating)
- **f. Cell Size**

•Broyles Ligament
•Pre-epiglottic Sp
•Paraglottic Sp

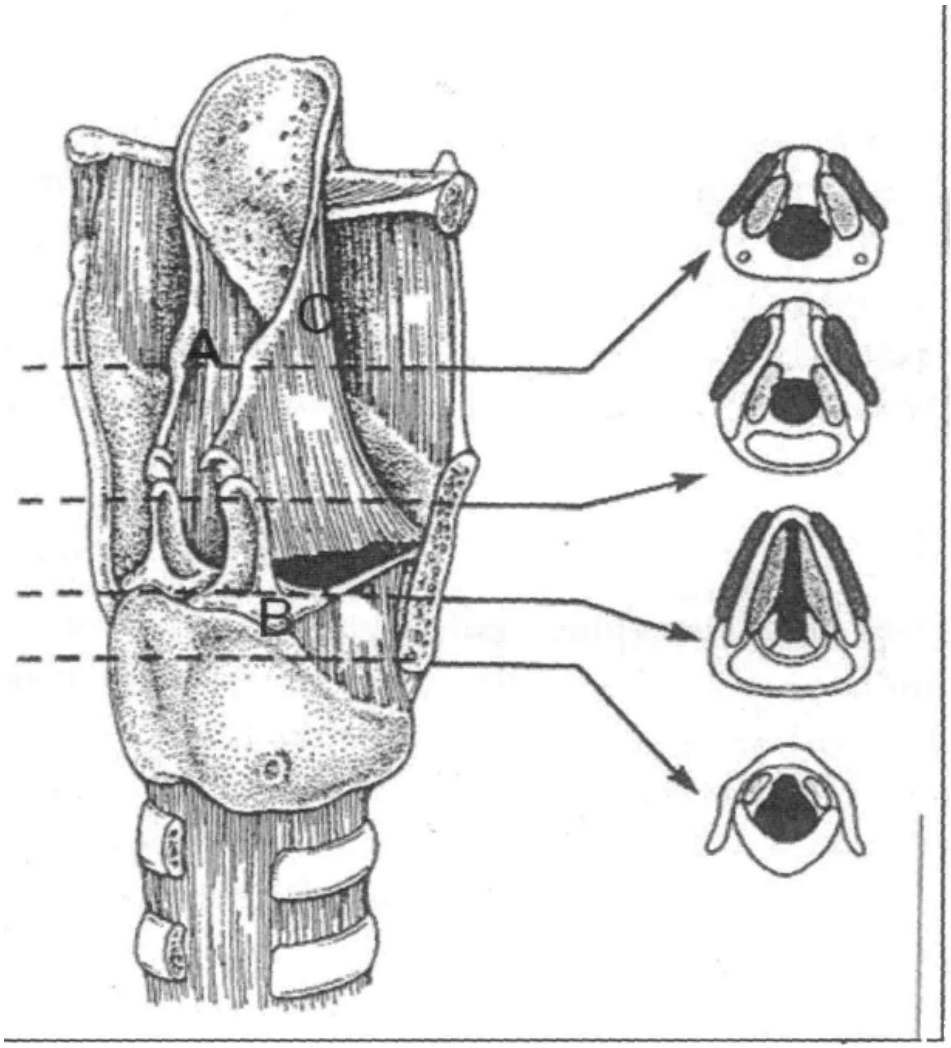
Spread

- **Direct:**
  - From one region to another
  - Liagmentous and cartilagenous structures of the larynx offer great resistance to invasion by carcinoma. once invaded , survival rate diminished dramatically
    - Quadrangular membrane : separate supraglottic from paraglottic space
    - Conus elasticus : separate glottis and subglottic space from paraglottic space and intrinsic laryngeal muscle → fixation
    - Thyrohyoid membrane :
      - ❖From anterior boundaries of pre-epiglottic space
      - ❖If the space involved , tumour may spread through membrane to the neck or into the deep muscles of the tongue base

- Cricothyroid membrane :Subglottic tumour may spread through this membrane into neck
- Anterior commissure : Spread along lead to cartilage invasion
- Thyroid and cricoids cartilage ;
  - Cartilage may produce substance that inhibits tumour angiogensis
  - Cartilage invasion usually occur in ossified portions of cartilage (may related to vascularity association with ossification)



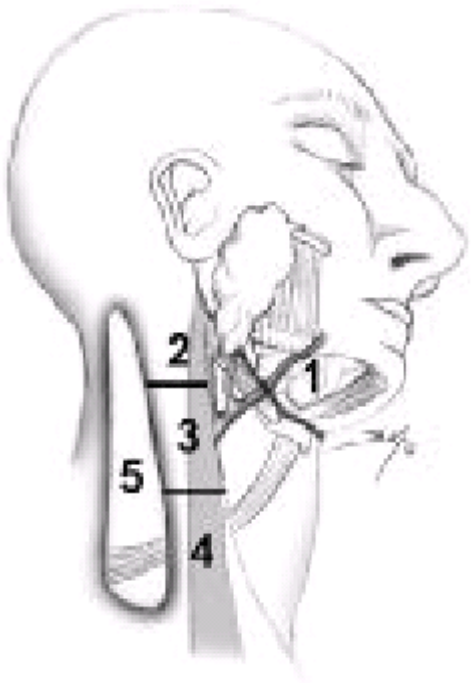
Connective tissue barriers within the larynx



Three-dimensional representation of the laryngeal barriers and compartments. The 4 cross sections on the right are axial schematics showing the extent of the preepiglottic and paraglottic spaces at various levels of the larynx. (A) quadrangular membrane; (B) conus elasticus; (C) thyrohyoid membrane

- Laryngeal carcinoma is associated with a high incidence to develop a **second primary** 6-12 % , in the areodigestive tract especially bronchogenic carcinoma.
- It occurs either synchronously (at the same time) in 0.5-1%,
- or metasynchronously in 5-10% of cases. Therefore, proper assessment and prolonged follow up of laryngeal carcinoma is essential.

- **Lymphatic**
  - By permeation , Embolism , perilymphatic
  - Most important factor in prognosis
  - +ve LN = drop 50% in prognosis
  - Supraglottic to upper deep cervical LNs (30-50 %)
  - Glottic has no lymphatic drainage (early glottic cancer doesn't spread to LNs) except after spread to the adjacent areas.
  - Subglottic to the lower cervical LNs then paratracheal LN and superior mediastinal LN.



- **Blood: distant**
  - 1% lung, bones, liver

- **There are several factors that determine cervical lymph node metastasis:**

1. **Site of the tumour**
2. **Size of the tumour: The incidence of nodal metastasis increases, with increased size of the tumour.**
3. **Stage: nodal metastasis is more in advanced (T3 & T4) lesions, than in early (TI & T2) lesions.**
4. **The histologic characteristics of the tumor, such as extracapsular spread in nodal metastases, angiolymphatic invasion, perineural spread, and a high histologic grade**
5. **Tumour differentiation: It is more with poorly, than with well differentiated tumours (according to Broders classification).**
6. **The incidence of nodal metastasis increases with cartilage invasion, extralaryngeal spread, and neural infiltration.**

- **Clinical picture:**

Symptoms

1. Hoarseness of voice which is progressive and unremitting.

- It is the earliest symptom in glottic tumours, and may presist as the only symptom for several months.
- Early in glottis carcinoma, late in supraglottic and subglottic carcinoma
- Supraglottic tumours produce a muffled voice rather than hoarseness.
- An important consideration is the cancer which develops in one who sufferes from chronic laryngitis, as they are at risk from delay in diagnosis, because they already have hoarseness of voice.
- Any patient presenting with hoarseness of voice for more than two weeks should be examined and investigated properly.

- May be due to ;
  - The slightest change in contour, thickness, or vibratory characteristics of the vocal cord will result in perceived changes in the voice.
  - Interference with mucosal vibration.
  - Invasion of vocalis muscle
  - Invasion of cricoarytenoid joint
  - Neural invasion

2.Dyspnoea and stridor due to airway obstruction.

- Most common in subglottic and may be the only symptoms. It occurs early in supraglottic tumours.
- Late symptoms as sequale of neglected dysphonia ,indicates advanced T
- It is due to enchroachement upon the airway by:
  - Large tumour
  - Fixation of the arytenoid or vocal cord.
  - Accumulated secretion and debris
  - Secondary odema
- Acute airway obstruction may be precipitated by :
  - Infection
  - Instrumentation

3. Pain (odynophagia & otalgia)

- Late symptoms
- More typical in supraglottic lesions
- Referred ear pain is particularly sinister and should always promote a high suspicious to cancer.
- If accentuated by swallowing may indicate invasion of deep structures e.g base of the tongue and/ or hypopharynx or invasion of laryngeal skeleton.
  - ➢ Sensation of discomfort in the throat on swallowing, complain of a foreign-body feeling in the throat may be an early symptom of supraglottic tumours.
  - ➢ Referred otalgia to the ipsilateral ear along the Arnold's branch of vagus.
  - ➢ Localized pain is rare, it may occur with supraglottic tumour, or may be due to perichondritis.

4.Cough and irritation in the throat :

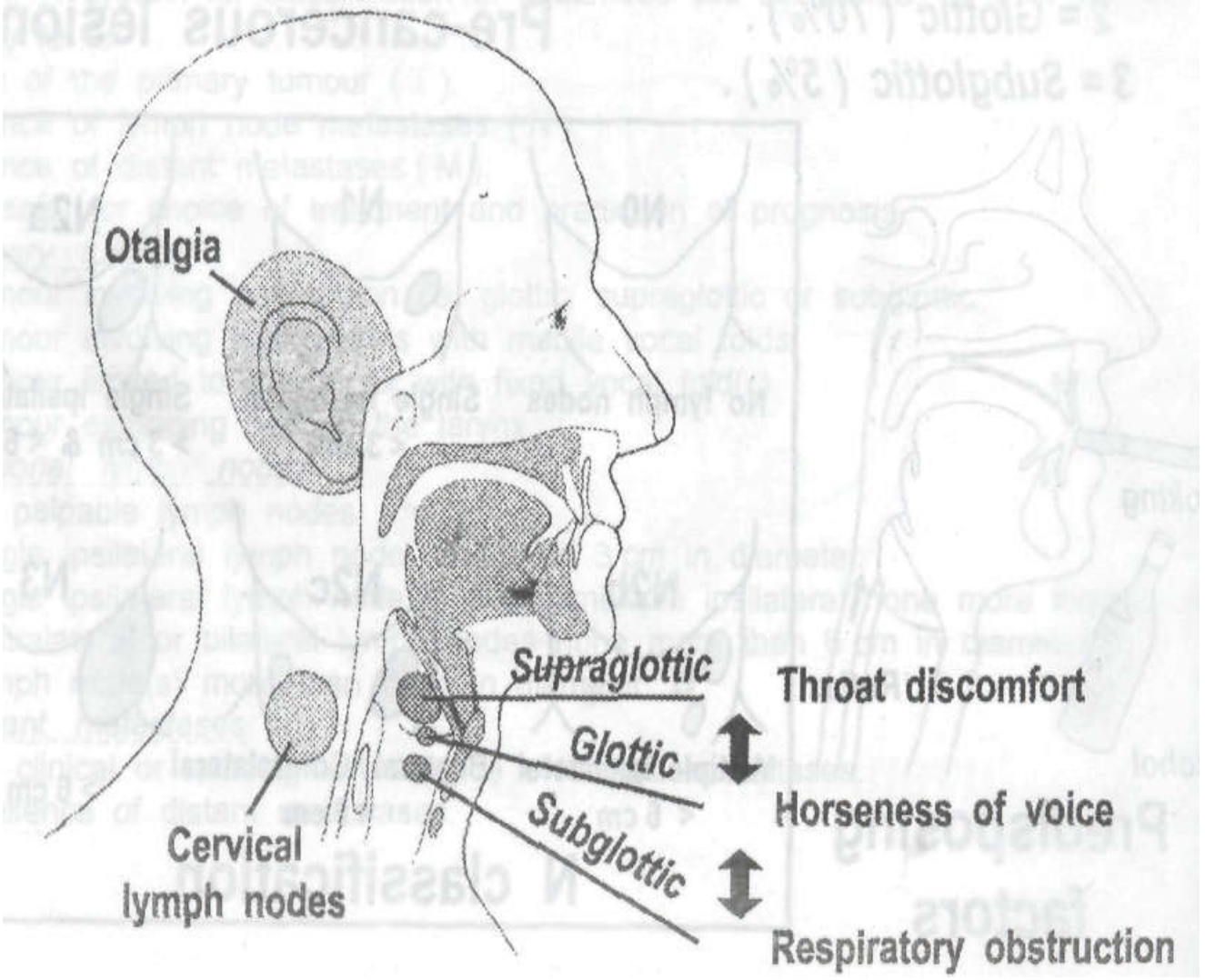
- May be the early non descriptive symptoms.
- Usually deveiops with supraglottic carcinoma due to involvement of the superior laryngeal nerve (especially in marginal zone)

5.Swelling (lump) in the neck or larynx mainly due to:

- Lymph node metastasis in the upper or middle cervical groups.
- It may be due to direct penetration of the tumour outside larynx invading thyroid cartilage and extralaryngeal spread.
- Perichondritis and abscess formation may give rise to painful, tender, oedematous swelling.

6.late symptoms:

- Dysphagia due to invasion of the hypopharynx.
- Haemoptysis :
  - Rare
  - Usually with large supraglottic carcinoma especially in lesion of margins of epiglottis.
- Anorexia and cachexia.
- Foetid breath.


Otalgia
Supraglottic
Glottic
Subglottic
Cervical
lymph nodes
Throat discomfort
Horseness of voice
Respiratory obstruction

Examination:

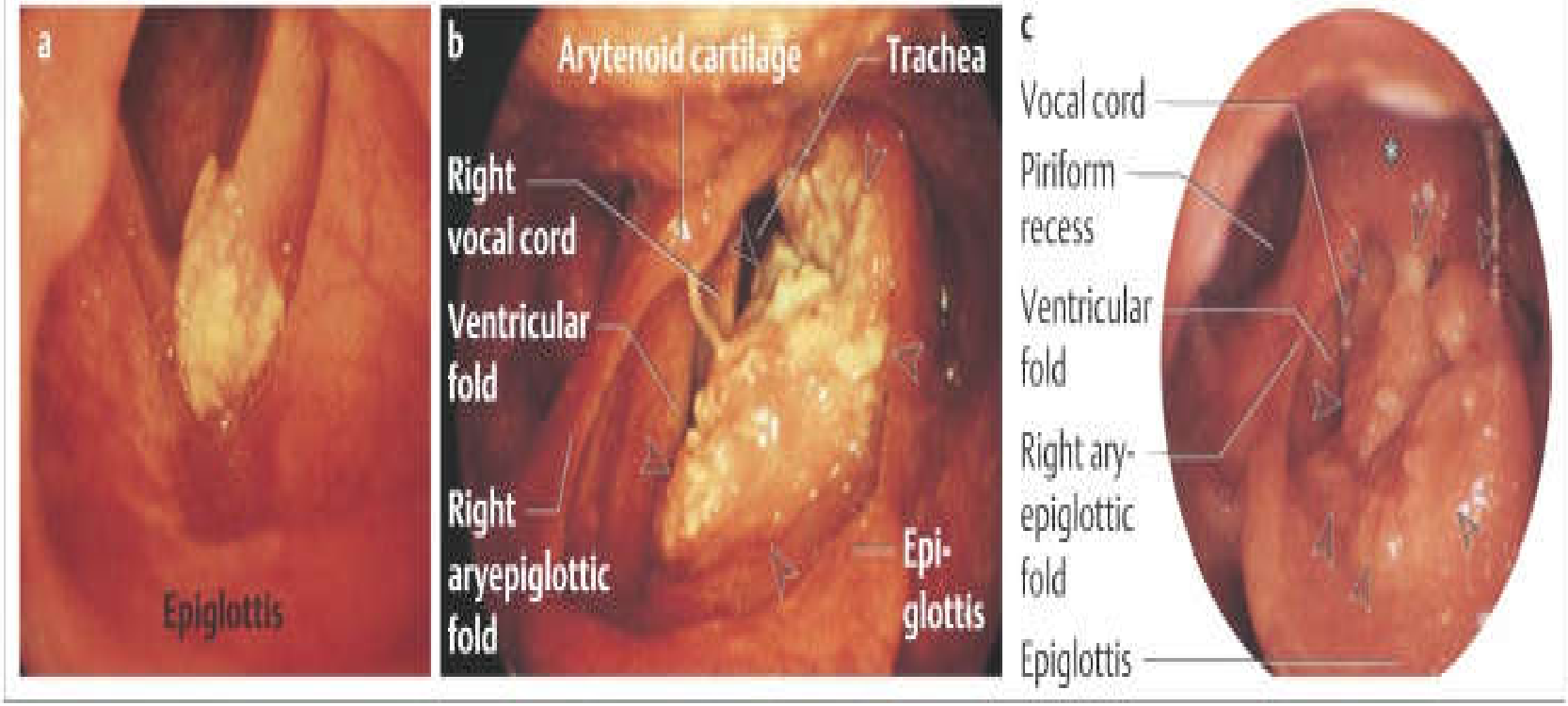
- General: Assess general condition
  - To assess the patient general condition
  - Chest examination
  - To detect possible distant metastasis
- Local :
  - The nose, oral cavity and the oropharynx must be examined to detect :
    - Possible second primary cancer.
    - Granulomatous disease.
    - Dental status for sepsis and oral hygiene must also be assess

- Neck:
  - Broadending of thyroid cartilage
  - Tenderness = perichondritis
  - Movement of lx: T extension
  - Click: post cricoid extension
  - Neck: Lymph nodes
- **Laryngeal Examination:**
  - Shows site, extension of the lesion in the larynx
  - Mobility of vocal cord
  - Shows extension to pharynx

Investigations

- General:
  - Assess general condition: ESR, CBC, ECG, DM, Liver
  - DD: serology syphilis, TB sputum
  - Chest x ray, pulmonary function test
  - Metastasis work-up
  - Chest X ray
  - Abdominal US
  - Bone scan

- Imaging:
  - Plain x ray lateral neck
  - Barium swallow: pharynx
  - CT: best study:
    - Tumor extension
    - Cartilage involvement LN
    - Carotid artery, jagular vein
  - Endoscopy: MLS
    - Assess tumor extension
    - Biopsy: confirm diagnosis, type of cancer, differentiation



a Glottic carcinoma involving the anterior third of the left vocal cord (T1a).

b Glottic–supraglottic carcinoma involving the left side of the larynx (T3; arrows).

c Supraglottic carcinoma (arrows) arising from the epiglottis. Note the edematous swelling of the arytenoid region on the affected side (*).

Diagnosis difficulities:

- **Negative biopsy**
- **Keratosis**
- **Previous radiation**
  - A low-grade perichondritis may prevent a larynx from returning to normal.
  - CT scan , another deep biopsy and close follow up are indicated PET is diagnostic
- **Hidden areas :**
  - Subglottic region, laryngeal surface of epiglottis , laryngeal ventricles
- **Miscellaneous conditions**
- such as chronic laryngitis, tuberculosis, syphilis and benign tumours may give rise to diagnostic confusion or difficulty so biosy is recommended

Classification: TNM

- Universal method for tumor classification
- Standardization
- Decision making
- Predict prognosis
- T: tumor grade: T1,2,3,4
- N: nodes: N1,2,3
- M: metastasis: M0,1
- Stage: combination of TNM, I, II, III, IV

Primary Tumor (T):

T_x	Primary tumor can't be assessed.
T_0	No evidence of primary tumor.
T_{is}	Carcinoma in situ.
T_1	Tumor limited to one site with normal vocal cord mobility.
T_2	Tumor extending to more than one site with normal vocal cord mobility.
T_3	Tumor limited to larynx with vocal cord fixation.
T_4	Tumor extending beyond the larynx.

N0 .		**clinically palpable nodesN0**
N1		**Single ipsilateral node 3 cm or less in diameter**.
N2		
	N2a	**Single ipsilateral node 3-6 cm in diameter**
	N2b	**Metastasis in multiple ipsilateral lymph nodes, none more than 6cm in greatest dimension**
	N2c	**bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension**
N3		**Single ipsilateral node one more than 6 cm in diarneter.** **Bilateral nodes.** **Contralateral nodes only.**

M	
M 0	No evidence of distant metastasis.
M 1.	Tumour with distant metastasis.

E 27-2. UICC TNM STAGING AND STAGE GROUPINGS FOR LARYNGEAL CARCINOMA[6]

Supraglottis

T_1	Tumor limited to one subsite of supraglottis with normal vocal cord mobility
T_2	Tumor invades mucosa of more than one adjacent region outside the supraglottis (eg, mucosa of base of tongue, vallecula, medial wall of piriform sinus) without fixation of the larynx
T_3	*Tumor limited to larynx with vocal cord fixation and/or invades any of the following: postcricoid* area, pre-epiglottic tissue, deep base of tongue
T_4	Tumor invades through thyroid cartilage and/or extends into soft tissue of the neck, thyroid and/or esophagus

Glottis

T_1	Tumor limited to vocal cord(s) (may involve anterior or posterior commisure) with normal mobility
T_{1a}	Tumor limited to one vocal cord
T_{1b}	*Tumor involves both vocal cords*
T_2	Tumor extends to supraglottis and/or subglottis and/or with impaired vocal cord mobility
T_3	Tumor limited to larynx with vocal cord fixation
T_4	Tumor invades through thyroid cartilage and/or extends to other tissue beyond the larynx— eg, trachea, soft tissue of the neck, thyroid, pharynx

Subglottis

T_1	Tumor *limited to subglottis*
T_2	Tumor extends to vocal cord(s) with normal or impaired mobility
T_3	Tumor limited to larynx with vocal cord fixation
T_4	Tumor invades through cricoid or thyroid cartilage and/or extends into other tissue beyond the larynx—eg, trachea, soft tissue of the neck, thyroid, esophagus

N stage

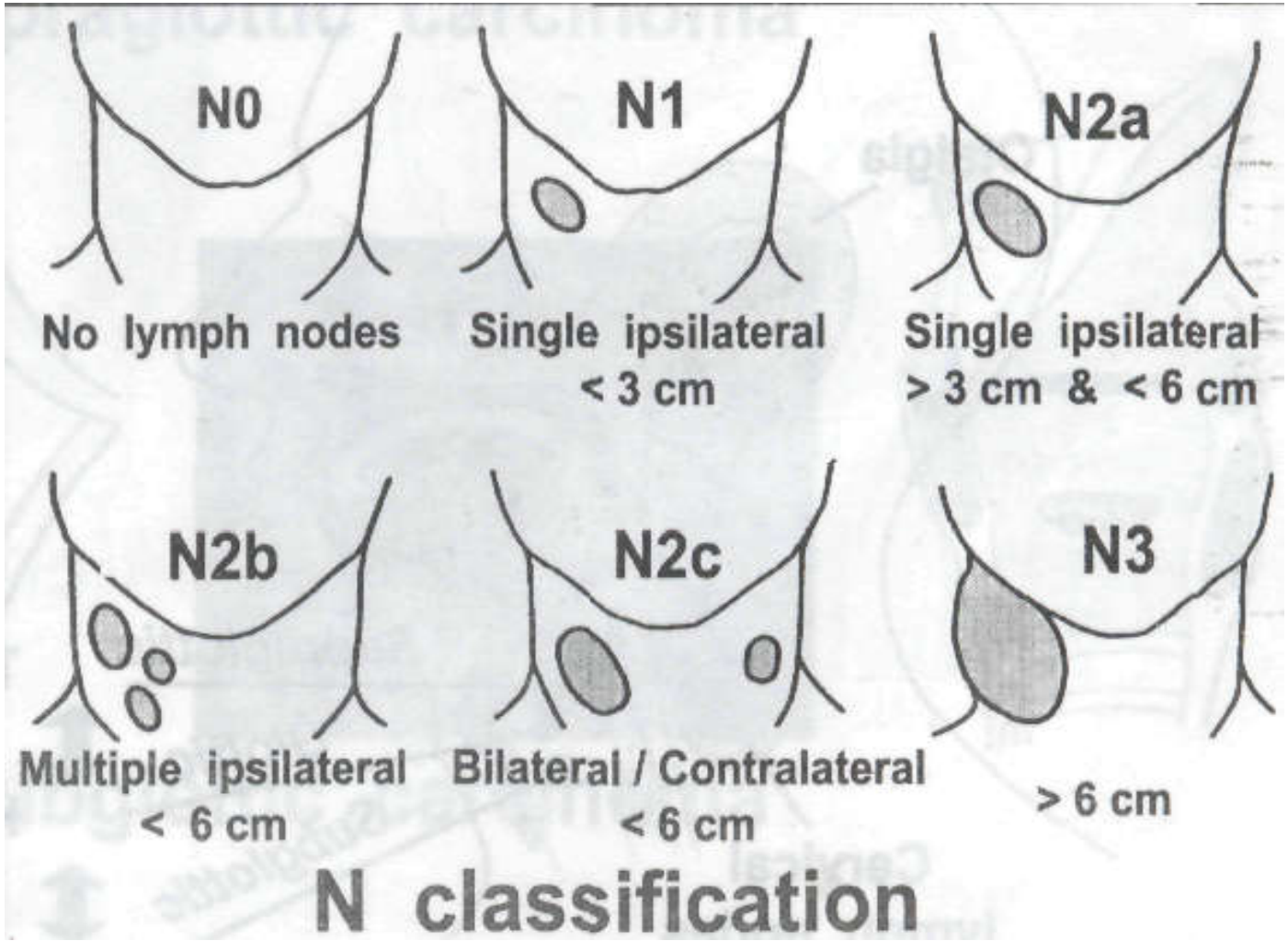
N_x	Regional lymph nodes cannot be assessed
N_0	No regional metastases
N_1	Metastases in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N_{2a}	Metastases in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension
N_{2b}	Metastases in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N_{2c}	Metastases in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N_3	Metastases in a lymph node more than 6 cm in greatest dimension

M stage

M_x	*Distant metastases cannot be assessed*
M_0	No distant metastases
M_1	Distant metastases

Stage groupings

Stage 0	Tis	N_0	M_0
Stage I	T_1	N_0	M_0
Stage II	T_2	N_0	M_0
Stage III	T_1, T_2	N_1	M_0
	T_3	N_0, N_1	M_0
Stage IVA	T_4	N_0, N_1	M_0
	Any T	N_2	M_0
Stage IVB	Any T	N_3	M_0
Stage IVC	Any T	Any N	M_1


N0
No lymph nodes
N1
Single ipsilateral
< 3 cm
N2a
Single ipsilateral
> 3 cm & < 6 cm
N2b
Multiple ipsilateral
< 6 cm
N2c
Bilateral / Contralateral
< 6 cm
N3
> 6 cm
N classification

- **Treatment**
  - **CA larynx potentially curable disease**
    - ✓ **Early diagnosis**
    - ✓ **Proper assessment**
  - **Aim:**
    - **Locoregional control**
    - **Distant control**
    - **Rehabilitation**
  - **Treatment modalities:**
    - **Curative:**
      - ❖ **Surgical/laser**
      - ❖ **Radiotherapy**
      - ❖ **Combination**
    - **Rehabilitation:**
    - **Palliative: inoperable disease**
      - ❖ **Distant metastasis**
      - ❖ **Advanced local disease**
      - ❖ **Poor general condition**

Surgical Treatment

- **Early glottic T:**
  - Cordectomy, partial vertical laryngectomy
    - T1 lesion, one vocal cord, mobile, not reaching anterior commissurel or arytenoid
  - Laser
  - Radiotherapy: better voice
- **Early supraglottic T:**
  - Supraglottic: horizontal partial laryngectomy:
    - Localized supraglottic lesions, normal cord mobility

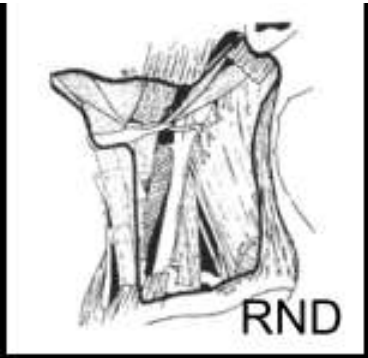
- **Advantages of partial resections:**
  - **Preservation of the larynx: voice**
  - **No permanent tracheostomy**
  - **Better QOL**
- **Disadvantages of partial resections:**
  - **Prolonged hospitalization**
  - **High rate of recurrence**
  - **Strict follow up is mandatory**
  - **Pulmonary complication: aspiration: Horizontal**
  - **Difficult technically: need training**

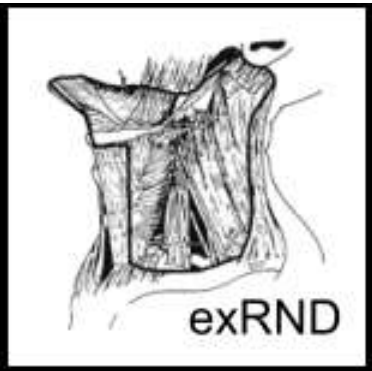
- **Late CA LX: Total laryngectomy**
  - **Indications:**
    - Cord fixation
    - Large tumors + extralaryngeal
    - Cartilage involved
    - Recurrent after RTH
  - **Advantages of total resections:**
    - Radical surgery gives better cure?????
  - **Disadvantages of total resections:**
    - Loss of voice
    - Permanent tracheostomy
    - QOL: Limited activities: swimming, inability to increase intra-thoracic pressure

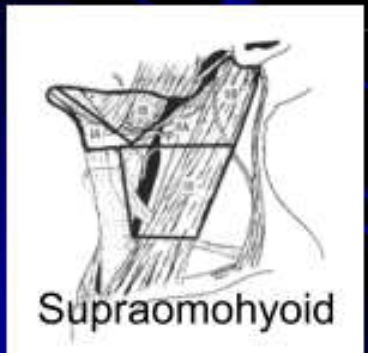
Neck dissection

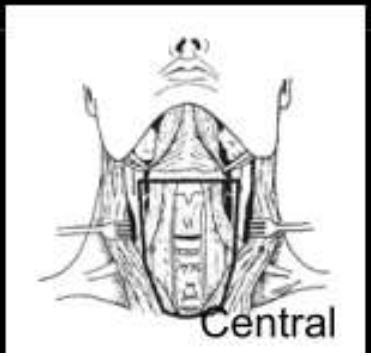
- **Indications:**
  - Lymph nodes present: curative neck dissection
  - Lymph nodes suspected: supraglottic
  - Elective/Prophylactic neck dissection
- **Radical Neck dissection:**
  - En-bloc dissection with laryngectomy
    - LN
    - SCM muscle
    - Accessory nerve
    - Jagular vein
  - Modified: functional: only LN are removed

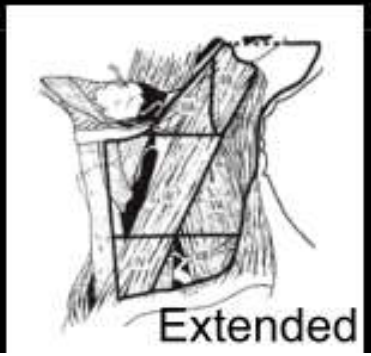
Types of neck dissection











TYPES OF LARYNGECTOMIES

1.Function-preservation laryngectomy:

- In conservation laryngeal surgery:
  - a. part of larynx remains
  - b. no permanent tracheostomy
  - c. patient can phonate
- Types of conservation laryngeal surgery:

1- For supraglottic cancer:

supraglottic (horizontal) laryngectomy

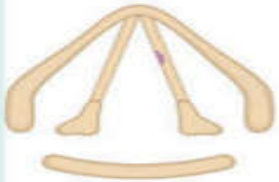
2-For glottic cancer:

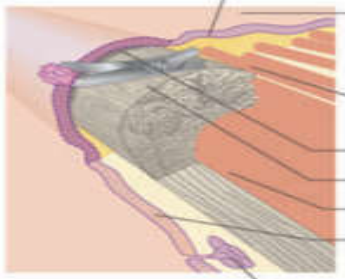
a. cordectomy (microlarynx or laser)

b. hemilaryngectomy (vertical)

17.12 Surgical treatment options for laryngeal carcinoma *(continuation)*

a Vocal cord stripping





Epithelium of Morgagni's pouch: respiratory columnar ciliated epithelium

Stratified squamous epithelium

Thyroarytenoid muscle, lateral part

Reinke's space

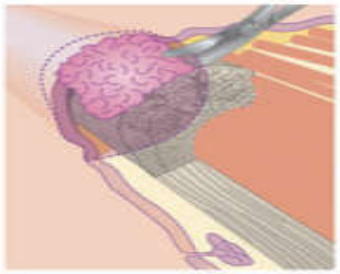
Vocal ligament

Vocalis muscle

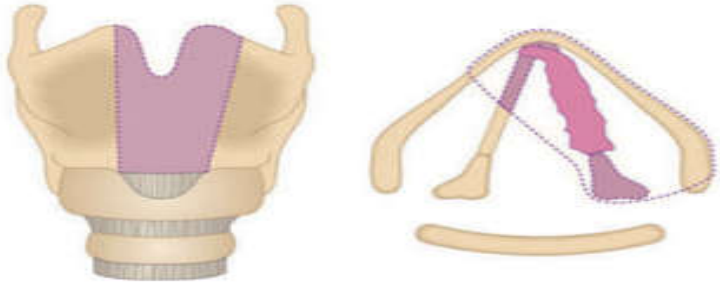
Subglottic epithelial covering: respiratory columnar ciliated epithelium

Mucous gland

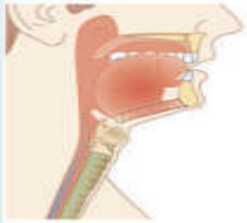
b Excision of vocal cord



c More extensive partial laryngectomy



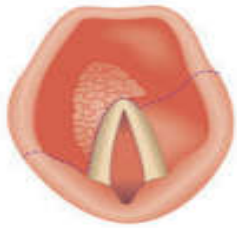
d Laryngectomy

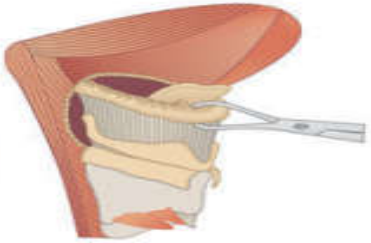


Before laryngectomy

After laryngectomy

e Horizontal partial laryngectomy





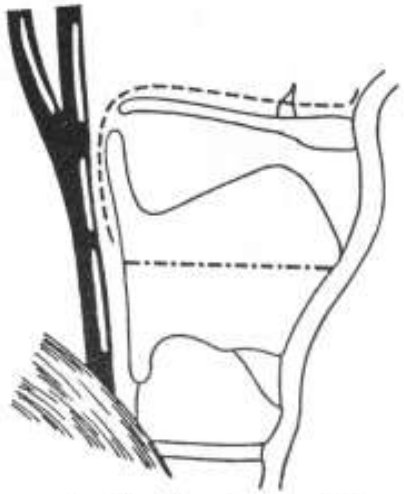
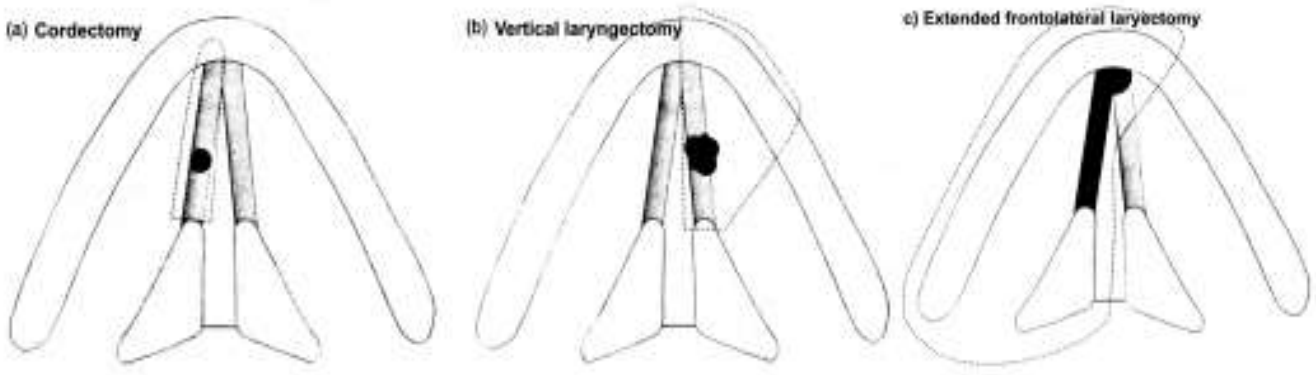
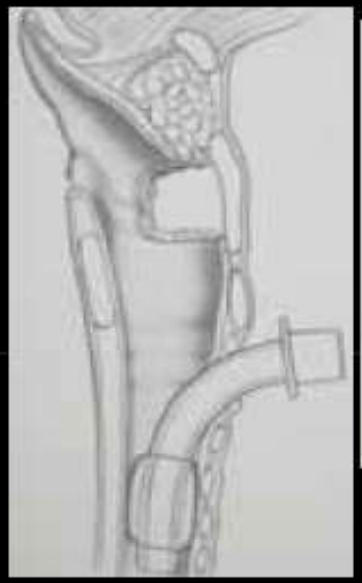
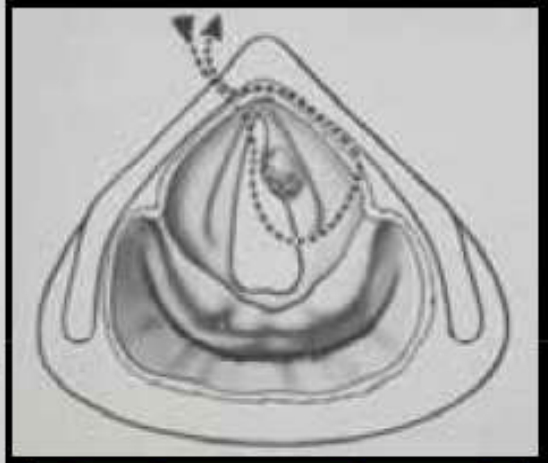


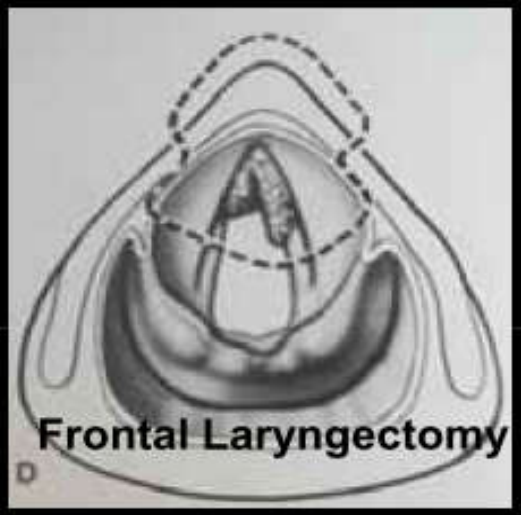
Fig. 25. Supraglottic (horizontal) laryngectomy



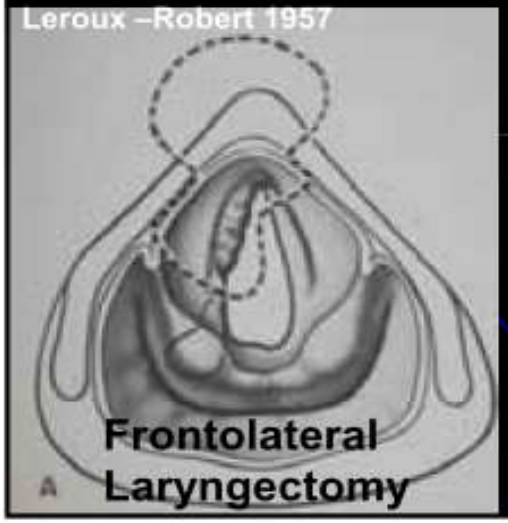


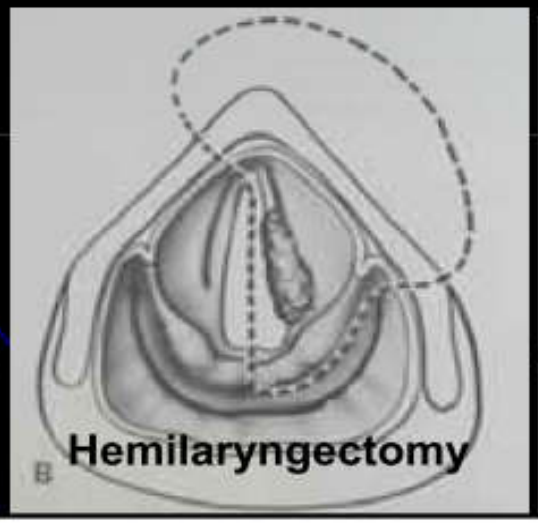


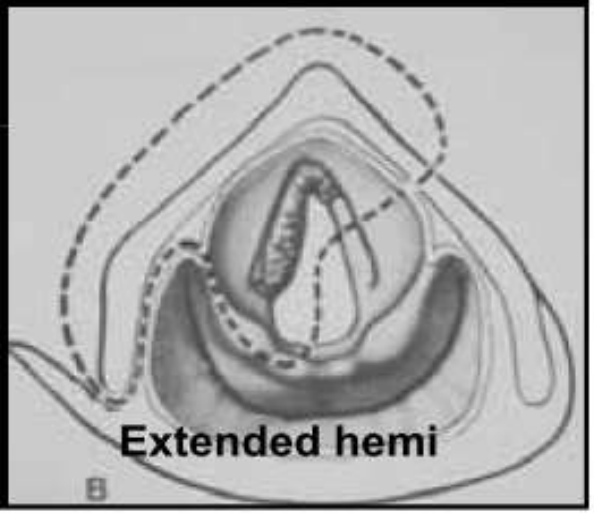
Cordectomy through Laryngofissure



Leroux –Robert 1957







2.Radical surgery (Total laryngectomy):

- In total laryngectomy:

  a. All larynx is removed

  b. There is a permanent tracheostomy

  c. Patient can not phonate unless voice restoration is done.

Radiotherapy

- **Dose:**
  - **Cobalt 60 or linear acceleration/ 5500-7000 rad/ fractionated on 5 session per week. Each session is 300-500 rad**
- **Indications:**
  - **Early tumors with mobile cord**
  - **When surgery is contraindicated**
  - **Recurrence after surgery**
  - **Non-resectable LN**
- **Contraindications:**
  - **Large tumors with fixed cord**
  - **Cervical LN**
  - **Cartilage involved**

- **Complications:**
  - **Skin coloration**
  - **Laryngeal edema**
  - **Xerostomia**
  - **Anorexia, malaise**
  - **Radio-perichondritis**
- **Disadvantages:**
  - **Prolonged treatment**
  - **Follow up for residual or recurrent tumor is difficult because of edema**
  - **Radiotherapy can not be repeated**

Rehabilitation

- **Partial laryngectomy:**
  - **Voice therapy**
- **Total laryngectomy:**
  - **Physiological methods: Esophageal speech**
  - **Surgical methods: Tracheo-esophageal valve**
  - **Artificial methods: electrolarynx.**

Palliative Treatment

- **Indications:**
  - Fixed local disease
  - Distant metastasis
- **Surgery:**
  - Tracheostomy for airway
  - Gastrostomy for feeding
  - Palliative excision for fungating tumors
- **Irradiation/chemotherapy:**
  - To avoid fungation
  - Relieve pain

- **Medical:**
  - **Antibiotics for infection**
  - **Pain control**

Prognosis

- Glottic good prognosis
  - Early symptoms
  - No lymphatic
  - 5 year survival 85-90%
- Late cases: worse prognosis
  - T4: 30% 5 year survival